Canon as Cartella

Using Earlier Templates for Contemporary Pipe Organ Works

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Contents

Declaration of Authorship

I, John Henry Forster, confirm that this thesis and composition portfolio are my own work. Where other authors and composers have been cited, they are credited in the text.

Abstract

How can elements from late Renaissance and Baroque organ repertoire be used as critical and narrative devices in contemporary composition to explore the formation and perception of canon and instrument?

Organists are familiar with retrospective pieces, from J. S. Bach's arrangements of Antonio Vivaldi's concertos, to Franz Liszt's *Fantasy and Fugue on the Theme B-A-C-H*, and Sigfrid Karg-Elert's *Homage to Handel*. The motivations for looking back vary, whether celebratory, didactic, parodic, or any number of other reasons. This thesis presents a compositional approach that capitalizes on the significance of earlier music and composers as cultural artefacts, and details how a set of procedures were developed to defamiliarize historic work-templates in order to explore aspects of the pipe organ and its associated musicking that can be taken for granted. These procedures operate at four levels: the structural organization of pipe organ sound with expanded counterpoint, the construction of performative scenarios presenting different iterations of that sound, the interrelation of elements mediated by those performances, and the sense of function, purpose, and ends arising from the mediations. Taken together, they enable the listener to get beneath the surface of the work-templates and what they embody to uncover old linkages—and make new ones—between creative traditions, communities of practice, and sounding bodies.

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Portfolio Projects

Orgelwerke (2021), 40′

Sixteen-channel installation using

custom loudspeakers and control module

Manual Works (2022), 25′

Box organ and four-channel live electronics

Passacaglias for Organ (2023), 55′

Fixed media for static multichannel diffusion

Organ Concerto (after Handel) (2023), 25′

Solo pipe organ

Clock Sync (2024), 10′

Automated hyperorgan

Glossary

Musically, the word 'organ' can refer to many things. Prefixes like 'pipe', 'church', or 'electronic' are often added, but these do not always clarify meaning. For example, the Willis organ at Liverpool Anglican Cathedral and the Wurlitzer organ at Blackpool Tower are both pipe organs, but their sound and context are quite different; Hammond organs and Silbermann organs can both be church organs, but each belongs to a distinct musical tradition; and the Continental range manufactured by Vox in the last century is as electronic as the organs made by Allen today, yet the former uses analogue synthesis to produce idiosyncratic sounds, while the latter uses digital synthesis to emulate pre-existing ones.

Without any prefix, 'organ' is usually taken to mean a pipe organ, with deviations from this being the ones requiring clarification. The *Grove Music Online* entry begins:

> A wind instrument consisting of one or more scale-like rows of individual pipes of graded size which are made to sound by air under pressure directed from a wind-raising device and admitted to the pipes by means of valves operated from a keyboard. Although this definition could include such instruments as the Regals, Portative, Positive and Claviorgan, this article is concerned with the larger organ proper.[1]

Like the *Grove* article, this doctorate is concerned mainly with the larger organ proper, i.e. the type of substantial acoustic instrument found in a church or concert hall. But it is also about the sound associated with pipe organs, how this can be produced, and the manner in which it is apprehended, and subsequent chapters will discuss pipe organ sound that is diffused through loudspeakers (whether sampled, synthesized, or processed live from an acoustic source) as well as its connotations. This can lead to further terminological issues with phrases like 'digital organ', 'electronic organ', and 'organ and electronics'. Where the word 'organ' appears alone in the text of the following chapters, it should be read as a synonym for 'pipe organ' unless stated otherwise, and for convenience, a glossary of specific terms I use is provided below.

[1] Barbara Owen, Peter Williams, and Stephen Bicknell, 'Organ', *Grove Music Online* (2001), https://doi.org/10.1093/gmo/9781561592630.article.44010, accessed 15/09/21.

Box Organ

Also called chest or continuo organs, they have a single manual, few stops, no pedals, and are characterized by being small and moveable—typically on wheels. As the name suggests, they are differentiated from their other diminutive cousins, like chamber, portative, or positive organs, by containing pipework inside a compact box which rarely extends above the keyboard.

Hyperorgan[2]

A technologically advanced pipe organ usually including some combination of enhanced action (e.g. interlinked tracker and electric, or 3D keyboards with full touch sensitivity), dynamic wind control, permanent internal microphones, permanent loudspeakers, MIDI and OSC functionality, or other additional components not present on a typical pipe organ.

Loudspeaker Organ

An instrument that generates pipe organ sound electronically, either analogue or digital, to be diffused through loudspeakers. Analogue methods include tonewheels popularized by early Hammond organs, electrostatic disks as used by the John Compton Organ Company, or electronic audio oscillators and filters. Digital loudspeaker organs use physical modelling, sampling, or a combination of both, and are available as standalone units or computer software, with some pipe organs also including digital stops due to spatial or financial constraints.

Pipe Organ and Electronics

A catch-all term for organ performance formats that include fixed media, tape, live digital signal processing, or other electroacoustic elements. It does not refer to loudspeaker organs that simply produce pipe organ sound through analogue or digital means.

[2] For a full explanation of hyperorgans, see Randall Harlow, 'Hyperorgan Part 1: Reinventing the Wondrous Machine', 'Hyperorgan Part 2: Fostering New Organ Communities', and 'Hyperorgan Part 3: Cultivating New Organ Art', *The American Organist Magazine* (April, May, and June 2024), pp. 2-8 in each.

Three Centuries, Three Countries

There is an allure to J. S. Bach's pipe organs. Which ones did he play? What did he think of them? And how do they sound now? Documentary evidence exists, but although a substantial number of instruments have a connection to Bach, only seven of his own inspection reports survive.[1] This has not deterred speculation, and instruments for which there is only tangential evidence of approval are liable to be elevated above their peers. Akin to the idealized concert hall performance of a Beethoven symphony, there exists an idealized performance of J. S. Bach's organ music: played on a verified (and favoured) pipe organ, with appropriate registration, and using historically aware technique.

In 1928, the Parisian organist and composer, Louis Vierne, made phonograph recordings of four J. S. Bach organ works on the 1868 Aristide Cavaillé-Coll at Notre-Dame Cathedral.[2, 3, 4] Vierne was one of the leading organists of his day, and Cavaillé-Coll one of the leading organ builders, but the recordings bear little resemblance to the aforementioned hypothetical ideal of how a Bach performance ought to sound. Vierne and Cavaillé-Coll are as closely associated with the French Romantic Organ School as J. S. Bach was with the North German Baroque School, and so hearing this collision of worlds gives a twist to the concept of historically informed performance. When playing Bach at Notre-Dame, should the modern performer consider how Bach might have played, imitate Vierne's approach, or neither?[5]

Today, it is not uncommon for virtuosos to use portable loudspeaker organs when on tour. Pioneered by the American recitalist Virgil Fox, the practice has continued with contemporary organists like Cameron Carpenter. Having their own personalized and versatile organ to take to

[1] Christoph Wolff and Markus Zepf, *The Organs of J. S. Bach: A Handbook* (University of Illinois Press, 2012), pp. 139–148.
[2] Rollin Smith, *Louis Vierne: Organist of Notre-Dame Cathedral* (Pendragon Press, 2009), pp. 504–515.
[3] Rollin Smith, 'Vierne on Record', *The American Organist* (Vol. 54/10, 2020), pp. 38–46.
[4] Louis Vierne, *Louis Vierne aux Grandes Orgues de Notre-Dame de Paris (Mono Version)* (BNF Collection, 2013) [Digital Album], https://open.spotify.com/album/6uU37FUPsejGrXJ10sGLZ2, accessed 29/11/21.
[5] For one solution, see Olivier Latry, *Bach to the Future* (La Dolce Volta, 2019) [CD]; re-released as *Bach to Notre-Dame* (La Dolce Volta, 2024) [CD].

concerts ensures that the performer will always have the 'right' sounds for the right music, but there is a problematic side-effect. Reusing the same sampled or synthesized stops at different venues runs contrary to the individuality of pipe organs and their symbiosis with the spaces they inhabit. This removes a defining characteristic of what it means to listen to pipe organ music—the uniqueness of each instrument and performance—and can diminish the listening experience.

Time, Site, and Place: Meanings

Every pipe organ has a unique sonic identity, and a trained ear can discern an instrument's provenance, actual or imitative, down to the country and century—even the region and decade. Repertoire can also be located in this way, with terms like French Romantic School, North German Baroque School, and English Virginalist School describing communities of practice familiar to most organists. The above examples illustrate how this locatedness is manifested via time, site, and place, and how the three are interrelated. It also hints at the bond between instrument and music, and how one can develop in tandem with the other.

The difference between musical site-specificity and place-specificity is highlighted by Morag J. Grant, who defines the former as being primarily acoustic in nature, the latter sociological. Drawing on the work of Manuel Castells and Marc Augé to distinguish between place and non-place, Grant observes 'a "place" is marked by a strong connection to (personal) history, belonging, rootedness, and what in English would be called "local colour". "Non-places", logically, are lacking in this.'[6] Grant uses Carlo Inderhees' *3 Jahre—156 musikalische Ereignisse* premiered at the Zionskirche in Berlin as an example of place-specific music, and is concerned with the Wandelweiser Group in particular, but the broader concept of how musical place-specificity arises through repetition is applicable to the communities of practice that evolved with the pipe organ, too. For example, the 'northern Germany' of the North German Baroque

[6] Morag J. Grant, 'Series and Place', *Contemporary Music Review* (Vol. 30, 2011), pp. 524-542.

Organ School is geographically vague, but the churches and courts in which said musicking took place are conceptually place-specific.

'Site-specific' is a widely used term, and in this context refers to the relationship between pipe organs and the buildings for which they are constructed. This relationship is not incidental, as everything from the size and disposition to the tonal qualities of a pipe organ are devised with the properties of the performance space in mind. The site-specificity of pipe organs is sometimes viewed as an obstacle, and organists are often faced with the dilemma of how best to perform music intended for another type of pipe organ on whatever they happen to find themselves playing. Alternatively, this dilemma can be treated as an opportunity, opening up interpretative possibilities and shedding light on aspects of the music that might otherwise remain hidden.[7]

As for temporality, the pipe organ has been called 'a mirror of its time', reflecting the social, political, and economic tides of the day.[8] Once in situ, a pipe organ occupies a finite window of modernity, after which it becomes historic, and its sound, appearance, and mechanism belong to another era. While pipe organs must be overhauled periodically to maintain functionality, care is usually taken to preserve as much as possible of finer instruments, especially the casework and pipework, to retain its overall character and avoid travelling too far on the Ship of Theseus. All pipe organs age: it is a case of when, not if.

The locatedness of pipe organs in time, site, and place is not necessarily static, however. An ancient chapel might commission a cutting-edge instrument from an overseas builder, while a modern cosmopolitan concert hall might opt for an historic replica made in the neighbouring town. This reality has implications for composers. Like the performer's dilemma mentioned above, the prospect of creating works for an instrument so intrinsically bound to a locatedness that can also be dynamic has prompted contrasting responses. In the twentieth century, for example, David Tudor and Arnold Schoenberg both expressed dissatisfaction with the pipe organ:

[7] Hans Fidom, 'Rethinking Organ Music: The Listener's Perspective', *The Organ Yearbook* (Vol. 44, 2015).
[8] Kerala Snyder (ed.), *The Organ as A Mirror of Its Time* (OUP, 2002).

> If, for instance, once wishes to do something for contemporary music, one must acknowledge the fact that the organ by its indirectness, lack of vitality and dated grandiose character is inadequate for the expression of the extremely complex dynamic and rhythmic inflection of our new music. Then also there is such a poor audience for organ playing—limited in every respect; any music worth listening to should reach the people of the world in large numbers.[9]

It seems odd that Tudor, himself first an organist prior to studying with Irma and Stefan Wolpe, rejected the pipe organ because of its 'poor audience', when it has many regular listeners in the form of congregations. Perhaps he is implying either that worshippers do not count because they are a captive audience with much of the music they hear being liturgically functional, and so an audience present solely to appreciate art music for its own sake would be preferable; or that he feels organ recitals are poorly attended and underappreciated, so there is little point in writing for the instrument. Schoenberg was similarly pessimistic, though for a different reason:

> If one did not remember the splendid organ literature and the wonderful effect of this music in churches, one would have to say that the organ is an obsolete instrument today. No one—no musician and no layman—needs so many colours (in other words, so many registers) as the organ has.[10]

But where some saw an obstacle, others saw an opportunity. The Radio Bremen concert of 1962, featuring György Ligeti's *Volumina*, Mauricio Kagel's *Improvisation Ajoutée*, and Bengt Hambraeus' *Interferenzen*, showcased novel ways to compose for the pipe organ, and the concert and its aftermath was a watershed moment. The positions adopted by Schoenberg and Tudor were antithetical to those of Ligeti and Kagel: where Schoenberg heard an obsolete instrument with timbral superfluity, Ligeti heard untapped sound potential; where Tudor saw something dated and grandiose, Kagel saw an opportunity for critique and subversion. It was Bengt Hambreus, however, who arguably catalysed this rehabilitation of the pipe organ with his *Constellations I* (1958), *II* (1959), and *III* (1961). Performed at Darmstadt in 1959, *Constellations I*

[9] Austin Clarkson, 'David Tudor's Apprenticeship: The Years with Irma and Stefan Wolpe', *Leonardo Music Journal* (Vol. 14, 2004), p. 5.
[10] Glenn E. Watkins, 'Schoenberg and the Organ', *Perspectives of New Music* (Vol. 4, 1965), p. 119.

inspired Ligeti's Volumina, *Constellations II* comprised taped sections of *Constellations I* mixed with electronic sound, and *Constellations III* for live pipe organ and two-track tape has been identified the earliest piece for pipe organ and electronics.[11]

Time, Site, and Place: Premises

With a few notable exceptions, the pipe organ was comparatively neglected by the avant-garde last century, but it has become increasingly popular among contemporary composers, a recurring theme being how to meaningfully engage with an instrument that comes with so much baggage. Far from a hindrance, this baggage can be an inspiration, pointing toward creative pathways that deepen our knowledge of the pipe organ and enrich our comprehension of its sound.

Time (when do pipe organs sound)

Organ pipes embody the sound of the moment, freezing in time what previous generations considered timbrally desirable. Unless explicitly writing for a recent instrument in a modern style, organ composition is a form of dialogue with the past, as every time an historic pipe speaks, its makers and society speak through it.[12] Allowing these voices to be an equal partner in the dialogue can create unexpected room for expression, helping us to grasp what it means to work with sounds that are centuries old, as well as our own position on the sonic timeline.

Site (what do pipe organs sound)

Like atoms, pipe organs are mostly empty space: the internal space of the organ pipes, the intermedial space of the organ case, and the external space of the building. When an organ pipe speaks, its sound travels outward through each space, from pipe to case

[11] Heike S. Burghart Rice, 'Music for Organ and Electronics: Repertory, Notation, and Performance Practice', DMA Submission (University of Cincinnati, 2015).
[12] Peter Peters, 'Crafting Baroque Sound: How the Making of Organ Pipes Matters Artistically', in Henk Borgdorff, Peter Peters, and Trevor Pinch (eds.), *Dialogues Between Artistic Research and Science and Technology Studies* (Routledge, 2019), pp. 125-136.

to building. Rarely do people experience the pipe organ's internal or intermedial spaces, however, and tend only to encounter its sound externally. Greater listener awareness of all three spaces can help emphasize the contingency of one upon the other, and, in turn, the complicated site-specificity of pipe organs.

Place (where do pipe organs sound)

Pipe organs do not exist in isolation, but are intimately linked to the organ builders, organists, and composers who work with them, and with the audiences that listen. These relationships are reciprocal, and from them arise the 'local colour' distinguishing particular schools of organ building and composition. To write music for a pipe organ is to become, for a span, part of an established community of practice, and to interact by proxy with the other individuals that have shaped its identity.

These premises are points of departure, not conclusions, intended to set the stage for the composition projects in the following chapters rather than being defensible arguments identifying constituent properties of pipe organ works. The destination is a music which does not take locatedness for granted, but which delves into its implications, and the journey involves the defamiliarization of historic compositions that act as reference points along the way. To condense the above premises into a single proposition: beyond passively accepting the inherent locatedness of pipe organs, how can it be actively explored through music, and what compositional procedures might be deployed to achieve this? This proposition is central to my doctorate, which demonstrates and describes a range of responses.

Time, Site, and Place: Questions

To guide these responses, four primary research questions were derived from John Tresch and Emily I. Dolan's four organological axes (after Foucault), which analyse the agency and ethics of instruments. These questions pertain to all five projects, mapping onto time, site, place, and locatedness, and act as a unifying framework across a stylistically diverse portfolio:

1) Material Disposition (Time)[13]

How can contrapuntal techniques be developed in a contemporary context to achieve expanded goals, like spotlighting the mechanical formalism and functioning of the pipe organ, and how can musical form and structure be used to sound out the material form and structure of the instrument itself? Just as pipe organs can be dated by their casework and pipework, so too can music by the nature of its composition. The temporality of pipe organs is complex, however, and revitalizing archaic techniques can be a way to facilitate the 'dialogue with the past' mentioned above.

2) Mode of Mediation (Site)

In what ways do different presentations of pipe organ sound affect apprehension of the instrument, e.g. how do human, automated, and semi-automated performances using acoustic, electronic, and electroacoustic sound shape listener perception of pipe organ agency? This mediation is technological, and refers to the physical means by which organ sound reaches our ears.

3) Map of Mediations (Place)

What can the use of historic pipe organ compositions as templates reveal about the interconnectivity of canon, instrument, and people, and how these linkages are embedded within pipe organ culture? This mediation is socio-historical, referring to the established repertoire's evolution and its effect on the reception of contemporary organ works today.

4) Telos (Locatedness)

In what ways can the techniques and procedures issuing from the previous questions be leveraged to expose interrelations between the objective properties of time, site, and place, and the subjective reactions to them through which a sense of function, purpose,

[13] See Chapter Two for further details about Tresch and Dolan's axes, along with a fuller discussion on expanded versions of the research questions.

and ends arise? This final question is overarching, designed to frame the application of these compositional techniques and procedures by establishing thematic lines of enquiry for each chapter.

In the following chapter, I contextualize the above premises and research questions by reviewing relevant literature, then surveying five recent organ works that have influenced my own thinking. In Chapter Two, I explain my compositional rationale and lay out the methodology supporting the music. The projects themselves are documented across three chapters: two projects in Chapter Three, one project in Chapter Four, and two projects in Chapter Five. Chapter Six draws together the various strands running through these projects, offering some final insights and conclusions.

* * *

Returning to Bach's pipe organs, there are perhaps two ways to interpret our ongoing fascination with them. The first is that it feeds into a simple fantasy about the prospect of being closer to the man and his music. If we visit the same church and listen to the same pipes in the same acoustic making the same sounds, then maybe we will experience the same sense impressions as he did. Setting aside the subtleties of the listening experience, from the unobtainability of the period ear to the subjectivity of ontological thickening, what happens if it is later discover that the supposed Bach connection of the pipe organ to which we are listening is spurious?[14, 15, 16] The second interpretation is deeper, and fuelled by a desire to catch a glimpse of the familiarized canon's once radical nature. The projects detailed below embrace this second interpretation, but do not provide definitive solutions to musicological problems. Instead, they seek to understand where the pipe organ resides in time, site, and place, and tease out how this dynamic locatedness correlates with composition past and present.

[14] Or even that the building itself has changed; see Braxton B. Boren, 'Acoustic Simulation of J.S. Bach's Thomaskirche in 1723 and 1539', *Acta Acustica* (Vol. 5, 2021).
[15] Shai Burstyn, 'In Quest of the Period Ear', *Early Music* (Vol. 25, 1997), pp. 692-697, 699-701.
[16] Stephen Davies, 'The Ontology of Musical Works and the Authenticity of their Performances', *Noûs* (Vol. 25, 1991), pp. 21-41.

Chapter One
Locatedness

I stated in the Introduction that my objective is music which does not take the pipe organ's locatedness for granted, and this chapter will situate this objective within topical research and practice. To organists and organ builders, the relevance of a pipe organ's locatedness is intuitively self-evident, and since the last century, there has been a growing effort to systematically investigate the influence of locatedness on pipe organ culture past and present. In **1.1**, I outline how locatedness emerged as a pipe organ research trend, referencing selected theorists, institutions, and artistic events that have played a leading role, and in **1.2**, I provide an overview of pertinent practice-based literature. Since the early 2000s, the pipe organ has steadily gained avant-garde popularity, and in **1.3**, I identify five recent pipe organ works that delve into the implications of locatedness, and which have informed my own approach.

1.1 Locatedness as a Research Trend

Published in 1980, Peter Williams' *A New History of the Organ from the Greeks to the Present Day* was the first comprehensive account of the instrument, and it helped set the tone and direction of modern pipe organ scholarship.[1] Reinhard Strohm was a pivotal figure in paving the way for a new sort of early musicology with his seminal monograph, *Music in Late Medieval Bruges*, but in the pipe organ sphere, Williams' contributions were just as impactful.[2] His writings encouraged readers to think of pipe organs not as antiquated monoliths hulking inside their cavernous homes, but as dynamic entities that were—and are—an active part of the communities and spaces embracing them.[3] Today, it has become normal for musicologists to think in terms of holistic sonic ecologies, and how intersections of time, site, and place beget the sounds and practices that arise in a location, but these are themes that have long been implicit in pipe organ discourse.

[1] Peter Williams, *A New History of the Organ from the Greeks to the Present Day* (Indiana University Press, 1980); see also *The King of Instruments: How Do Churches Come to Have Organs?* (SPCK, 1993).
[2] Reinhard Strohm, *Music in Late Medieval Bruges* (Clarendon Press, 1985).
[3] Pre-empting, for example, Eliot Bates' 'The Social Life of Musical Instruments', *Ethnomusicology* (Vol. 56, 2012), pp. 363-395.

Translating words into action requires long-sightedness, as pipe organs take considerable time to plan and build, and over the last thirty years, several organizations have committed to interdisciplinary projects that have borne fruit—and others are in the pipeline. Founded in 1995, the Göteborg Organ Art Center (GOArt) and its inaugural director, Hans Davidsson, were at the forefront of realizing progressive pipe organ initiatives. The impetus for GOArt was the desire to construct a series of instruments with a 'strong stylistic identity' as opposed to 'eclectic organs with no particular historical profile', thus instituting the type of integrated pipe organ research familiar now.[4] GOArt did not limit its purview to organ reconstruction, and its completed projects range from *The Organ in Recorded Sound: History, Sources, Performance, Practice* to developing sensor technology capable of monitoring corrosive organic acids and humidity levels inside pipe organ cases.[5, 6] Another pipe organ hub, with which GOArt collaborated, is the Eastman School of Music in Rochester, New York, whose Kerala Snyder edited the indispensable *The Organ as a Mirror of Its Time*.[7] Time, site, and place are central to Snyder's book, and its twenty-five wide-ranging chapters neatly illustrate how closely they are linked. A third institution supporting similarly broad research is Het Orgelpark. Based in Amsterdam and led since 2010 by Hans Fidom, Orgelpark hosts around eighty events a year, and publishes periodic reports to accompany its colloquia.[8] Orgelpark's world-leading hyperorgan (the Utopa Baroque Organ) was completed in 2018, and represents a pinnacle of their work so far, with its gestation and construction over seven years being thoroughly documented in two successive reports.

In all instances, a common goal has been to weave together various topics connected to the pipe organ, foregrounding the interrelated importance of when they were built, where they are installed, and who interacts with them. Indeed, a recurring theme of Fidom's writing is situationality: 'Organ Musicology is, more than any other musicological discipline, driven by the

[4] 'Göteborg Organ Art Center (GOArt)', University of Gothenburg, https://www.gu.se/en/research/goteborg-organ-art-center-goart, accessed 12/06/23.
[5] Kimberly Marshall (ed.), *The Organ in Recorded Sound: History, Sources, Performance, Practice* (Göteborg Organ Art Center, 2012).
[6] Carl Bergsten et al., 'Sensor System for Detection of Harmful Environments for Pipe Organs (SENSORGAN)', *e-Preservation Science* (Vol. 7, 2010), pp. 116–125.
[7] Kerala Snyder (ed.), *The Organ as A Mirror of Its Time* (OUP, 2002).
[8] Available online at https://www.orgelpark.nl/en/Wetenschap/Research-Reports, accessed 12/06/23.

situationality of music-making. If there is one form of music which is explicitly situational, certainly within our Western culture, then it is organ music.'[9] Leading on from this, Fidom, citing the philosopher Bert van der Schoot, suggests that pipe organ music is really installation art, 'art, which is designed for a specific room and which, after the exhibition is finished, can never exist again in the same way.'[10] Fidom's use of the term 'situationality' is different to mine of 'locatedness'. [11] When referring to the pipe organ as being located, I am emphasizing how time, site, and place affect its identity and our perception of that identity, as well as how composers respond to this, but I am not making any claims about the ontology of pipe organ works or arguing that pipe organ music is a form of installation art. There are plenty of physically instantiated sound works utilizing the pipe organ (or components thereof) that exist outside of a purely musical continuum, and these would seem to fall more readily into the category of sound art, but Fidom's statement raises the question of where that boundary lies.[12]

Beyond the academic role that pipe organ organizations play, they also facilitate the production and performance of new music through workshops and concerts, as do events like Aggregate in Germany, Mainly Slow Organ Music and Organ Reframed in the UK, Organ Sound Art Festival in Denmark, Registri in Italy, Toulouse-les-Orgues in France, and the itinerant Spire. In addition to running a festival, the Royal Canadian College of Organists' FutureStops project included a podcast, hosted by Blake Hargreaves, that invited performers and composers to explain their work.[13] As implied by the geography of the above list, locatedness is as much a factor when being commissioned to write new music as it is when taking existing pieces on tour, and the FutureStops interviews revealed how individuals from around the world reacted to the

[9] Hans Fidom, *Orgelpark Research Report 2* (VU University Press, 2020), p. 26.
[10] Ibid. p. 27.
[11] For me, 'situational' is a little too close to 'situated', as I do not wish to inadvertently stress site-specificity over temporality or place-specificity. Furthermore, I am writing from the composer's perspective, not the performer's, and 'locatedness' draws attention to the pipe organ as a compositional proposition rather than the moment of performance that 'situational' can suggest. See Thor Magnusson and Claudia Molitor, 'Curating Experience: Composition as Cultural Technology – A Conversation', *Journal of New Music Research* (Vol. 50, 2021), pp. 184-189.
[12] e.g. Finnboggi Pétursson, *Diabolus* (2001); Nikola Bašić, *Zadar Sea Organ* (2005); Jennifer Allora and Guillermo Calzadilla, *Algorithm* (2011); Philip Blackburn, *Sewer Pipe Organ* (2011); Johanna Mårtensson and Ida Lundén, *Orgel* (2016); Dawn Scarfe, *Swell Engine* (2017); and Ronald van der Meijs, *Exploring Earthly Sounds for Nine Candles* (2017). This is not to say a non-sound component is required by the term 'sound art', but that the pipe organ's visually arresting components lend themselves well to appropriation.
[13] 'Podcast', FutureStops, https://futurestops.org/podcast/, accessed 12/06/23.

challenge of working with the pipe organ, often for the first time. Whether being explored via sound works and chatted about in conversation, or forming the backbone of institutional research, the locatedness of instrument and music are common tropes across the discipline.

1.2 Practice-Based Literature

Informal material, e.g. blog posts, interviews, and podcasts, on contemporary pipe organ composition is easy to come by, but formal academic writing is less abundant, especially practice-based research.[14] What does exist is predominantly concerned with organ and live electronics, not that this precludes locatedness also being touched upon, but it means when time, site, and place do come up, they tend to be viewed through an electroacoustic lens. Although not itself practice-based, Heike S. Burghart Rice's 'Music for Organ and Electronics: Repertory, Notation, and Performance Practice' is a good starting point when surveying electroacoustic organ music.[15] Having compiled a list of extant works for pipe organ and electronics, 132 in total, Burghart Rice analyses the notation strategies used in these pieces and associated interpretative issues. Furthermore, she conducted interviews with eleven composers and organists, offering a snapshot of an active compositional community. The appendix gives key information about every work in table form, but lacks where they were first performed.

Completed four years earlier, Andrew Blackburn's 'The Pipe Organ and Real-Time Digital Signal Processing (DSP): A Performer's Perspective' is more descriptive in that it charts his own journey of workshopping and playing four new works for pipe organ and electronics.[16] Blackburn includes a section on 'Performance Space and Sonic Re-location', and locatedness is present in the background throughout the thesis. The level of detail he supplies when recounting the prosaic

[14] The last substantive survey of pipe organ composition to appear was Christopher S. Anderson's (ed.) *Twentieth-Century Organ Music* (Routledge, 2012). Although primarily about the previous century, some contributors also mention current composers in passing.
[15] Heike S. Burghart Rice, 'Music for Organ and Electronics: Repertory, Notation, and Performance Practice', DMA Submission (University of Cincinnati, 2015).
[16] Andrew Blackburn, 'The Pipe Organ and Real-Time Digital Signal Processing (DSP): A Performer's Perspective', DMA Submission (Queensland Conservatorium, Griffith University, 2011).

aspects of bringing works to performance is illuminating, as are the practical hurdles that navigating time, site, and place can pose for musicians. Additionally, Blackburn argues that music for pipe organ and electronics is the latest stage in the instrument's evolution, and he sees a traceable progression from Max Reger to the present day, with Olivier Messiaen, Bengt Hambraeus, and György Ligeti serving as intermediate links.[17] While this is a valid assertion, committing to the idea of linearity risks marginalizing practices that fall outside of one (admittedly large) category; trying to prove a lineage connecting prominent composers of previous eras to a single contemporary practice area so that it might inherit the avant-garde mantle is problematic, as it can imply, albeit unintentionally, that other modes of expression are less legitimate.

Two recently completed research projects are Jacob Lekkerkerker's 'SPACE / SOUND / BODY: A New Collective Subjectivity in Church and Cathedral Spaces / Extended, Hyper and Augmented Organ', and Lauren Redhead's *Sound and Space: Music for Organ and Electronics*, both of which allude to aspects of locatedness.[18, 19] In Lekkerkerker's case, he states that 'pipe organs are built with reference to the architectural context in which they are situated and, therefore, I have paid significant attention to spatialization of sound, choreography of performers, and the collective experience of musicians and audiences', and his stipulated research topics are 'extended playing techniques, augmentation by live electronics, and hyperorgans'.[20] Redhead likewise writes about 'organ performance as a site-specific practice that interacts with the instrument and space through the medium of the performer', going on to say that 'the nature of organ performance is that radical differences in instrumental sound, construction, and concert space and acoustic are experienced from location to location, and

[17] See also Blackburn, 'Messiaen and His Musical Role in Developing the Organ as an Avant-Garde Instrument and a New Era of Organ Composition', *Organists' Review* (June, 2014), pp. 32-37.
[18] Jacob Lekkerkerker, 'SPACE / SOUND / BODY: A New Collective Subjectivity in Church and Cathedral Spaces / Extended, Hyper and Augmented Organ', PhD Thesis (Goldsmiths, University of London, 2020), https://research.gold.ac.uk/id/eprint/30137/, accessed 12/03/24.
[19] Lauren Redhead, *Sound and Space: Music for Organ and Electronics*, Goldsmiths, University of London, https://research.gold.ac.uk/id/eprint/24828/7/Sound%20and%20Space%20For%20Website.pdf, accessed 13/06/23.
[20] Lekkerkerker, 'SPACE / SOUND / BODY', p. 2.

this has encouraged constant re-evaluation of the music and its performance as the music has travelled'; she ultimately published a book chapter on the project about the interpretation of open scores and notation, as well as a more recent article on her performance practice.[21, 22, 23]

Two Masters theses on pipe organ and electronics are Pam Hulme's 'Manipulating Musical Surface: Perception as Compositional Material in Live Looping and Organ with Electronics' and George Rahi's 'Music for the Augmented Pipe Organ'.[24, 25] Like Lekkerkerker and Redhead, they allude to locatedness, including the site-specificity of pipe organs and the potential spatialization of their acoustic and processed sound, as well as their historical and technological precedents. Hulme also incorporates historical composition into her own work in the form of familiar chorale melodies and a remix of J. S. Bach's Fantasia and Fugue in G minor (BWV 542). A third Master's thesis, this one solely about an acoustic pipe organ, is Mauricio Silva Orendain's 'A Bridge Between Composition & Sound Design: Reflections on the "Experimentalorgel" at St. Martin's Church', in which he tests the sonic possibilities of a unique experimental pipe organ in Kassel, Germany.[26]

As for journals, one of the most frequently cited articles is 'Of Pipes and Patches: Listening to Augmented Pipe Organs' by Markus Noisternig and Christophe d'Alessandro. Noisternig and d'Alessandro jointly conceived the Orgue et Réalité Augmentée (ORA) project, which first ran in 2008, and have released a CD together, *Les Douze Degrés du Silence*.[27, 28] The article describes their work with ORA, elucidating the semi-acousmatic nature of pipe organ sound from a Pythagorean and Schaefferian perspective, and its relationship with electroacoustic

[21] Laruen Redhead, 'Notation as Process: Interpreting Open Scores and the "Journey Form"', in Vanessa Hawes and Lauren Redhead (eds.), *Music and/as Process* (Cambridge Scholars Publishing, 2016), pp. 116-133.
[22] Redhead, *Sound and Space: Music for Organ and Electronics*, pp. 3, 8.
[23] Lauren Redhead, 'Developing Live-Interactive Approaches to New Music for Organ and Electronics through Collaboration', *Contemporary Music Review* (Volume 42, 2023), pp. 339-350.
[24] Pam Hulme, 'Manipulating Musical Surface: Perception as Compositional Material in Live Looping and Organ with Electronics', MA Submission (University of Huddersfield, 2020).
[25] George Rahi, 'Music for the Augmented Pipe Organ', MFA Submission (Simon Fraser University, 2019).
[26] Mauricio Silva Orendain, 'A Bridge Between Composition & Sound Design: Reflections on the "Experimentalorgel" at St. Martin's Church', MA Submission (Musik-Akademie Basel, 2021).
[27] Christophe d'Alessandro and Markus Noisternig, 'Of Pipes and Patches: Listening to Augmented Pipe Organs', *Organised Sound* (Vol. 24, 2019), p. 42. Thematically similar work has been done by Robert Sholl and Justin Paterson in the form of *Les ombres du Fantôme* (Métier, 2024) [CD], with an accompanying paper having been given at several UK conferences, though not yet published.
[28] D'Alessandro and Noisternig, *Les Douze Degrés du Silence* (Editions Hortus, 2013) [CD].

augmentation. Other articles worth mentioning are Michele del Prete's 'Sound Thresholds: Visual and Acoustic Values of the Fernwerk in Post-Romantic Organ Building and Architecture', Jean-Louis Florentz's 'The Question of Timbre and Harmonic Vibratos in *Les Laudes* (Op. 5) for Organ', Gergely Loch's 'Two Faces of a Cathedral: Ákos Rózmann's Black Illusions and Organ Piece No. III/a', and Annette Schmucki and Alistair Zaldua's '"Music and Language Tilt into Each Other": Annette Schmucki Interviewed by Alistair Zaldua'.[29, 30, 31, 32] While these do not deal with locatedness head on, they demonstrate how diverse awarenesses of time, site, and place have been reflected in pipe organ culture: del Prete through an exhaustive study of an unusual organ division,[33] Florentz by ruminating on the ideal hypothetical pipe organ for his own work, Loch by highlighting the codependence of instrumental and personal locatedness in Ákos Rózmann's organ music, and Zaldua by interviewing Schmucki about her *musik und sprache* method when creating a novel pipe organ work.

To summarize, current practice-based pipe organ research tends to refrain from making assumptions about when, where, and how pipe organs should sound, often questioning some aspect of locatedness in the process. Like the earlier efforts of Williams and others to challenge preconceptions, the current generation of academic composers have picked up the baton to address these issues artistically.[34] But this questioning of locatedness can be indirect or tangential, with the resulting compositional outputs having varied foci. At times, authors may use language referencing time, site, and place, while at others the connection is implicit and buried beneath the surface. This is not a criticism, as the material discussed above does not claim to

[29] Michele del Prete, 'Sound Thresholds: Visual and Acoustic Values of the Fernwerk in Post-Romantic Organ Building and Architecture', *Music in Art* (Vol. 42, 2017), pp. 233–251.
[30] Jean-Louis Florentz, 'The Question of Timbre and Harmonic Vibratos in Les Laudes (Op.5) for Organ', *Contemporary Music Review* (Vol. 8, 1993), pp. 95–111.
[31] Gergely Loch, 'Two Faces of a Cathedral: Ákos Rózmann's Black Illusions and Organ Piece No. III/a', *Leonardo Music Journal* (Vol. 28, 2018), pp. 25–29.
[32] Annette Schmucki and Alistair Zaldua, '"Music and Language Tilt into Each Other": Annette Schmucki Interviewed by Alistair Zaldua', *Contemporary Music Review* (Vol. 39, 2020), pp. 373–385.
[33] Organ stops are grouped into divisions, with all the pipes of one division typically located in the same place within the organ case, and being played on a specific manual.
[34] Ongoing doctoral research is being conducted by del Prete at the University of Leiden and Orpheus Institute, Ghent entitled 'Composing for Organ and Electronics: Spaces and Practices'; and also by Cláudio de Pina at NOVA University, Lisbon entitled 'Sound Expansion in the Historical Organ and Performance Practices of Contemporary Music'. See https://www.universiteitleiden.nl/en/research/research-projects/humanities/composing-for-organ-and-electronics-spaces-and-practices, accessed 13/03/24; and https://cesem.fcsh.unl.pt/pessoa/claudio-de-pina/, accessed 13/03/24.

target locatedness per se, rather, it is an exposition of the niche that my own doctorate is intended to fill, as what has so far been absent is a dedicated effort to develop a set of compositional techniques and procedures placing the complexities of locatedness front and centre.

1.3 Selected Works

Having outlined the academic precedent for my research, below I will concentrate on five composers who have influenced my own projects. Their five works, listed chronologically, embody a range of approaches and performance scenarios, and all exemplify organ music that does not take locatedness for granted. The following summary analyses provide contextual information, as well as identifying elements which, through the lens of the four primary research questions, stand out as being salient.

1.3.1 *The Four Beasts' Amen: Mass for Organ and Electronics*, Hans-Ola Ericsson (1999–2000)

Organist and composer Hans-Ola Ericsson has a multifaceted career, having collaborated with Olivier Messiaen, John Cage, and György Ligeti to record their works, held professorships at several music academies, and led varied pipe organ construction projects. *The Four Beasts' Amen* was commissioned in connection with the inauguration of the new North German Baroque Organ at the Örgryte New Church, Sweden, and is a nine-movement mass based on texts by Olov Hartman.[35] Compositionally, it is defined by synthesis, both in the literal sense of combining sound from the new organ with recordings of the historic organs that guided its construction, and in the formalistic sense of integrating stylistically diverse movements. These fall into four groups: those which are quasi-historical, those which are idiomatically contemporary using only pitched sound, those which focus on the timbral properties of all pipe organ sound, and those which are a combination of the three. The first and seventh movements (Preludium: Embers, and Agnus Dei:

[35] Hans-Ola Ericsson, *The Four Beasts' Amen and Other Organ Works* (BIS Records, 2006), pp. 4–9, 29–35 [CD insert].

…branching out…) belong to the first group, the former dedicated to Matthias Weckmann (1616–1674), and the latter to Martin Düben (1598/9–late 1640s). In the second group are movements three, four, and six (Gloria: Wing-mirrors, Hallelujah, and Sanctus: The Seed). In the third group are movements two and five (Kyrie: The Key, and Interludium: …concealed in every stone…), the former prominently featuring non-pitched organ sound, and the latter zooming in on the timbral properties of certain stops. In the last group are the final two movements (Communion: Scala Angelica, and Postludium: Nails), with the penultimate movement dedicated to Olivier Messiaen (1908–1992), appositely including imitative birdsong, while the closing movement is conceptually reminiscent of similarly programmatic crucifixion organ pieces, like J. S. Bach's chorale prelude 'O Lamm Gottes, unschuldig' (BWV 656).

The result is a blending of different times, sites, and places, to yield a complex togetherness, but the point is less whether the separate parts seem to fit together comfortably or grate against one another as it is how the listener perceives these juxtapositions in the context of the music and the new organ's reconstructed being. For example, the sonic effect of combining pipe organs with different historic temperaments is striking, as are the allusions to earlier compositional styles; but when considering the fraught debates surrounding temperament from Arp Schnitger's time to the present day, the reciprocal involvement of organists, organ builders, and composers in such debates, and the function of the new research organ itself, the music reveals an extra dimension. Consideration of material disposition, mode of mediation, map of mediations, and telos are all here, and Ericsson's achievement is to successfully meld the literal and abstract to create a work that blurs what we are hearing with the interpretive meanings that arise from those hearings.

1.3.2 *Zeit Raum II: Ströme*, Martin Herchenröder (2001/2007)

Martin Herchenröder was commissioned to write two sets of pieces for the restored 1746 Hildebrandt pipe organ at the Stadtkirche St. Wenzel, Naumberg. The first, *Zeit Raum I: Ad Fontes*, was written in 1996 for the completion of the Rückpositiv division, with *Zeit Raum II: Ströme*

following five years later once the rest of the restoration had been finished—the closing ricercare being added in 2007. The Hildebrandt pipe organ is significant, as J. S. Bach is known to have examined and approved of the instrument.[36] However, the reversal of modernizing changes made by successive builders was not universally popular, as some felt that the restored pipe organ would be unable to play contemporary music effectively. Though Herchenröder was asked to demonstrate how the newly restored pipe organ could indeed play such music, he also wished for there to be a strong connection to J. S. Bach.[37]

Of the five works surveyed, *Zeit Raum II: Ströme* is the most conventional in that it requires no electronics, and only pitched sound from the organ pipes; the movements are scored on between two and five staves, although there are several passages of non-standard notation. The music displays a high degree of contrapuntal and structural clarity, which becomes an effective tool to explore the material form and structure of the restored instrument. Herchenröder makes his methodology clear in an introduction to the score, stating 'in the individual movements of my composition, various characteristic features of the organ become the basis of their design … my composition therefore explores the organ using artistic means.'[38] There is a didactic aspect, too, with the movements intended as *études* for the performer, honing technical facility, improving historical awareness of the forms themselves, and demonstrating the Hildebrant's capabilities: 'it is no coincidence that the movements are like the building blocks of a modern *orgelbüchlein* in the Bachian sense, breathing new life into various "classic" types from the organ repertoire (Fantasie, Präludium, Trio, etc.).'[39]

The first movement, Fantasie (Sonnenton – Sturmerscheinung), is virtuosic and improvisatory, channelling the *stylus phantasticus* energy of the earlier North German Baroque;[40] the second, Hymnus (Lichtklang – Schattenspur), is based on the chorale 'Allein Gott in der Höh

[36] Wolff and Zepf, *The Organs of J. S. Bach: A Handbook*, pp. 74–77, 148.
[37] Anne Laver, 'Interview with Martin Herchenröder', https://www.youtube.com/watch?v=9b70N19bGts, accessed 15/09/21.
[38] Martin Herchenröder, *Zeit Raum II: Ströme* (Bärenreiter, 2009), p. III.
[39] Ibid. p. IV.
[40] The *stylus phantasticus* was an early Baroque style typified by a sense of freedom and spontaneity, often involving florid, homophonic, imitative episodes etc. being contrasted with one another.

sei Ehr', and utilizes overlapping melodic fragments and chords that are held and released on different manuals, generating a 'sound filter technique to test the smallest timbre transitions'; the third, Trio (Windgesang), examines the microtonal possibilities of the organ via the solo use of mutation stops; and the fourth, Ricercare (Himmelsatem), is an energetic rondo finale.[41] *Zeit Raum II: Ströme* serves as a musical waymarker in the life of Stadtkirche St Wenzel's Hildebrandt organ, celebrating the point at which it was newly made old again. Herchenröder may be viewed as belonging to the latest iteration of modernizing contrapuntists, showing an expanded purpose by engaging with the material disposition of the instrument. Janus' gaze is captured well by the composer, who deftly crafts a committedly contemporary work to satisfy sceptical parishioners while remaining sensitive to the spirit of Bach and Hildebrandt: 'by rediscovering the 250-year-old organ, the cycle, so to speak, creates music across the centuries, a connection between times, which the title 'zeit raum' alludes to.'[42]

1.3.3 *Anacrusis for Organ/Organists, Wood Workers, and Electronic Sounds*, Kevin Ernste (2011)

Kevin Ernste was commissioned to write *Anacrusis* for the opening of the new Baroque organ in the Anabel Taylor Chapel at Cornell University, where Ernste is Associate Professor of Composition. A collaboration between Parsons Pipe Organ Builders of New York and GOArt, the instrument was based on the 1706 Arp Schnitger organ at Schloss Charlottenburg in Berlin.[43] The score for *Anacrusis* is notated on five staves: three for manuals and pedal, and two for electronics and woodworkers. Despite being only three pages (ten minutes) long, the work showcases an array of associated sound beyond that of the Anabel Taylor Chapel organ itself, including a fixed media track of other pipe organs at Cornell University, simple processing of live pipe organ sound (a resonant low pass filter), complex processing of live pipe organ sound (a custom algorithm for an 'infinite suspension' passage), and organ construction sound performed live.

[41] Herchenröder, *Zeit Raum II: Ströme*, p. IV.
[42] Ibid. p. III.
[43] Martin Küster, 'Keyboard Culture in 18th-Century Berlin and the German Sense of History', *Eighteenth-Century Music* (Vol. 8, 2011), p. 364.

The inclusion of other pipe organs from around Cornell University has echoes of Ericsson, but the use of woodworker sound harks back further to Mauricio Kagel's *Improvisation Ajoutée* (1961) and *Phantasie für Orgel mit Obbligati* (1967), and Dieter Schnebel's *Choralvorspiele I* (1966) and *II* (1969). These earlier works pioneered the use of non-organ sound, which became a means to critique the pipe organ's assumed role in performance and places of worship. Ernste is subtler than Kagel or Schnebel, and his woodworkers seem like a fitting part of an organ collage instead of an interjection or act of subversion. This collage also comprises Baroque references, but unlike Ericsson's pastiching of Weckmann and Düben, or Herchenröder's modern part-writing, Ernste's use of counterpoint comes in the form of quotations from J. S. Bach's Passacaglia in C minor (BWV 582), notable for its repeated anacruses, played live by the organist. This is then transformed by his 'infinite suspension' algorithm, and latterly overlayed with the organist playing an unprocessed excerpt from the Passacaglia in C minor.

Rather than treating the pipe organ as something that spontaneously sprang into being ready for inauguration, Ernste draws on its creation, reinforced by the performative inclusion of craftspeople and the workshop soundworld associated with an organ prior to on-site assembly. The work is as much about process as product, and about an instrument's expected (then realized) potential prior to (and after) fully instantiated existence. Ernste himself singles out temporality, 'the anticipation and the suspension of time that happened in the construction of this organ', yet there is a wider tension between the locatedness of the finished pipe organ used for performance and the music's subject matter, which is the instrument's ambiguous locatedness during construction.[44] The first recital on new pipe organ normally represents a moment of singularity, a single person playing a single instrument in a single place at a single time, but Ernste's spotlighting of indeterminacy explodes this, affording the listener an all-encompassing experience of how a pipe organ comes to reside in time, site, and place.

[44] Linda Glaser, 'Anacrusis', http://digital.music.cornell.edu/kevinernste/anacrusis/, accessed 15/09/21.

1.3.4 *Breath for Organ*, Eva-Maria Houben (2017)

A longtime and prolific member of the Wandelweiser Group, Eva-Maria Houben is also an organist, and has produced a large catalogue for the instrument. Her organ works adhere to the Wandelweiser aesthetic, but she makes a distinction between shorter organ 'pieces' and longer 'installations' that last many hours.[45, 46] Released as a single track seventy-five minute CD, *Breath for Organ* sits somewhere between the two, and, as the title suggests, charts the passage of air through a pipe organ. It is easy to forget that pipe organ bellows were operated by people prior to the industrial revolution, and referring to wind supply as 'breath' is an effective way to anthropomorphize the instrument.[47] This mindset has inspired others, but Houben's offering is one of the most committed.[48] Although pitched sound from the pipes is heard intermittently, it is the timbral range of the non-pitched wind sound that stands out, and the delicate variances in the organ's 'breath' that are caused by different stops speaking—or remaining silent.

Of the five examples listed here, Houben's is the only wholly fixed media work, but she has realized similar projects live without any electronic sound or loudspeakers.[49] Presenting the music as a stereo recording, however, frees the composer from insurmountable physical obstacles, like fitting an audience inside an organ case from where they can fully appreciate the sound. The idea of pipe organ spaces, i.e. internal pipe space, intermedial case space, and external building space, was introduced in the previous chapter, and this will be expanded on in relation to concepts of noise in Chapter 4. The site of primary interest for *Breath for Organ* is the intermedial case space, representing a departure from norms that inverts expectations of pipe organ sound and how it is encountered. Conventionally, hearing only pitched pipe sound is desirable, with extraneous mechanical and wind sound classed as 'noise', but in *Breath for Organ*

[45] Though lacking a manifesto, the group's output is unified by the central importance of a post-Cageian consideration of 'silence', sparing use of performer-generated sound material, and a high degree of openness when interpreting scores.
[46] Eva-Maria Houben, 'Presence - Silence - Disappearance', Wandelweiser Group, https://www.wandelweiser.de/_eva-maria-houben/texts-e.html, accessed 14/06/23.
[47] Francis O'Gorman, 'Endless Breath? The Pipe Organ and Immortality', in David Fuller, Corinne Saunders and Jane Macnaughton (eds.), *The Life of Breath in Literature, Culture and Medicine: Classical to Contemporary* (Palgrave Macmillan, 2021).
[48] e.g. Lawrence English, *Observation of Breath* (Hallow Ground, 2021) [CD].
[49] Organ Installations I, II, and III (2022), https://www.youtube.com/watch?v=-scQQc0YC4c, accessed 26/08/24.

it is the wind sound that carries greater importance, with the pitched sound produced as a by-product of wind flow becoming the noise.

By moving the listener into the intermedial case space, Houben collapses the inherent site-specificity of the pipe organ, as the external building space's acoustic properties and the internal voicing of the organ pipes to suit it no longer matter; it is the unique and equally site-specific configuration of the intermedial case space that is captured. This is all the more poignant considering the Karl Göckel organ at the St. Franziskus church in Krefeld, Germany, on which she recorded the original work, has now been moved to the St. Peter church—also in Krefeld.[50] This presentation of relocated sound aurally upends the pipe organ, offering a listening perspective that is usually out of reach to the audience, but one that has remained the same despite the organ being moved elsewhere.

1.3.5 *Occam XXV*, Éliane Radigue (2018)

Commissioned by the Organ Reframed festival and premiered at the Union Chapel in London, *Occam XXV* is Radigue's first piece for pipe organ. Began in 2011, the Occam series has involved Radigue working with a variety of instrumentalists, an 'occam' being a solo work, a 'river' a duet, a 'delta' a trio or quartet, a 'hexa' a quintet, and an 'ocean' an ensemble. The 'occam' of the title refers to William of Ockham's razor, emphasizing parsimony and simplicity, while the 'ocean' alludes both to the notion of us existing in a sea of electromagnetic, gravitational, and sound waves, as well as the composer's affinity for flowing water. A core principle of the series is oral transmission, and Radigue collaborates with performers in person to produce her music, each work being peculiar to said individuals(s). The organist with whom she partnered for *Occam XXV* was Frédéric Blondy, director of ONCEIM (Orchestra of New Creations, Experimentations, and Improvisations), Blondy having previously commissioned *Occam Ocean* (2015) for ONCEIM.[51, 52]

[50] Karl Göckel Orgelbau, 'Krefeld St. Peter', https://www.goeckelorgel.de/opus/37/, accessed 15/03/24.
[51] Éliane Radigue, *Occam XXV* (Organ Reframed, 2022), pp. 3-4, 7 [CD insert].
[52] Emmanuelle Majeau-Bettez, 'Through Time and Space: Éliane Radigue's Relationship to Sound', PhD Thesis (McGill University, 2022), pp. 151-156, https://escholarship.mcgill.ca/concern/theses/05741z14x, accessed 18/03/24.

In addition to the physical sound waves heard in performance, there are two structural meta-waves that govern their unfolding: amplitude and frequency. Characterized in this way, the amplitude meta-wave gradually increases and then gradually decreases, swelling toward the middle of the piece, whereas the frequency meta-wave continually increases from start to finish in a single upward gesture:

> The sound narrative of Occam XXV is, precisely, one base in the exploration of the whole register of the instrument. Oozing from silence, the piece explores the depths of the low notes of the instrument, gradually making its way to the high register, and finally ending on a sustained high note before returning—almost imperceptibly—to silence.[53]

Contained within these structural meta-waves is a wealth of timbral nuance derived from the instrument's idiosyncrasies, requiring carefully prepared registrations to yield desirable beatings between pipes.[54] The sonic complexity of this premise is found in the space between notes—not the individually sounded pitches and timbres themselves, but the resultant interference patterns and transitions—and successful execution requires forethought and concentration.

Despite *Occam XXV's* contemporary timbralism, there are undertones of the pipe organ's heritage running through the music, whether Radigue intended it or not. Firstly, the manner in which the material disposition of the organ, i.e. the length of its pipes, dictates the structure of the piece recalls established registration conventions governing which stops to draw in a predetermined manner. In this sense, the piece is a giant deconstructed *plenum* stretched out over forty minutes.[55] Secondly, pipe organ culture has historically been improvisatory, with organists seldom committing pieces to paper, and often using tabulated shorthand when they did. The evolution of *Occam XXV* is not dissimilar, with Radigue's expectations initially being discussed verbally with Blondy, who then, unusually for an Occam piece, prepared a non-conventionally notated score-template to guide what would essentially remain a spontaneous

[53] Ibid. p. 214.
[54] Ibid. p. 213.
[55] *'Organum Plenum'* typically refers to a principal chorus up to mixtures with a pedal reed, not a literal pulling out of all the stops.

performance.[56, 57] Finally, there is the repeatability of the piece versus the individuality of pipe organs. There have been two performances of *Occam XXV* to date, one on the 1877 Willis organ at the Union Chapel, London, and one on the 2015 Rieger organ at the Philharmonie, Paris. The instruments are profoundly dissimilar, a fact accentuated by Radigue's timbre-centricity, and reminding us of the performer's dilemma mentioned in the Introduction.

1.4 Compositional Approaches

Returning to the primary research questions at the end of the Introduction, I will briefly compare the preceding composers' approaches to engaging with locatedness, before expanding on how they prompted my own research directions and methodology in the next chapter.

1.4.1 Material Disposition

The linkages between counterpoint, structure, form, and material disposition differ among works, with some weighted more toward one than the other, and ranging from those with a greater to a lesser degree of deterministic codification. Herchenröder relies solely on notated counterpoint, and, as quote above, views his techniques as an artistic means to explore the pipe organ in *Zeit Raum II: Ströme*. Ernste combines notated counterpoint in the form of J. S. Bach quotations with electroacoustic augmentation in *Anacrusis*, altering it in the process, and further augments the scope of the piece with the addition of electronic organ sound. Ericsson opts for holism in *The Four Beasts' Amen*, interspersing contrapuntal moments across separate movements. Radigue shifts to determinism of another order, allowing the material attributes of the organ pipes to dictate the form of *Occam XXV*. Houben's *Breath for Organ* presents as a fantasia, reflecting the pipe organ's freely flowing breath in a meandering through-composed work.

[56] Majeau-Bettez, 'Through Time and Space: Éliane Radigue's Relationship to Sound', p. 217. This person-centricity arguably takes locatedness to its extreme, as by creating a singular human repository for the work, it becomes performer-specific beyond being time, site, or place-specific.
[57] Éliane Radigue, 'The Mysterious Power of the Infinitesimal', *Leonardo Music Journal* (Vol. 19, 2009), pp. 47–49.

1.4.2 Mode of Mediation

The presentation of pipe organ sound is equally diverse, with similar starting points leading to divergent sonic profiles. Both Herchenröder and Radigue use only a single acoustic instrument, but their treatment of organ sound is distinct. For all its modernity, Herchenröder's work retains a discernible connection to earlier music, whereas Radigue's soundworld is rooted firmly in the present. Ernste's and Ericsson's works are both electroacoustic, the former combining multiple elements in a single piece which feels measured and restrained, the latter exploring several ideas across multiple movements which are expansive—almost symphonic. Houben's work is somewhat equivocal, for although we only hear pipe organ sound, its transmission requires electronic intervention due to practical constraints; digital technology has been used to present sound, but not in the first instance to alter its fundamental properties.

1.4.3 Map of Mediations

The historical references present in the works can also be stratified: some are explicit, some implicit. Ernste's foregrounding of J. S. Bach is the most overt, but is limited to the inclusion of recognizable motifs rather than formalistic borrowings. Herchenröder's use of archaic names for each movement situates his composition within the established canon, priming the listener's structural expectations, though the music follows a contemporary trajectory. Ericsson's designation of his work as a mass also primes expectations, and his pastiching of earlier composers achieves a similar effect to Herchenröder through alternative means. Radigue's historical connoting is more subtle; the score template references an earlier era of performance practice, while the *plenum* allusion taps into established registration conventions. Houben is again the most ambiguous, alluding to a pre-industrial time when organ playing required humanized wind supply. Here, the flow of air itself serves as the historic template.

1.4.4 Telos

Taken together, these approaches are the compositional means to an end, but the scope of this final research question goes beyond how they align with the composer's intentions, and toward

how the narratives of the works elucidate their instruments' ends. Ericsson's *The Four Beasts' Amen* and Ernste's *Anacrusis* were both written for the inauguration of newly constructed instruments in a period style connected to GOArt, and so there is an apparent shared telos, but the composers present contrasting responses to the complexities of building new old pipe organs. Guided by Hartman's poetry, Ericsson offers a religious and metaphorically charged perspective on instrumental genesis and rebirth seemingly driven by divine forces; Ernste's *Anacrusis*, on the other hand, is a secular rumination on the earthly aspects of organ building, like carpentry, supplying an Enlightenment counterpoise. Herchenröder wrote *Zeit Raum II: Ströme* for an historically significant eighteenth-century instrument whose restoration was controversial, and the work's compositional dexterity seems like a firm response to concerns about atavism surrounding the instrument. Houben's *Breath for Organ* is like a musical negative, with the conspicuous lack of pitched sound from the organ pipes drawing attention to their typical role in organ music. Unlike the other works, Radigue's *Occam XXV* is not a standalone piece, but part of a greater whole, and this sense of belonging aligns with how the thousands of individual sounding bodies that constitute a pipe organ together represent a sonic wholeness.

* * *

This chapter has sought to show three things: firstly, that while language may vary, the concept of locatedness has been part of pipe organ discourse since the last century, and it is embedded across the discipline; secondly, that current practice-based literature mostly covers pipe organ and electronics, and that when time, site, and place are mentioned, it tends to be in the service of other research interests; and thirdly, that although contemporary composers are producing works consciously responding to facets of locatedness, whatever commentary there is by the composer accompanying them is, with a few exceptions, usually informal and not analogous to an analytic essay. The contextual goal of my research is therefore twofold: to develop a compositional approach which engages directly with locatedness, and to supplement this with in-depth critical commentary.

Chapter Two
Sounding the Monument

Three of the five works surveyed in the previous chapter were written for pipe organ inaugurations, two of which were for research organs constructed in period styles. In the introduction to *The Four Beasts' Amen*, Hans-Ola Ericsson writes:

> I have used sounds from the instruments that have formed the basis of the [Örgryte New Church organ] research project: the Arp Schnitger organs in Hamburg, Stade, Norden, Cappel and Lüdingworth. These organs have been sonically dissected and documented for the purpose of this work.[1]

The methodology outlined below is grounded in the idea that aspects of organological research can point to creative pathways for composers. In **2.1**, I lay out my rationale for this with reference to an article by Peter Peters and Darryl Cressman; in **2.2**, I explain how my projects' work-templates, new compositions, and pipe organs used for performance may be thought of as triangulation points that generate a sense of locatedness; and in **2.3,** I elucidate the work-template to new composition defamiliarization process fundamental to all five projects.

2.1 Pipe Organ as Palimpsest

I use 'palimpsest' in the figurative and literal sense. The concept of what a pipe organ can be continues to change, each era's ideas overwriting the last, and when pipe organs are overhauled, organ builders physically leave their mark on what was already there. In previous centuries, pipe organ evolution was comparatively straightforward; successive generations of organ builders produced increasingly innovative instruments, and composers capitalized on their expanded sound potential.[2] It was acceptable for older instruments to be modified or upgraded, even

[1] Hans-Ola Ericsson, *The Four Beasts' Amen and Other Organ Works* (BIS Records, 2006), p. 5 [CD insert].
[2] This is, of course, a generalization about the trajectory of organ building and composition up to the last century, not a specific claim about reciprocity between organist-composers and organ-builders. As Peter Williams notes, 'fine organs are [not] inextricably related to fine music; many times over the centuries organs have been "better" than the music they were built to play, notably those of Holland in 1660, France in 1760 and England in 1860. Even when music and organ appear to be paired, as Frescobaldi with an Antegnati of 1580 or Buxtehude with a Schnitger of 1680, the actual connection between the two seems to me not at all straightforward.' Williams, 'The Organs of Saxony', *The Musical Times* (Vol. 111, 1970), p. 1143.

historically significant ones like Stadtkirche St Wenzel's Hildebrandt, and the march of progress followed the arrow of time. With the *Orgelbewegung* movement, the notion of progress was disrupted with revivalism, which was accompanied by a flurry of neo-Baroque and neo-Classical pipe organ music.[3] Today, our understanding of early instruments and music is more nuanced, pipe organ evolution is not so straightforward, and newness can be ambiguous. When commissioned to construct a pipe organ now, will an organ-builder be asked to recreate something from another time in a certain geographic style, construct a cutting-edge instrument showcasing their propriety technology, or devise a hybrid? The Utopa Baroque Organ at Het Orgelpark, for instance, is one of world's most advanced hyperorgans, but it is also a meticulously researched and crafted Germanic Baroque organ. Pipe organ culture continues to be in a state of multimodal evolution. Interdisciplinary work involving academics, composers, organists, and organ builders is ongoing, with researchers looking at how pipe organs might advance in the future (i.e. as hyperorgans), how they evolved in the past, and how they can be evolved laterally to incorporate existing technologies like live electronics. These strands converge at concerts, in conferences, on CDs, and around pipe organ fora, which promote diverse idea exchange and so foster further plurality.

The value of scrutinizing the link between old and new is highlighted by Peter Peters and Darryl Cressman, who worked on the 2012 Van Straten organ at Het Orgelpark, which is a reconstruction of a 1479 instrument by Peter Gerritsz.[4]

> We find [the early music] 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?[5]

[3] Peter Williams, 'The Idea of *Bewegung* in the German Organ Reform Movement of the 1920s', in Christopher S. Anderson (ed.), *Twentieth-Century Organ Music* (Routledge, 2012).
[4] Peter Peters was also a member of the core team that worked on the Utopa Baroque Organ.
[5] Peter Peters and Darry Cressman, 'A Sounding Monument: How a New Organ Became Old', *Sound Studies* (Vol. 2, 2016), p. 24.

These questions are also pertinent from a compositional perspective, as it makes little sense to separate music from the instruments on which it is played. If the newness of pipe organs can be indeterminate, what does this mean for the works written for them? Peters and Cressman go on to argue that the most pragmatic way to construct knowledge about the past and its relationship to the present can be by emulating it:

> 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 [Hans-Jörg] Rheinberger … 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.[6]

This sort of organological research offers an angle on how we might engage artistically with locatedness: by using historic compositions as work-templates in a similar way to how organ builders use historic pipe organs. Just as projecting 'contemporary insights regarding sound and performance techniques onto the past' can create knowledge of older musical cultures, so revisiting past composition techniques in the present can enrich our experience of current musical cultures. As demonstrated by the works in Chapter One, this can be highly effective, revealing much about the locatedness of old organs, new organs, and new old organs.

In the Van Straten organ's twelve years of existence, it has been predictably popular with early music enthusiasts. It has also proved popular with contemporary musicians including Sarah Davachi, and these are outcomes of which its recreators would approve.[7]

> 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.[8]

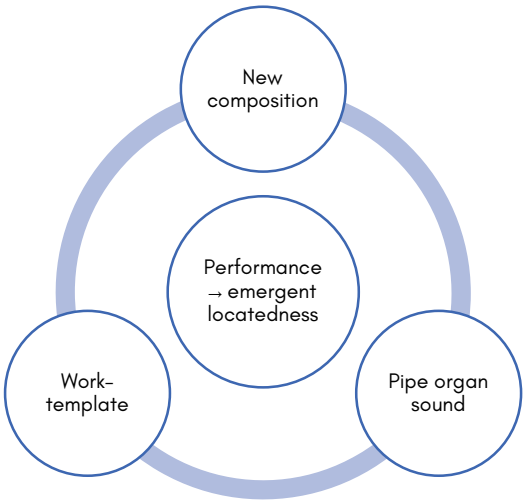
[6] Ibid. p. 33. This echoes Richard Taruskin's argument in 'The Modern Sound of Early Music', *Text and Act* (OUP, 1994), pp. 164-172.
[7] Sarah Davachi, *Cantus, Descant* (Late Music, 2020).
[8] Peters and Cressman, 'A Sounding Monument: How a New Organ Became Old', p. 23.

Throughout their article, Peters and Cressman stress that attention should not be fixated on the newly finished old object, but on the knowledge that interactions with the object from inception to completion and performance produce. This is true for how work-templates should be used, with my rationale based not on superficial anachronism, but on how composed encounters between homogenous elements can produce knowledge about pipe organ culture today.

2.2 Triangulation Points

The opening examples I gave in the Introduction about J. S. Bach, Notre-Dame, and portable loudspeaker organs illustrated how pipe organ repertoire can be as located as the instrument, and how their intermixing can encourage us to reorientate our listening perspective. This is a core part of my methodology, for which reason it is important to conceive of each project not as a linear progression where work-template + new composition + instrument used = performance, but as an interdependent process where each component acts as a triangulation point to approximate locatedness. It is also important to distinguish between time, site, and place as objective properties, and the perception of locatedness that arises as a subjective response to these things.

For example, pipe organs are constructed in a style, installed in a building, and inaugurated on a date. Opinions will differ, however, on whether they conform to stylistic expectations, if their tonal disposition suits the building's acoustic, and how much must be original for them to be authentically dated. Likewise, music is created, heard, and both influences and is influenced by other communities of practice, but we cannot know all its poietic details, and even when presented with the same facts, there will be disagreement over how to interpret the impetus for a particular work or performance. All three performance components therefore have their own sense of perceived locatedness unique to the listener, with each component containing subjective points of harmony and dissonance:



2.2.1 Work-Templates

A central claim of Lydia Goehr's *The Imaginary Museum of Musical Works* is how the work concept is an open concept that has evolved through Western musical history, and continues to do so.[9] At one point, Goehr asserts that '[J. S.] Bach did not intend to compose musical works', a statement that has provoked strong reactions.[10, 11] It is hard for modern audiences not to 'workify' early music, even when we are aware that it is problematic—all the more so for improvisatory traditions. Depending on the listener's viewpoint, the historic compositions connected to each project can be thought of either as works, which are strongly located, or templates, which are weakly located. When thought of as a catalogued work by a named composer, they gain a concrete presence and become tied to a certain time, site, and place, but as templates jotted down by that composer for a student, the same assemblage of notes represents a generic archetype to be copied out, studied, and recycled, becoming diffused across time, site, and place. Dieterich Buxtehude's organ works exemplify this, especially bearing in mind the role that the young J. S. Bach played in copying out his music, and emphasizes the importance of assimilating work-templates to the pipe organ tradition.[12]

[9] Lydia Goehr, *The Imaginary Museum of Musical Works* (OUP, 2007).
[10] Ibid. p. xlii.
[11] For one such reaction, see Harry White, *The Musical Discourse of Servitude* (OUP, 2020).
[12] 'The transmission of the free works for keyboard instruments is based exclusively on copies, as Buxtehude's original compositions in autographs and fair copies are no longer extant.' Harald Vogel (ed.), 'Critical Commentary', *Buxtehude Organ Works, Vol. I/2: Free Organ Works* (Breitkopf & Härtel, 2021), pp. 44-79, English translation: https://www.breitkopf.com/assets/pdf/EB_9305_Kritischer-Bericht_Engl.-Translation_klein.pdf, accessed 04/02/25; see also Peter Wollny and Michael Maul (eds.), *Weimar Organ Tablature: J.S. Bach's Earliest Music Manuscripts* (Bärenreiter, 2007).

I do not wish to support one stance or the other, of work-template as definitively work or template, but to exploit their capacity for equivocality. Depending on how identifiable the work-template is in the new composition, listeners may contemplate the project's belonging: to the original composer, to me, or to a tradition. There is a difference between modern attitudes toward learning from earlier pipe organ cultures and the dogmatic reformism of last century's *Orgelbewegung*, and with this in mind, I am not advocating for a neo-neo-Baroque organ composition movement. The creative potential of historic work-templates lies in taking them for what they are and employing them experimentally to act as a lens through which to view pipe organ culture, not in rehashing them to perpetuate prescriptive attitudes about a singular way to compose for the instrument. To treat Buxtehude's free organ music as autonomous works is to take something away, but to acknowledge their improvisatory beginnings, the circuitous route by which they have reached us, and the influence they exerted over other organist-composers along the way, is to animate them and the people who gave them life.

2.2.2 Pipe Organs

Listening to pipe organs involves a degree of suspended disbelief, as the audience knows that they are not hearing a single sounding body, but thousands of separate pipes; that though an organist may not be visible, one probably exists; and that while the instrument may seem static and timeless, it could have been overhauled or replaced the previous year. Beyond their physical presence, pipe organs have a symbolic presence, but this is no more fixed than the people and institutions that imbue it with this symbolism in the first place. Just as a multiplicity of replaceable components comprise the physical pipe organ, so a field of mutable concepts gives rise to the symbolic pipe organ.

To an organist, an organ pipe is a known quantity and a means to an end: different pipes have different timbral characteristics, and their purpose is to produce sound in order to facilitate musical performance. To an organ builder, however, an organ pipe represents a range of possibilities: they fabricate, voice, and tune pipes every day, and conceive of pipe organs as

machines as much as they do musical instruments. Then again, to an artist, an organ pipe could be an end unto itself if they present it as such: the materiality of the pipe and its sound may be of equal or greater importance than any modes of signification to which it is usually attached. Despite its monolithic presence, there is no single monolithic conception of the pipe organ, with the gap between the objectively located physical pipe organ and the conceptually located symbolic pipe organ being mediated by our own personal frames of reference.

2.2.3 New Compositions

When I referred to Vierne playing Bach as a 'collision of worlds', it was for dramatic effect, as really it represents an intermingling. My compositions are about effecting other interminglings, and in conjunction with the work-templates and pipe organs used for performance act as triangulation points in the expanse of pipe organ culture. This expanse represents over two thousand years of music involving innumerable people across many countries, from the pipe organ's origins in Hellenistic Alexandria (via the Roman and Byzantine Empires, then Medieval Europe) to the rest of the world, and ultimately to present day hyperorgans. My windows into this stretch from the earliest to the latest work-templates used, and from the commencement to the completion of this doctorate. Compared to the whole expanse, this gap of a few centuries might seem small, but we know from historically informed performance that it can be a huge gulf.

The new compositions do not try to correct for musical drift, instead testing techniques that draw on and accentuate natural movement. Each project and its constituent pieces develop different means to zoom in and capture snapshots of canonic glaciation, and together provide a comprehensible picture of an incomprehensible whole. By combining and mentally arranging these snapshots, a more or less familiar aural map forms in the mind of the listener. Whether this sonic image bears any resemblance to the true landscape or has all the accuracy of a Victorian dinosaur illustration is a moot point, as no one has ever seen a living dinosaur. But by giving them room in our imagination, they are temporarily brought to life, and the archival musical fossils are free to roam through the musical undergrowth again.

2.3 Canon as Cartella[13]

Having described in **2.1** how the aesthetic and physical processes affecting historic pipe organs renders them a cultural palimpsest, what sort of equivalent processes might be purposefully employed with historic work-templates? Given that my goal is not musical recreation, this is where my methodology diverges from Peters and Cressman, who seek to (re)discover knowledge through meticulous acts of reconstruction. To simply replicate pieces in an idiomatic late Renaissance or Baroque style, however, would fail to achieve comparable enlightenment, as composition is not organology—a discipline which straddles the natural and social sciences. The compositional techniques and procedures detailed in the remainder of this thesis are therefore intended to defamiliarize the work-templates, not reproduce them as Peters and Cressman reproduced an organ. This defamiliarization process is the critical step that permits the triangulation of locatedness, and involves treating the work-templates, and by extension the wider pipe organ canon, as a cartella to be altered, added to, and written over.[14]

To bridge the gap between organology and composition, I adapted John Tresch and Emily I. Dolan's four axes (after Foucault) to formulate the four primary research questions. Building on the work of Bernard Stiegler, Tresch and Dolan articulate a 'new organology', a central claim of which is that we ought not to compartmentalize the study of musical and scientific instruments, as the trajectory of one category can reveal much about the other and about the societies that developed them. Tresch and Dolan use the pipe organ as an example in their article, and they question how we perceive the agency and ethics of instruments, proposing the following axes to facilitate effective scholarship in this regard:[15]

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[13] 'The erasable tablets used for musical purposes were given a variety of names referring to their form (tabletes, tabella, tavola, tabula), the material with which they were made (slate, ardoyse, Schiffer Stein) or their function (tabula compositoria, palimpsestus compositorius) and were widely used for teaching, preparing transcriptions and intabulations, and composing. The most common name was the Italian word 'cartella' and its cognates.' Friedemann Sallis, *Music Sketches* (Cambridge University Press, 2015), p. 56.
[14] The English word 'defamiliarization' has come to be associated with various concepts, from Bertolt Brecht's 'verfremdungseffekt', to Jacques Derrida's 'différance', and Sigmund Freud's 'unheimliche'. In a musical context, the word is not well defined, and can mean different things to different people; see Felipe de Almeida Ribeiro, 'Being the Other: Defamiliarization Processes in Musical Composition', *Música Hodie* (Vol. 23, 2023), https://doi.org/10.5216/mh.v23.73322, accessed 12/09/24. Here, I am using the word in the literal descriptive sense of taking something familiar and making it less so. The actual artistic results of this and the effect it has on how the new compositions are apprehended varies between projects, and will be discussed in **3.5**, **4.3**, **5.4**, and **6.2**.
[15] John Tresch and Emily I. Dolan, 'Toward a New Organology: Instruments of Music and Science', *Osiris* (Vol. 28, 2013), p. 284.

1) The *material disposition* of the instrument: the nature and configuration of its elements, and the materials and parts that make it up. Also, and perhaps most important, this disposition is defined by which parts are seen as necessary to make the object an instrument of a certain type, and which may be varied to alter its specific action. (This corresponds to what Foucault called the ethical substance, that part of the self made an object for moral reflection).

2) The instrument's *mode of mediation:* whether its action is considered to be autonomous or passive, modifying or transparent, hidden or visible (corresponding to Foucault's ethical activity, the work conducted to make oneself a subject of ethics).

3) The *map of mediations* of which the instrument is a part. Such maps, joining together a number of distinct elements, may be rather complex: in music they include air, sound, composers, players, other instruments, and listeners, as well as orchestration treatises and rules of composition; in the sciences they include the phenomena being investigated, the observer or experimenter, and other elements in the experimental system, as well as rules of method, laboratory protocols, scientific institutions, and patterns of moving between observation and generalization. (This category relates to what Foucault calls the mode of subjection, or the subject's relation to rules or obligations).

4) The *telos* of an instrument's activity, or its ends (Foucault uses the same term to describe the goal of ethical work). What is the nature of the enterprise within which the instrument is deployed; what are its social contexts and uses, and the social, economic, and political relations they express, reinforce, or perhaps modify? At the level of telos we might also want to bring in broader conceptions of the goals attributed to instruments (much as Hadot suggested in his critique of Foucault mentioned above): not the instrument's relation to itself but its relation to its users and those exposed to its products, as well as its impact on the entire collective. Furthermore, we might consider the relationship an instrument is seen to entertain with the natural order, with the cosmos as a whole.

From these axes were derived the four primary research questions, which were used to guide the compositional direction of the projects. With reference to defamiliarization and to the approaches discussed in the previous chapter, below is an overview of the techniques and procedures I aimed to deploy.

2.3.1 Material Disposition

How can contrapuntal techniques be developed in a contemporary context to achieve expanded goals, like spotlighting the mechanical formalism and functioning of the pipe organ, and how can musical form and structure be used to sound out the material form and structure of the instrument itself?

The counterpoint identified in Chapter One may be split into three broad groups: pastiche, contemporary, and electronically augmented. My projects build on these, combining them to produce new hybrid contrapuntal techniques which act as a common language to facilitate a dialogue with the past. Their function is to explore the physical instrument in conjunction with the music's structural and formalistic arrangement, and so the role of defamiliarization here is to foreground the space between historic and contemporary practice which can expose parts of pipe organ design taken for granted. Quoting Jean-François Gauvin, Tresch and Dolan recount how the Jesuit philosopher Marin Mersenne saw the pipe organ as 'reification of [his] universal harmony, a harmony juxtaposing the spiritual and the worldly, the music of pure consonances with the levers, gears and bellows of a mechanical device', but in my own projects, it is the dissonances which are of interest. Not in the tonal, but the abstract sense.[16] The projects in the next chapter, *Manual Works* and *Orgelwerke* combine pastiche counterpoint with electronic augmentation, showing different ways in which electronics can provide a secondary layer of contrapuntal transformation. In Chapter Four's *Passacaglias for Organ*, contrapuntal principles were used to organize unintentionally pitched and non-pitched organ

[16] Tresch and Dolan, 'Toward a New Organology: Instruments of Music and Science', p. 295.

sound in a similar way to the intentionally pitched sound from the pipes. The final two projects in Chapter Five, *Organ Concerto (after Handel)* and *Clock Sync*, examine how process-driven transformations can be used to re-order original notes.

2.3.2 Mode of Mediation

In what ways do different presentations of pipe organ sound affect apprehension of the instrument, e.g. how do human, automated, and semi-automated performances using acoustic, electronic, and electroacoustic sound shape listener perception of pipe organ agency?

The most common performance scenario involving the pipe organ is a human playing an acoustic instrument, and so any departure from this norm is, to an extent, a form of defamiliarization. As shown by Éliane Radigue and György Ligeti before her, however, pitched sound from a single pipe organ can also seem defamiliarized. Each composition project uses one of the five performance formats in which it is possible to encounter pipe organ sound today: solo pipe organ, temporarily augmented pipe organ, permanently augmented pipe organ (i.e. a hyperorgan), fixed media (either for live multichannel diffusion or stereo CD release), and physically instantiated ('sound art').[17] In all cases, the projects attempt to find a Goldilocks zone, as the success of defamiliarization depends not on making something totally unrecognizable, but on altering it just enough. *Manual Works* is for box organ and four-channel live electronics, *Orgelwerke* is a sixteen-channel installation using custom-made loudspeakers, *Passacaglias for Organ* is a fixed-media electroacoustic work for diffusion, *Organ Concerto (after Handel)* is for pipe organ alone, and *Clock Sync* is for automated hyperorgan.

2.3.3 Map of Mediations

What can the use of historic pipe organ compositions as templates reveal about the interconnectivity of canon, instrument, and people, and how these linkages are embedded within pipe organ culture?

[17] Loudspeaker organs have been omitted from this list, as they are essentially synthesizers with a highly specific timbral palette.

If the work-template was too recent, then the new composition might feel like an act of homage rather than a distinct work, but if it were ancient, then it could seem distant and unrelatable. If it was obscure, then it might hamper its recognizability as a point of reference, but if it were ubiquitous, then overfamiliarity could impede its efficacy as a critical tool. If it was loosely constructed, then the new composition might be too vague, but if it were excessively rigid, then scope for personal expression could be diminished. Given the integral role of counterpoint in my research, it was necessary for the work-templates to be stylistically appropriate, and so my choice stretches from the mid-sixteenth century to the mid-eighteenth century. Here, the defamiliarization is textual, getting beneath the surface of what they embody to uncover old linkages—and make new ones—between traditions, repertoires, and sounding bodies. The research goal was to test ways of referencing historic composition, and so the nature of the selected work-templates varies, with some new compositions using a specific historic piece as their model, but others a compositional type or the stylistic blueprint of a composer. Exactly how each work-template is defamiliarized also varies, and some new compositions quote or rework them directly, while others keep them in the background and reference them indirectly.[18]

2.3.4 Telos

In what ways can the techniques and procedures issuing from the previous questions be leveraged to expose interrelations between the objective properties of time, site, and place, and the subjective reactions to them through which a sense of function, purpose, and ends arise?

As previously stated, this final question is overarching, designed to frame the development and application of the compositional techniques and procedures of the previous questions by establishing thematic lines of enquiry for each chapter. These lines of enquiry provided a starting point for the projects, and are contextualized at the beginning of each chapter:

[18] William Porter, 'Reconstructing 17th-Century North German Improvisational Practice: Notes on the Praeambulum with a Report on Pedagogy Used in December 1995,' *GOArt Research Reports* (Vol. 2, 2000), pp. 25-40.

- Chapter Three: Origin and Imitation

  Why do notions of (in)authenticity and verisimilitude affect the perceived realness of organ sound and allusive composition, and in what ways can one be combined with the other to say more about both?

- Chapter Four: Signal and Noise

  How do concepts of noise and space relate to the pipe organ, and the manner in which the intentionally pitched, unintentionally pitched, and non-pitched sounds that they produce interact with one another, their environment, and the listener?

- Chapter Five: Order and Reorder

  What can pipe organ arrangement and registration conventions tell us about how the instrument's material disposition is perceived, and how might subverting them reconfigure assumptions about the agency of sounding bodies and the autonomy of their works?

* * *

To recap: my methodology borrows from the principles of experimental historic organology practised by Peters and Cressman, as their application to contemporary pipe organ composition offers a route to writing for the instrument that brings into focus multiple facets of its identity. Rather than using historic pipe organs as templates for reconstruction, however, I use historic compositions from the late Renaissance and Baroque as templates for defamiliarization. In turn, this defamiliarization allows for the triangulation of locatedness as an emergent property of performance. Defamiliarization is achieved by refracting the image of earlier music through the prism of Tresch and Dolan's axes via the primary research questions, representing different strata of organization, and leading to the development of dedicated composition techniques and procedures.

How these techniques and procedures were developed will unfold over the next three chapters, with each chapter including background to the projects, critical commentary on individual pieces and movements, and a reflection on the projects as a whole. No single piece—or project—demonstrates everything, but divided across the chapters are the answers to the above questions. From the various ways in which a work-template can be treated, either as a structural and formalistic model, an idiomatic paradigm, a motific reference source, or a mixture of the three; to the application of modernized counterpoint, like how to reorganize the notes of an existing work using predetermined processes, how to add another layer of contrapuntal transformation using live electronics, and how to apply contrapuntal principles normally associated with intentionally pitched sound to unintentionally and non-pitched sound; as well as the various permutations of pipe organ sound presentation involving human, semi-automated, fully automated, acoustic, electroacoustic, and electronic performance formats. The promise of these kind of techniques and procedures lies in their ability to sympathetically echo the historical being of pipe organs, reinterpreting what is already there, and tapping into a rich seam of historically aware ingenuity that has long typified pipe organ culture.

Chapter Three
Origin and Imitation

Why do notions of (in)authenticity and verisimilitude affect the perceived realness of organ sound and allusive composition, and in what ways can one be combined with the other to say more about both?

3.1 Background

In 1929, Edouard Eloy Coupleux and Joseph Aarmand Givelet demonstrated their Automatically Operated Musical Instrument of the Electric Oscillator Type at the Salle Pleyel in Paris, which was the world's first sequenceable synthesizer.[1] Although it did not take off in that form, they were later commissioned to install manually playable instruments as pipe organ substitutes across France.[2] Three years after Louis Vierne made his phonograph recording of J. S. Bach, he attended Maurice Duruflé and Maurice Béché's inaugural 1932 recital on the Coupleux-Givelet organ at the Poste Parisien radio station auditorium on the Champs-Élysées, during which Duruflé played pieces by Dieterich Buxtehude and J. S. Bach.[3] Writing the same year, Director of the Metz Conservatoire, René Delaunay, recounted the mixed reactions to the new 'orgue des ondes' (wave organ) as it was known:

> There are also those who do not believe that the pipe organ can be modified or replaced. They reproach the newcomer for the quality of its stops, which they consider not to be as beautiful as those of older organs. This assessment is purely subjective, first of all because the timbres of an organ vary from one instrument to another, and that, strictly speaking, there is no standardization of stops; then also because the labels given to these timbres, Trumpet, Flute, Oboe, etc., do not constitute exact imitations of said instruments, but

[1] Mark Vail, *The Synthesizer* (OUP, 2014), p. 114: 'It was the first electronic instrument to allow automated control of pitches produced by four vacuum-tube oscillators, their output amplitude, and filtering of the sound to vary its timbre. The Coupleaux-Givelet [sic] incorporated a paper-tape reader with a pneumatic tracker bar like a player piano. Holes punched in specific rows of the tape varied the instrument's parameters, allowing the sequencing and articulation of predetermined notes and control of the overall sound.'
[2] Michel Dimitri Calvocoressi, 'Music in the Foreign Press', *The Musical Times* (Vol. 79, 1938), p. 181.
[3] Alain Cartayrade, 'Concerts et Emissions d'Orgue à la Radio Française de 1924 à 1940', *Bulletin de l'Association Maurice et Marie-Madeleine Duruflé* (Vol. 11, 2011).

> simple analogies. However, the timbres of the new organ are neither less beautiful nor less rich than those of the old; there are some which are purer, and there are others which are new and very curious.[4]

Delaunay's stance was a progressive one, as almost a century later, public sentiment is still mixed. The debate tends to be couched in technological terms, with the focus on how convincingly loudspeaker organs can replicate pipe organ sound, or what live electronics can add to performance. But what does it mean for performance and sound to be convincing?

John Croft attempts to answer this in his 'Theses on Liveness', where he questions 'what more there is to music than sound'. With reference to Roland Barthes' concept of 'grain', Croft discusses how the ephemeral moments resulting from 'the appearance of the body in the (musical) text – the body of the performer, and the sounding body of the instrument' that lead to a sense of liveness and instrumentality might be transliterated to electroacoustic performance.[5] Covering similar topics in 'Of Pipes and Patches: Listening to Augmented Pipe Organs', Christophe d'Alessandro and Markus Noisternig outline their main aesthetic principles, i.e. microphony, fusion, and instrumentality. On their use of the word 'instrumentality', D'Alessandro and Noisternig clarify that it 'concerns the limitation to sound material stemming from the organ (source) that feeds into the audio processing. It thus restricts electroacoustic processing to organ sounds only, without using any external source or sample playback', before going on to propose a taxonomy of musical effects producible with an augmented pipe organ.[6] Although not cited directly, there are parallels with Croft's work, and preserving instrumental causality between the pipe organ and loudspeakers during performance is paramount to d'Alessandro and Noisternig.

In terms of granularity, modern loudspeaker organs can sound unreal not because they are imperfect, but because they are too perfect. Their stops are flawlessly in tune, timbrally

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[4] René Delaunay, 'L'Orgue, son Histoire de l'Antiquité à Nos Jours', *Mémoires de l'Académie Nationale de Metz* (Tome XVI, 1933), p. 272, https://gallica.bnf.fr/ark:/12148/bpt6k9604718m, accessed 23/11/21.
[5] John Croft, 'Theses on Liveness', *Organised Sound* (Vol. 12, 2007), p. 65.
[6] Christophe d'Alessandro and Markus Noisternig, 'Of Pipes and Patches: Listening to Augmented Pipe Organs', *Organised Sound* (Vol. 24, 2019), p. 42.

consistent, impervious to temperature and humidity, and unaffected by anything else happening around them.[7] At the other end of the spectrum, overprocessing pipe organ sound with live electronics can sound unreal when the original timbral characteristics of the stops are no longer discernible, especially in the cavernous acoustic of a cathedral. The stops of the Coupleux-Givelet organ, however, had a quality of realness. Not only because the instability of the analogue oscillators, filters, amplifiers, and rudimentary loudspeakers would have produced a sound as characterfully granular as an acoustic instrument, but because the Coupleux-Givelet organ was more than an attempt at mimicry, it was a reinterpretation of an extant sound culture.[8]

Perhaps the same is true of composition, where flawless imitation or over-exaggeration results in music that feels unreal because it is also lacking something vital. The sociocultural milieu that gave rise to whatever it is being imitated will have passed, maybe centuries ago, and so the meaning transmitted becomes changed. In addition to citing Barthes, Croft references Julia Kristeva's ideas of phenotext and genotext in relation to liveness.[9] Applying these to the context of allusory composition, literal pastiche involves generating an idiomatic phenotext, but the original nature of any genotext in the absence of a compositional type's progenital musical culture will be irreplicable. This chapter is not about the ontology of pastiche works, which is a subject that already occupies many pages elsewhere, but about how to respond creatively to the associated ambiguities that feed into cycles of creation and reception.[10]

From a compositional perspective, there are two main points of tension regarding origin and imitation: grain and genotext. Or to put it more poetically, how to reanimate the inanimate. Regarding fugues, of which there are two in *Orgelwerke*, Paul Walker concludes that writing one

[7] Even if the sound is physically modelled to approximate the sonic interactions and other variables within an organ case, and even if hundreds of high-performance loudspeakers were to be used, it would never be possible to capture the cumulative, changeable, emergent grain of the tens of thousands of moving and sounding components distributed within such a large volume that constitutes a pipe organ.

[8] Calvocoressi, 'Music in the Foreign Press', p. 182: 'The new organ does aim at slavishly reproducing the tone and idiosyncrasies of the old, shortcomings and all. It is a new instrument, with valuable possibilities of its own.'

[9] John Croft, 'Theses on Liveness', p. 65. Also Julia Kristeva, *Revolution in Poetic Language* (Columbia University Press, 1985), pp. 86-89.

[10] See Alessandro Bertinetto, 'The Musical Pasticcio: A Plea for a Readymade Ontology for the Musical Work', in Berthold Over and Gesa zur Nieden (eds.), *Operatic Pasticcios in 18th-Century Europe* (Transcript, 2021); and Ingeborg Hoesterey, 'Postmodern Pastiche: A Critical Aesthetic', *The Centennial Review* (Vol. 39, 1995), pp. 493-510.

now is 'an act of homage to the past.'[11] When completing an exercise for a university techniques of composition module, this might be true, but to imply that fugues, or any other early compositional type, can no longer be used artistically in contemporary contexts seems hasty. The challenge is to avoid reducing the work-template to a stereotype, and to translate the subtleties that would have been intelligible to period audiences into nuances that are not alien to modern ones. The projects detailed below, *Manual Works* and *Orgelwerke*, take the above uncertainties as their starting point, and position the compositional implications of perceived realness as the topic of the music itself, offering two takes on (in)authenticity and verisimilitude.

3.2 *Manual Works*

Manual Works comprises three short pieces inspired by the English Virginalist School, and is for a single performer playing an box organ with four-channel live electronics. The first is based on Orlando Gibbons' Fantazia of Foure Parts, the second alludes to the hexachordal 'ut, re, mi, sol, fa, la' pieces popular at the time, and the third is a set of variations on the tune O Mistress Mine after William Byrd. The pieces are straightforward, and the use of electronics is restrained. Two microphones are placed immediately in front of the box organ, their output is routed through a laptop and mixed down for processing via four channels, then the sound is diffused through four loudspeakers.

Box organs are seldom used for recitals due to their limited timbral range and modest volume, instead accompanying singers in a choral setting or playing continuo in an orchestral one. Here, the loudspeakers take on the role of a four-part choir, but they accompany the box organ as much as it accompanies them. Each voice adds an additional contrapuntal layer, using simple effects like delay, distortion, filtering, and reverb to imitate what has been played on the organ. The degree of delay increases from piece to piece, with Fantasia's maximum delay being

[11] Paul M. Walker, 'Fugue', *Grove Music Online*, https://doi.org/10.1093/gmo/9781561592630.article.51678, accessed 14/07/23.

four crotchet beats, Ut, Re, Mi…'s being fifty-six seconds, and O Mistress Mine looping entire variations to superimpose them over subsequent ones.

3.2.1 Fantasia

The opening piece maps directly onto Orlando Gibbons' Fantazia of Foure Parts found in the c. 1615 collection *Parthenia*, which was both the first book printed in Great Britain with engraved copper plates, and the first printed anthology of keyboard music published anywhere in the world.[12] The material has been reimagined section by section, so that both pieces are the same number of beats long, with the junctures at which significant motifs appear occurring at the same point in the original and new works. Fantasia was conceived as a meditation on Gibbons' music, with its goal being to retain the essence of the contrapuntal devices and motific gestures, but to make space for them to unfold in a changed manner.

The comparatively short loudspeaker delays synchronized to the underlying tempo are intended to echo the imitative elements of the notated counterpoint, exaggerating the texture by doubling, tripling, and quadrupling the canonic, fugal, and sequential episodes heard throughout the piece. Each loudspeaker gradually fades in, building to b. 25 when a 4′ stop is drawn. At this point, they begin to transpose the box organ sound up, complementing the addition of the 4′ and latterly the 2′ stop, with each loudspeaker gradually crossfading to thin out the delays and introduce a virtual 'mixture' comprising a 5th, 8th, 12th, and 16th.

SEC-TION	FANTASIA (JHF)	FANTAZIA (OG)	LDSPKR 1 DEL./TRAN.	LDSPKR 2 DEL./TRAN.	LDSPKR 3 DEL./TRAN.	LDSPKR 4 DEL./TRAN.
I	bb. 1-6	bb. 1-8	-	-	-	♩/0
II	bb. 7-12	bb. 9-11	-	-	𝅗𝅥/0	♩/0
III	b. 13	b. 12	-	-	𝅗𝅥/0	♩/0
IV	b. 14	b. 15	-	𝅗𝅥./0	𝅗𝅥/0	♩/0

[12] *Parthenia or The Maydenhead of the first musicke that ever was printed for the Virginalls* (G. Lowe of London, c. 1615), British Library, Music Collections R.M.15.i.15. The bar numbers in the table and examples below correspond to the British Library manuscript, but the notation has been modernized.

V	bb. 15–24	bb. 16–23	b. 19 𝅝/0	𝅗𝅥./0	𝅗𝅥/0	♩/0
VI	bb. 25–32	bb. 23–25	𝅝/0	𝅗𝅥./0	𝅗𝅥/0	♩/0
VII	bb. 33–49	bb. 25–32	𝅝/0	𝅗𝅥/+8th	𝅗𝅥/0	b. 33 ♩/0 b. 44 𝅗𝅥/+5th
VIII	bb. 50–53	bb. 33–36	b. 50 𝅗𝅥/+12th b. 52 0/+12th	b. 50 𝅗𝅥/+8th b. 52 0/+8th	b. 50 𝅗𝅥/0 b. 52 0/+16th	b. 50 𝅗𝅥/+5th b. 52 0/+5th
IX	bb. 54–57	bb. 37–41	0/+12th	0/+8th	0/+16th	0/+5th

Section I introduces the opening material of Gibbons' Fantazia, juxtaposing the original subject as a series of held and broken chords in bb. 1–5 (JHF) with the original rising countersubject figure soloed-out in b. 6 (JHF):

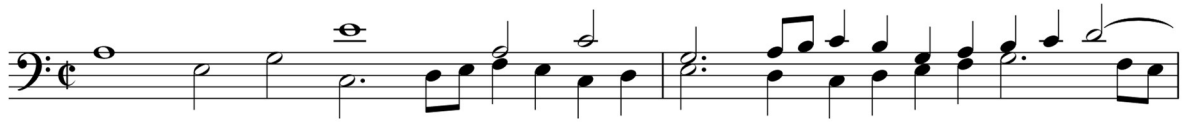

Figure 3.1 **Fantazia (OG), bb. 1–2**

Section II is extrapolated from bb. 9–11 (OG), but only repeated and ascending notes were kept, emphasizing the upward trajectory of the passage:

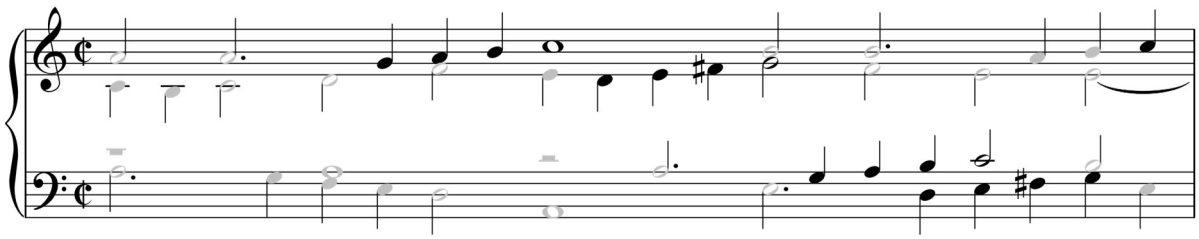

Figure 3.2 **Fantazia (OG), b. 9**

Section III highlights Gibbons' dramatic written-out trills:

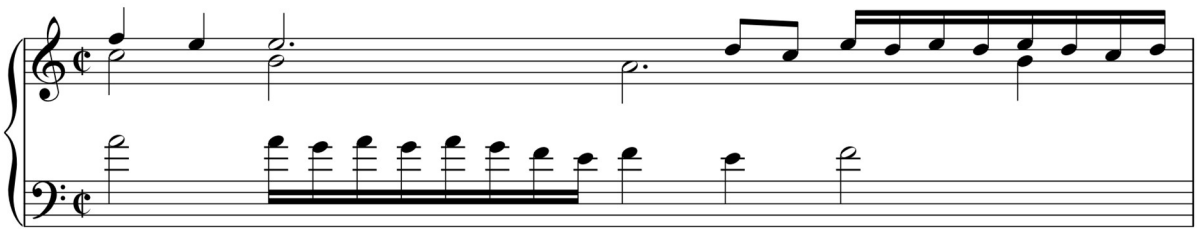

Figure 3.3 **Fantazia (OG), b. 12**

The descending canonic figure of section IV is derived from b. 15 (OG), pre-empting related passages later in the piece:

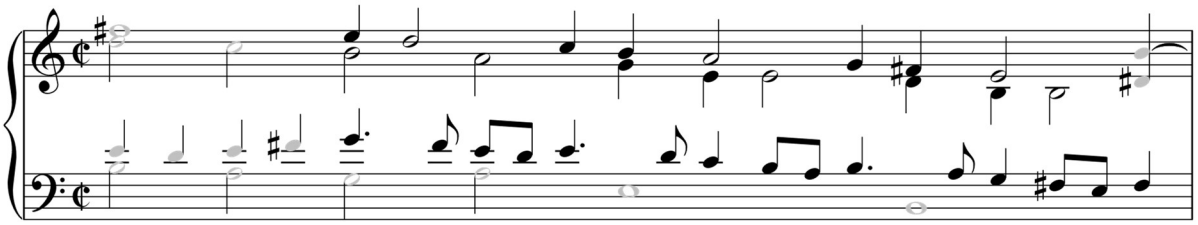

Figure 3.4 **Fantazia (OG), b. 15**

Bb. 15-17 (JHF) and 19-22 (JHF) of section V uses a similar approach to section II, directly copying consecutive motif entries from Gibbons, but here layering subsequent notes of the motif to create cluster chords; b. 18 (JHF) and b. 23 (JHF) break this pattern, overlaying tied motif notes with a recurrence of the rising countersubject figure from the opening:

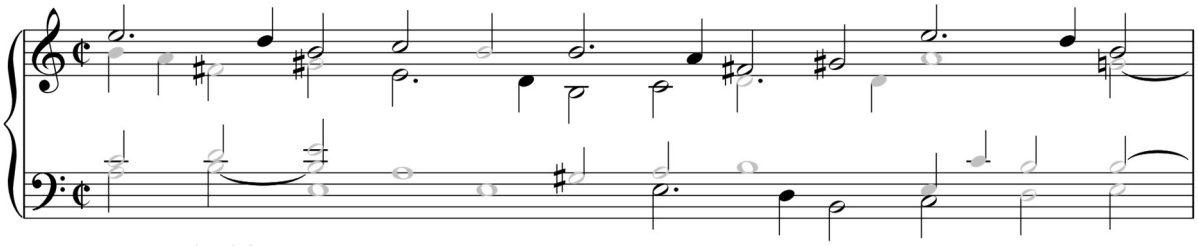

Figure 3.5 **Fantazia (OG), b. 17**

Section VI alludes to the quaver and semi-quaver acceleration of Gibbons' corresponding passage, while also recalling the canon of section III:

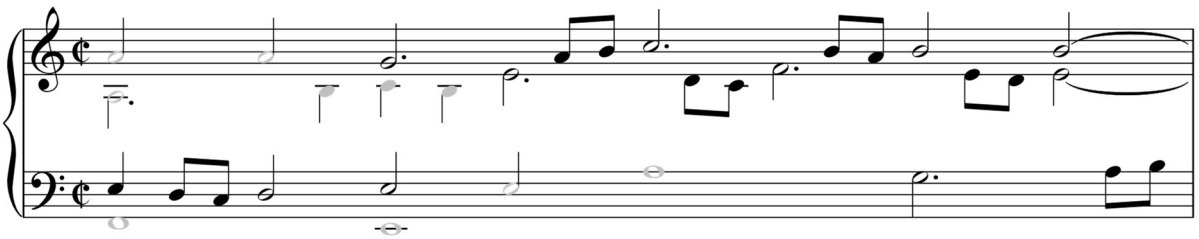

Figure 3.6 **Fantazia (OG), b. 23**

Section VII borrows the basic rhythm, contrary motion, and sequentiality from Gibbons, but distils its essence and simplifies the part-writing to make it more homophonic:

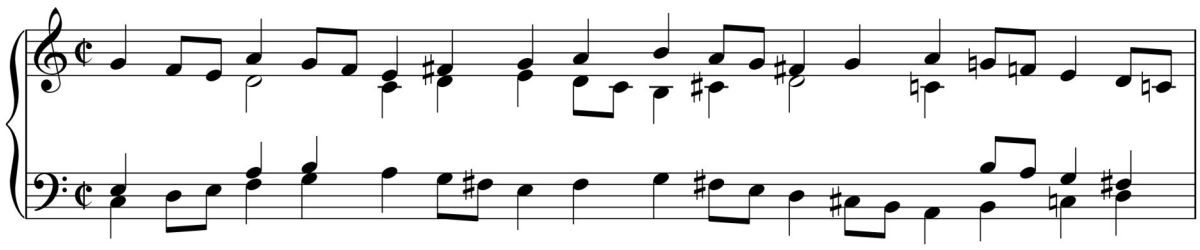

Figure 3.7 **Fantazia (OG), b. 26**

Section VIII decouples the two constituents of Gibbons' penultimate passage, the circle-of-fifths motif and syncopated rhythm, which are now separated between the left and rights hands:

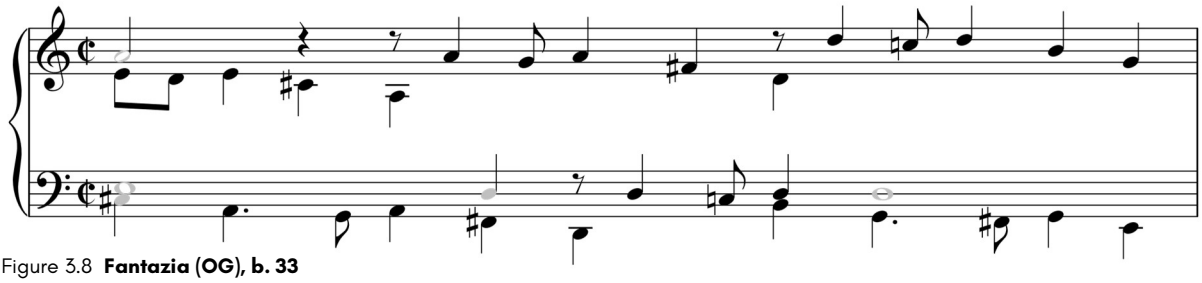

Figure 3.8 **Fantazia (OG), b. 33**

Section IX again layers Gibbons' motifs as clusters, initially with tied notes then repeated chords, before the final cadence closes with an altered version of the opening motif.

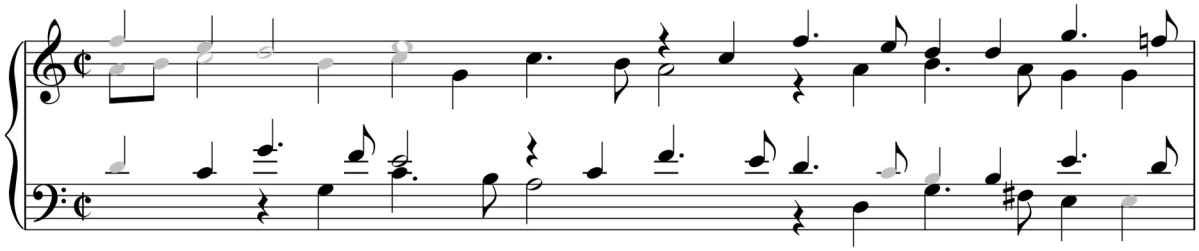

Figure 3.9 **Fantazia (OG), b. 37**

3.2.2 Ut, Re, Mi…

So called 'hexachord fantasias' were characterized by strict self-imposed parameters and learned counterpoint, but could also be playful and virtuosic.[13] Originating in England as keyboard pieces, they later spread to the continent and formed the basis of instrumental and choral works.[14] Rather than being built around a hexachord, Ut, Re, Mi… is based on modern modes, harmonically untethering it and defamiliarizing the work-template's foundation from the outset. The first stipulation was that every part must move by step through each note of a scale for an octave before it can leap a larger interval, at which point it must begin a stepwise octave scale again. The second was that the piece should allude to species counterpoint by introducing notes of decreasing value from breves to demisemiquavers as the music progresses. These are stringent stipulations, resulting in music that feels self-consciously overdetermined and quixotic.

[13] Gary Verkade, 'John Bull: Ut, re, mi, fa, sol, la, A Performer's Investigation' [Parts 1 and 2], *The Diapason* (Vol. 1118, 2003), pp. 16-18 [Part 1], and *The Diapason* (Vol. 1119, 2003), pp. 15-17 [Part 2].
[14] Jehoash Hirshberg, 'Hexachord', *Grove Music Online*, https://doi.org/10.1093/gmo/9781561592630.article.12963, accessed 14/07/23.

The bass part opens with an ascending breve Locrian scale starting on C2, followed by a descending Aeolian scale on C3 at b. 8, an ascending Mixolydian scale on C2 at b. 15, a descending Lydian scale on C3 at b. 22, an ascending Phrygian scale on C2 at b. 29, a descending Dorian scale on C3 at b. 36, and finally an ascending Ionian scale on C2 at b. 43.

The alto part enters at b. 8 with an ascending semibreve Locrian scale starting on C4, then follows the same modal scale sequence as the bass part, but two octaves higher and in semibreves, until it has moved through all seven modes by b. 32, at which point it descends the Locrian scale once more and drops out at b. 36.

The tenor part enters at b. 15 with an ascending minim Locrian scale starting on C3, then follows the same modal scale sequence as the bass and alto parts, but at the octave in between and in minims, until it has moved through all seven modes by b. 27, at which point it descends the Locrian scale once more. Between bb. 29–35, the tenor part plays an alternating ascending then descending harmonic minor crotchet scale starting on the same pitch as the bass part at the start of each bar, then between bb. 36–42, it plays alternating ascending then descending modal white-note-only quaver scales before dropping out by bar 43.

The soprano part enters at b. 22 with an ascending crotchet Locrian scale starting on C4, then follows the same modal scale sequence as the other parts, at the same octave as the alto part but in crotchets, until it has moved through all seven modes by b. 28, at which point it descends the Locrian scale once more. Between bb. 29–35, it plays alternating ascending then descending melodic minor quaver scales starting on the same note as the alto part every semibreve. Between bb. 36–42, it plays modal white-note-only semi-quaver scales, then from bb. 43–50, a pattern of eight ascending and then eight descending major demi-semi-quaver scales starting on the same note as the bass part at the start of each bar.

Instead of accentuating the notated contrapuntal features as in Fantasia, the live electronics here produce new ones, with each loudspeaker having a different one-octave

bandpass filter and delay to create four quasi-canons: loudspeaker 1, C5-C6, 8 seconds (=1 bar); loudspeaker 2, C4-C5, 16 seconds (=2 bars); loudspeaker 3, C3-C4, 32 seconds (=4 bars); loudspeaker 4, C2-C3, 56 seconds (=7 bars). The written parts frequently move outside of these octave boundaries, so the loudspeakers do not simply act as SATB repeaters, but fundamentally alter the contrapuntal scope. To maximize the filters' efficacy, only an 8' stopped flute is used for performance, which is the closest a pipe organ can come to producing a partial-free sine wave. Combined with the bandpass filter, however, this leads to timbral blandness, and so lightly increasing distortion is added as the piece progresses.

3.2.3 O Mistress Mine

O Mistress Mine survives as a vocal arrangement in Thomas Morley's *The First Book of Consort Lessons*, a set of variations by William Byrd found in the *Fitzwilliam Virginal Book*, and a later songbook with a different text. Although Shakespeare seems to allude to the song in *Twelfth Night*, the connection has not been proven.[15] *Manual Works'* final piece takes Byrd's presentation of the tune as the basis for six short variations, successively superimposing certain ones on top of each other with filters and reverb during repeats.[16]

VARIATION	LOUDSPEAKER 1 1 sec. rev. length	LOUDSPEAKER 2 2 sec. rev. length	LOUDSPEAKER 3 3 sec. rev. length	LOUDSPEAKER 4 4 sec. rev. length
Theme	-	-	-	-
I first time I repeat	- Theme	-	-	-
II first time II repeat	- Variation I	- Theme	-	-
III first time III repeat	- Variation II	- Variation I	- Theme	-
IV	-	-	-	-
V (no repeat)	Live organ sound	Live organ sound	Live organ sound	Live organ sound
VI first time VI repeat	Variation III Theme	Variation II Theme	Variation I Theme	Theme Theme

[15] Sandra Mangsen, *Songs without Words: Keyboard Arrangements of Vocal Music in England, 1560-1760* (University of Rochester Press, 2016), p. 32.
[16] The loudspeakers only diffuse the wet reverb signal, which is filtered to make each one seem increasingly distant.

For the opening theme, the right hand plays the tune as it appears in Byrd's first variation, underlaid with additive cluster chords, pre-empting the superimposition of variation repeats:

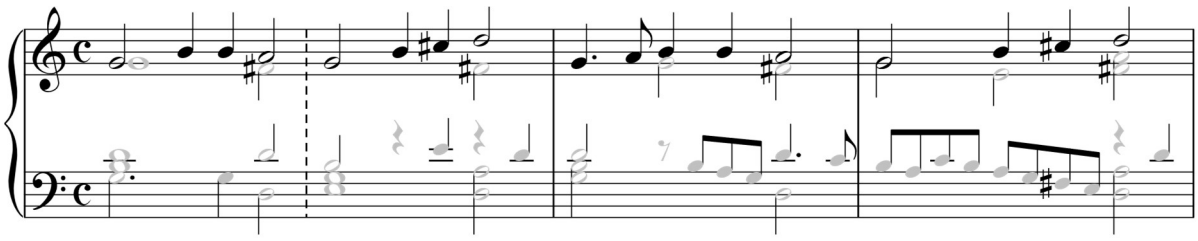

Figure 3.10 **O Mistress Mine (WB), bb. 1-3**[17]

Variation I is a two-part canon, where each successive pitch of the original melody is repeated only once, and the rhythm cycles through different permutations of two minims and two crotchets per bar. Variation II combines the melodic gestures of the tune in double note values with the familiar ostinato minim-crotchet-crotchet-minim rhythm. In bb. 29-32, the tune starts in the bass, with a perfect fourth above added every two minims:

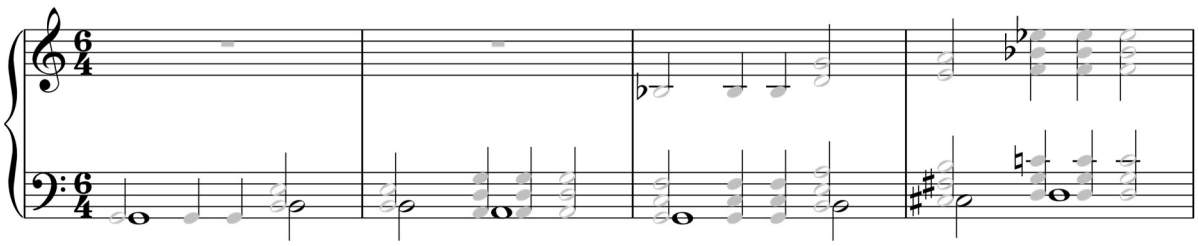

Figure 3.11 **O Mistress Mine (JHF) with melody added, bb. 29-32**

In b. 33 and b.34, the tune swaps from soprano to bass, this time with added fifths rather than fourths. From bb. 35-42, the tune starts in the soprano, with a perfect fourth below added every two minims. From the last beat of b. 39 to the end, the upper notes gradually drop out, leaving the remainder of the resultingly transposed tune to sound progressively lower. Variation III picks out each note of the melody, filling out the octave displacement with hemi-demi-semiquaver glissandi to create a florid monophonic line. Variation IV again picks out each note of the melody, but this time concatenates them into series of octave-displaced broken chords. There is no loudspeaker sound in this variation, and the box organ plays alone.

[17] Bar numbers correspond to the original manuscript housed in the Fitzwilliam Museum, Cambridge, MU.MS.168, but the notation has been modernized.

Variation V is built around a truncated minim version of the tune that is embellished and transformed. Constructed in four seven-bar sections, the first section from bb. 67-73 has the truncated tune in retrograde in the right hand, and in retrograde and inverted in the left hand; the second section from bb. 74-80 has the unaltered truncated tune in the right hand and inverted in the left hand; the third section from bb. 80-87 has the truncated tune transposed up a perfect fourth in retrograde in the right hand, and transposed down a major fourth, inverted, and in retrograde in the left hand; the fourth section from bb. 88-94 has the truncated tune transposed up a perfect fourth in the right hand, and transposed down a perfect fourth and truncated in the left hand.

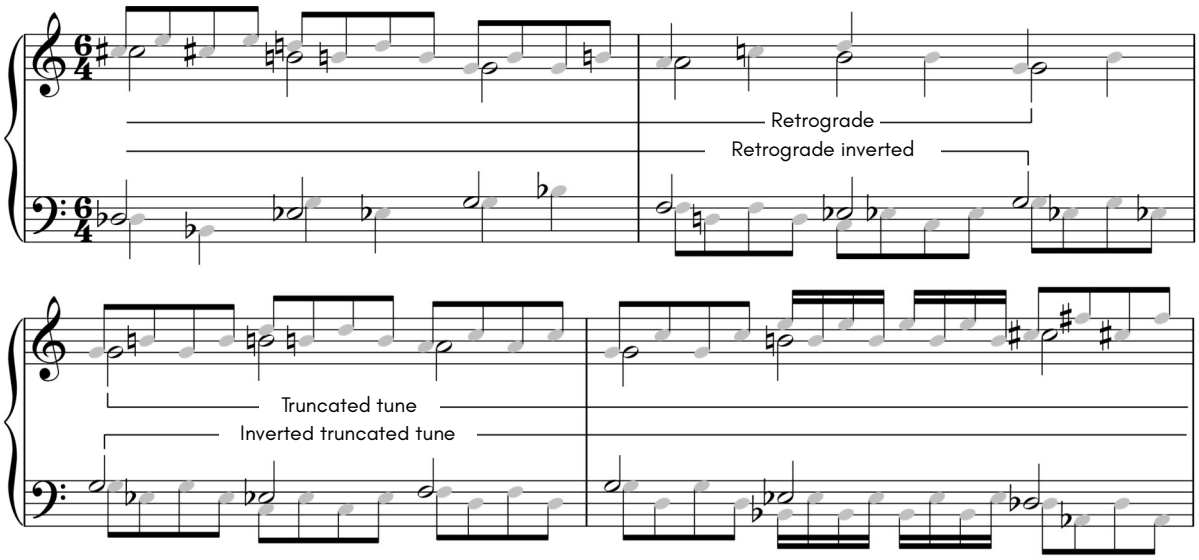

Figure 3.12 **O Mistress Mine (JHF) with melody added, bb. 72-75**

As the variation progresses, the tune is filled in with added notes of deceasing values and increasing intervals, with bb. 67-70 featuring crotches and seconds, bb. 71-74 quavers and thirds, bb. 75-78 semi-quavers and fourths, and bb. 79-82 demi-semi-quavers and fifths; at the halfway point, the note values decrease, but the intervals continue to widen, with bb. 83-86 featuring semiquavers and sixths, bb. 87-90 quavers and sevenths, and bb. 91-94 crotchets and eighths.

The final gigue variation uses a simplified melody accompanied by a quaver countermelody, which is a diminuted version of the original melody. From bb. 95-100, the melody in the right hand is underlaid with the countermelody in retrograde, then from bb. 100-106, the

melody in the left hand is overlaid with the countermelody in the right hand. From bb. 107–112, the melody is spelled out in octaves and cluster chords across both hands, then from bb. 113–124, the melody appears in the left hand in canon with an inverted version of itself and overlaid with free counterpoint countermelody, then from bb. 125–137, the melody appears in the right hand underlaid with an inverted version of the free counterpoint countermelody.

3.3 Interlude

Six years after Duruflé and Béché's inauguration of the Poste Parisien organ, Jerome Markowitz patented a stable audio oscillator in the United States of America, establishing the basis for the analogue loudspeaker organs he would manufacture with his company, Allen Organs, before switching to digital in 1971.[18] Following the release of Wendy Carlos' *Switched-On Bach* in 1968, Markowitz and synthesizer pioneer Bob Moog considered a partnership, but despite the analogue overlap of their creations, nothing came of it.[19, 20] The difference between an analogue loudspeaker organ and a Moog synthesizer was one of fixity versus changeability. Analogue loudspeaker organs needed to preserve sounds that would remain stable over time, not unlike organ pipes, but Moog offered the flexibility to manipulate parameters.[21] That loudspeaker organs synthesize only a small range of sound does not make them any less of a synthesizer, what sets them apart is being bound to a pre-existing sound culture.

Like Markowitz, Carlos connected the past to the present, but rather than devising new ways to make old sounds, she recorded old music with new sounds. The purpose of *Switched-On Bach* was, in her own words, 'to demonstrate that I could make "real" music with Bob Moog's

[18] Steve Markowitz, *The History of the Digital Organ and Sampling*, https://www.allenorgan.com/TheHistoryOfTheDigitalOrganAndSamplingSteveMarkowitz.pdf, accessed 27/04/21.
[19] Wendy Carlos, *Switched-On Bach* (Columbia Records, 1968), reissued: (East Side Digital, 2001).
[20] Alan Lenhoff and David Robertson, *Classic Keys: Keyboard Sounds That Launched Rock Music* (University of North Texas Press, 2019), p. 299.
[21] A practical downside to flexibility was the instability of early Moog synthesizers, which perhaps had too much grain. See Amanda Sewell, *Wendy Carlos: A Biography* (OUP, 2020), p. 47: 'If Carlos was lucky, she has said, she could produce a measure or two of music before the synthesizer went out of tune.'

marvellous new synthesizer. Then I could "get on" creating my own music with it.'[22] Carlos' definition of 'real' is ambiguous, although her dislike for serialism is well documented, and she objected to how electronic sound had become associated with what she perceived to be a narrow range of avant-garde composition. *Switched-On Bach* leveraged the privileged position that J. S. Bach's music enjoys in the Western musical canon to legitimize the synthesizer as a mainstream instrument, while also implicitly linking it to tonal music. Despite sounding as though it were from the future, *Switched-On Bach* was an elegy to the past, to J. S. Bach, and composition prior to the Second Viennese School.

This musical retrospection was also apparent in the two twentieth-century composition schools that informed *Manual Works* and the following project, *Orgelwerke*: the Second English Renaissance and the Germanic neo-Baroque. In Britain, composers like Gustav Holst, Herbert Howells, and Ralph Vaughan Williams looked to William Byrd, Thomas Tallis, and other Tudor figures, while on the continent, Johann Nepomuk David, Ernst Pepping, and Paul Manz, turned to J. S. Bach, Dieterich Buxtehude, and their contemporaries for inspiration.[23, 24] These were movements that eschewed the newly emerging dodecaphony as well, but what distinguishes them from Carlos' work is the nature of their belonging, as there is a difference between the nationalistic undertones of the European revivalism and American retrofuturism. In terms of locatedness, there was an obvious contemporaneous alignment of time, site, and place to the Second English Renaissance and Germanic neo-Baroque, and from today's vantage point, we can see how Carlos' work embodied mid-twentieth-century American technological prowess—like musical Apollo missions. Along with composers such as Isao Tomita, she instigated what became a globally influential movement, but one which now belongs to a bygone century, too.[25]

[22] Wendy Carlos, *Switched-On Bach* (East Side Digital, 2001) [CD insert], p. 14.
[23] Suzanne Cole, '"A Great National Heritage": The Early Twentieth-Century Tudor Church Music Revival', in Tatiana C. String and Marcus Bull (eds.), *Tudorism: Historical Imagination and the Appropriation of the Sixteenth Century* (OUP, 2011), pp. 78-96.
[24] Hermann J. Busch and Martin Herchenröder, 'The German Speaking Lands' in Christopher S. Anderson (ed.), *Twentieth-Century Organ Music* (OUP, 2012), pp. 43-65.
[25] For further discussion on the implications of historic electronic music, see Joseph Auner 'Wanted Dead and Alive: Historical Performance Practice and Electro-Acoustic Music from IRCAM to Abbey Road' in Craig A. Monson and Roberta Montemorra Marvin (eds.), *Music in Print and Beyond: Hildegard von Bingen to The Beatles* (Cambridge University Press, 2014), pp. 213-231.

3.4 *Orgelwerke*

Orgelwerke is a sixteen-channel installation that plays a set of three pieces: Præambulum G-Moll, modelled on Heinrich Scheidemann's Præambulum (WV 41); Præludium C-Dur, modelled on Dieterich Buxtehude's Præludium C-Dur (BuxWV 137); and Präludium und Fuge Es-Dur, modelled on J. S. Bach's Präludium und Fuge Es-Dur (BWV 552). The work-templates chosen mark chronological stages in the development of the prelude and fugue, from the prototypical praeambula of Scheidemann to the high Baroque apotheosis of J. S. Bach. The installation is intended to play periodically, not continuously, over the course of the day. Each 'performance' lasts forty minutes, with copies of the redundant scores being displayed around the building.

Præludium C-Dur (A)	**Præambulum G-Moll (A)**	**Präludium und Fuge**	**Præambulum G-Moll (B)**	**Præludium C-Dur (B)**
Music forward →			←	Music mirrored
Notes forward + audio forward	Notes forward + audio forward	Notes forward + audio forward crossfades into: Notes forward + audio reversed	Notes reversed + audio forward	Notes reversed + audio reversed
Hauptwerk →				Arturia Modular V
Werckmeister III	Pythagorean tuning	Equal temperament	Pythagorean tuning	Werckmeister III
Original oscillator instability	Exaggerated oscillator instability	No oscillator instability	Exaggerated oscillator instability	Original oscillator instability
Clocks synced →				Clocks drift
Channels by organ division	Channels by pitch class	Prelude: channels by SATB (spectral) / Fugue: channels by SATB (voice)	Channels by pitch class	Channels by organ division

The sixteen speakers and control box were custom made for the installation, and are laid out in a large rectangle to allow space for listeners to move in between. Initially, sound sampled from a 1965 Dutch organ via Milan Digital Audio's Hauptwerk platform is used alone, but this gradually crossfades into Arturia's Modular V analogue modelling synthesizer during performance. The Modular V was utilized to devise a basic approximation of the sampled organ's stops, with the

stop patches kept as simple as possible, harking back to the limited analogue technology available to Coupleux and Givelet.[26] Each of the three pieces was recorded in a different temperament in Hauptwerk, with Præambulum G-Moll using Pythagorean tuning, Præludium C-Dur Werckmeister III, and Präludium und Fuge Es-Dur equal temperament; the Modular V remains in 'equal' temperament, but the oscillator instability of the physical modelling varies for each piece. The compositions were not written with any sensitivity to specific temperaments, e.g. avoiding wolf fifths or favouring pure intervals in the tonic and dominant. When assembling the control box, the clocks of the eight stereo WAV decoder boards were left unsynchronized, so that as the music progresses, the channels start to drift. The manner in which sound is distributed between channels changes for each piece, meaning this drift effects the fabric of the music in a distinct way. At the halfway point of performance, the music transitions to becoming a mirror image of itself, with the notes and audio being reversed in different combinations for each of the mirrored iterations of the pieces. By the end of the performance, what started as a familiar compositional and instrumental imitation has disintegrated to become contrapuntally and sonically implausible.

3.4.1 Præludium C-Dur (Prelude, Fugue, and Chaconne)

Dieterich Buxtehude's C major prelude (BuxWV 137) is one of his best-known works. Exuberant and puckish, the piece combines *stylus phantasticus* elements with episodes of stricter counterpoint. The opening prelude section of Præludium C-Dur (Prelude, Fugue, and Chaconne) is likewise composed, freely interspersing florid gestures with contrapuntal passages and introducing the main motifs of the fugue. The fugal section is written using the plan of a 'fairly typical' fugue found on Wikipedia, although this plan exemplifies later Baroque fugal writing, and is more prescriptive than earlier imitative pieces.[27] The closing chaconne progresses around a circle of fifths, with a ground bass in the pedal underpinning manual variations.

[26] Originally built by Vermeulen for a church in Almelo, the sampled Hauptwerk organ now resides in Saints Simon and Jude Thaddeus Apostles Church in Raszczyce, Poland. The sample set was recorded by Piotr Grabowski, and is available at https://piotrgrabowski.pl/raszczyce/, accessed 18/07/23.
[27] 'Fugue', Wikipedia, https://en.wikipedia.org/wiki/Fugue, accessed 16/11/2021.

Marrying learned forms and light-hearted material is not new, and 'serious' pieces that use unlikely themes are found across eras.[28] Fugues have gained online popularity as a semi-comic medium, and in 2011, the pianist Dejan Lazić played a short example by Giovanni Dettori on Lady Gaga's Bad Romance during the BBC Proms.[29] In this vein, the thematic material for the fugal section of Præludium C-Dur (and, by extension, the prelude and chaconne) was adapted from the soundtrack by Yōko Kanno to the science-fiction anime series *Cowboy Bebop*:[30, 31]

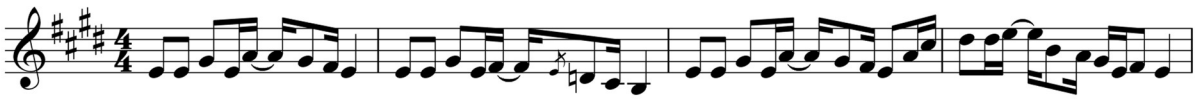

Figure 3.13 **Melody from 'The Egg and I' (YK)**

The spontaneity of North German praeludia belies a well-ordered structure, and there was a reciprocity between what was improvised, what was written down, and the rhetorical planning associated with both.[32] The prelude section of Præludium C-Dur comprises a series of idiomatic gestures which extemporize on subsequent material, serving to introduce the fugue and chaconne sections. The triadic figures that run through the opening pedal solo of b. 1 hint at the fugue subject, while the ascending scale at the end suggests the countersubject; the declamatory chords that punctuate the prelude outline the subject more explicitly, with the longer note values also pre-empting the subject's augmentation to form the chaconne's ground bass; the triadic motif is continued in b. 2, while the motific call and response anticipates a similar dialogue in the chaconne; the echo codetta and chordal ritornello in b. 3 shifts the music definitively into the dominant, linking the passages on either side and reaffirming the main theme; the dotted pattern in b. 4 is overtly Buxtehudian, although the motif here falls rather than rises, and the circle of fifths alludes to the melodic progression of the chaconne section; the

[28] e.g. the Renaissance parody masses that, prior to the Council of Trent, borrowed from bawdy secular songs; or W. A. Mozart's scatological canons.
[29] Giovanni Dettori, 'Lady Gaga Fugue', *Lady Gaga Fugue & Other Pop Hits* (Hal Leonard, 2013).
[30] Seatbelts, 'The Egg and I', *COWBOY BEBOP (Original Motion Picture Soundtrack)* (Sunrise Music, 1998) [CD].
[31] Philip Brophy, 'Kanno, Yōko', Grove Music Online, https://doi.org/10.1093/gmo/9781561592630.article.A2262542, accessed 16/11/21. Kanno is a leading composer of soundtracks for anime, film, TV, and video games, and she is known for an eclectic approach that combines diverse compositional inspirations. Given the retrofuturist influence of Carlos on the project, as well as my broader use of work-templates, borrowing a theme from a science-fiction series known for referencing varied musical styles seemed apt.
[32] Terence Charlston, 'Now Swift, Now Hesitating: The Stylus Phantasticus and the Art of Fantasy', *Musica Antiqua* (2012), pp. 32-36.

syncopation of the first half of the flourish in b. 5 suggests the syncopation of the fugue subject, while the contrary motion of the second half of the flourish anticipates the contrary motion between manuals in the chaconne; the prolonged cadence in b. 6 offers a final resolution both to the ritornello chords, and to the section as a unit.

The plan used to write the fugue had to be adapted from the one found on Wikipedia, which was for only three voices.[33] The decision to use Wikipedia rather than devise an original plan or find one from a reliable academic source is in keeping with the mood of the piece. Being guided by a user-edited website (rather than Johann Joseph Fux's *Gradus ad Parnassum*) fits with the notion of venerable forms being a vehicle for levity, subverting the fugue's revered and exclusive status as the pinnacle of contrapuntal mastery. The chaconne acts as a boisterous finale, using a simplified and energetic presentation of the recurring motifs: a ground bass derived from the fugue subject supports manual variations derived from the countersubject.

For diffusion, each channel was assigned different stops according to division and pitch, so that the loudspeakers diffusing the Hoofdwerk, Rugwerk, and Pedal were grouped together, and within them the 16′, 8′, 4′ stops and so on. The mechanical sounds of the trackers and keys etc. are also diffused through the loudspeakers, the intention being to emulate the sensation of being inside an organ case. As the channels desynchronize, the stop combinations no longer sound together, giving the impression that the organ is starting to come apart. As the first piece, the phenomenon is subtle, but when it returns as the final one, it is pronounced.

3.4.2 Præambulum G-Moll

Heinrich Scheidemann's præambula are significant in that they laid the groundwork for what would become a distinct genre, and he developed the improvised organ introit into a structured form with distinct sections, at least one of which tended to be fugal.[34] Præambulum G-Moll is the shortest and simplest of *Orgelwerke*, and the one that most literally reflects its model. The

[33] A comparison of the original and adapted plans can be found in Appendix 1.
[34] Peter Dirksen, *Scheidemann's Keyboard Music: Its Transmission, Style and Chronology* (Routledge, 2007).

piece is a deconstruction and reorganization of Scheidemann's Præambulum (WV41), which comprises an introductory section preceding two thematically related fugal sections.[35] Præambulum G-Moll is also written in three sections: the first reorders the notes and rests of Scheidemann's original first section by duration, the second restructures the phrases of Scheidemann's original second section into new patterns, and the third combines a cantus firmus derived from subject entries of Scheidemann's original third section overlaid with reworked presentations of the second countersubject that also appears there.

SECTION	HS	JHF	MATERIAL
Introductory	bb. 1-24	bb. 1-24	HS notes and rests re-ordered by duration.
Fugal 1	bb. 24-46	bb. 25-73	HS phrases restructured into new patterns.
Fugal 2	bb. 47-73	bb. 74-101	HS fugue subject with reworked countersubjects.

Every note and rest of Scheidemann's introductory section was reordered by duration, with the longest first and the shortest last, resulting result is a stately opening that steadily becomes more urgent. The first fugal section also recycles Scheidemann's notes, but this time new passages were derived from the original pitches and note values using a pre-determined system. This was achieved by adding up the total number of notes in all four parts, then dividing them into a series of symmetrical phrases. The pitches appear in the same order as in the original, but their rhythm was decided by the order in which different note values appeared, and their repetition by the symmetrical series. For example:

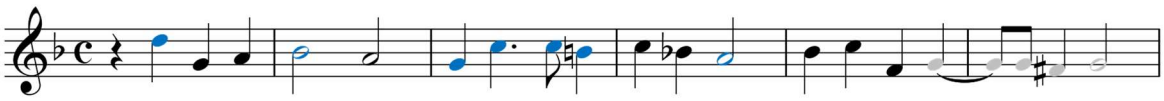

Figure 3.14 **Præambulum G-Moll (HS), bb. 24-29**

The grey notes indicate those that fall outside of the pre-determined selection length for the reworked phrase, and the blue notes indicate the different note values to be used consecutively

[35] Heinrich Scheidemann, 'Praeambulum in g', in Werner Breig (ed.) *Orgelwerke Band 3* (Bärenreiter, 2019), pp. 24-26.

for the rhythm. The pitches to constitute the reworked phrase, i.e. the blue and black ones, are:

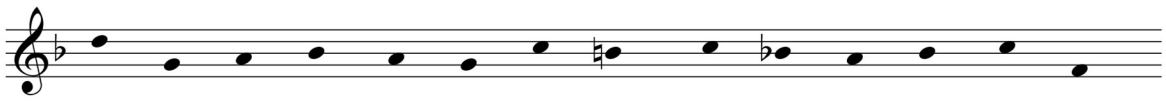

Figure 3.15 **Pitches for reworked phrase**

And their rhythm as indicated by the blue notes will be:

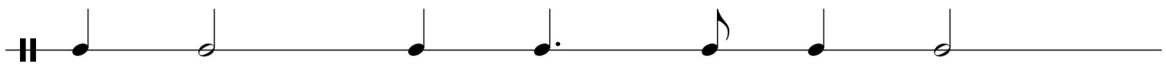

Figure 3.16 **Rhythm for reworked phrase**

The length of the reworked phrase must be fourteen minim beats to achieve overall symmetry, meaning both the pitches and rhythm must repeat, but this will not occur at the same juncture. The reworked version of the first phrase now becomes:

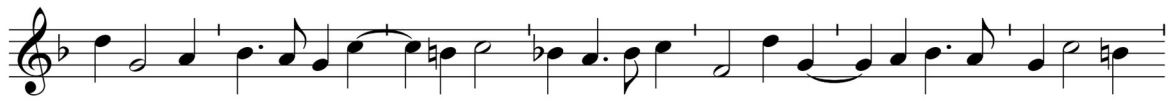

Figure 3.17 **Præambulum G-Moll (JHF), bb. 25–31**

At the start of Scheidemann's second fugal section, the subject enters in the dominant followed by a new chromatic countersubject consisting of a descending figure of six adjacent pitches:

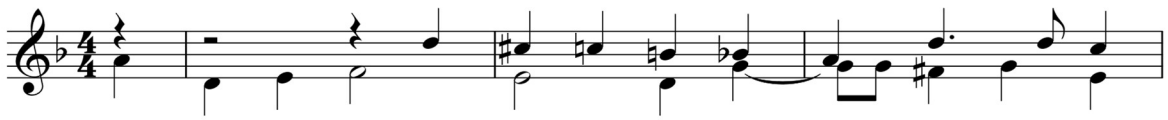

Figure 3.18 **Præambulum G-Moll (HS), bb. 25–26**

There are ten real and false subject entries in this final section, firstly in the dominant and latterly in the tonic, all of which are transcribed into the pedal to form the cantus firmus of the reworked version. Scheidemann's chromatic countersubjects in the dominant and tonic provide the pitches from which the monophonic, chordal, and toccata countersubjects are formed.

This time, each channel is assigned a different pitch class corresponding to the left/right C/C# distribution of organ pipes on a typical windchest, with all stops of a given class being

diffused through the same loudspeaker. The effect of the clock drift is therefore one of temporal displacement, as the notated sounding of each pitch and interval is nudged out of alignment. This secondary electronic transformation complements the first, which also involves displacing the notes of the original to form new patterns and contrapuntal relationships.

3.4.3 Präludium und Fuge Es-Dur

J. S. Bach's Prelude and Fugue in E♭ major (BWV 552) act as the opening and closing movements of the Clavier-Übung III, which contains some his finest organ music. The number three, likely a reference to the Holy Trinity, is a recurring theme throughout the work; the prelude contains three distinct themes, each in a different style, and the fugue also has three sections. Präludium und Fuge Es-Dur is instead based on the number five, with both movements containing five sections that last ninety beats, and each of the five fugue subjects lasting five beats or multiples thereof.

SECTION	BAR	FUGUE MATERIAL	FUGUE ENTRY
1	1 (ritornello) 2 (episode)	Primary subject	b. 11 (bass)
2	3 (ritornello) 4 (episode)	Secondary countersubject	b. 18 (alto)
3	5 (ritornello) 6 (episode)	Tertiary subject	b. 29 (bass)
4	7 (ritornello) 8 (episode)	Quaternary subject	b. 45 (soprano)
5	9 (episode) 10 (ritornello)	Quintenary subject	b. 63 (tenor)

The opening ritornello hints at the primary fugue subject, while also alluding to the opening bars of BWV 552 through its bold opening chord and double-dotted rhythms.

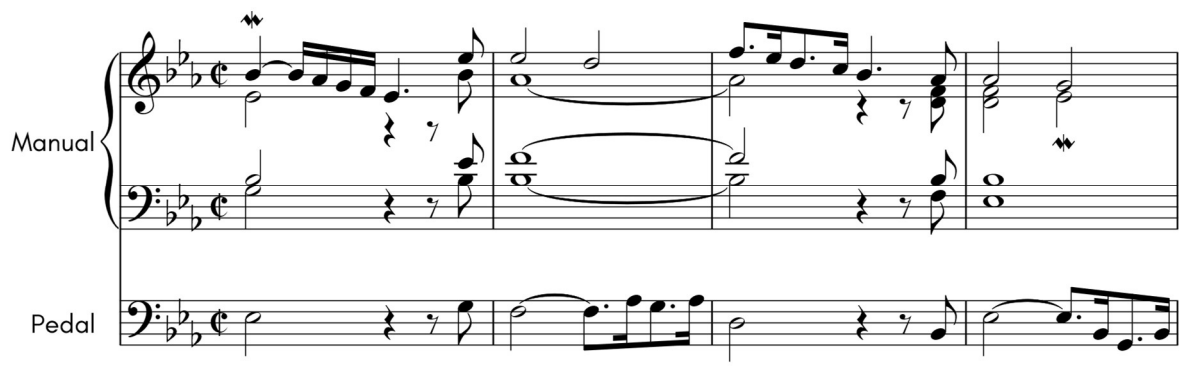

Figure 3.19 **Prelude and Fugue in E♭ major (BWV 552), bb. 1-4**

The ritornello of Präludium und Fuge Es-Dur appears five times in conventional key areas, E♭, B♭, Cm, A♭, and E♭; in the first four instances, it precedes the introduction of fugue material, but for its final recurrence comes afterwards. Whereas the fugue is concerned with contrapuntal clarity and linear motif development, the prelude focusses on textural density and expansive motif presentation. Following the opening ritornello, the primary fugue subject is introduced in b. 2 as three separate broken chords:

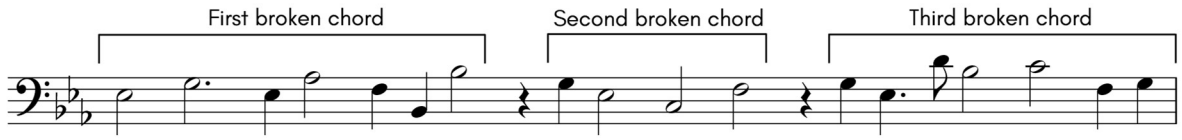

Figure 3.20 **Primary fugue subject**

After the second ritornello at b. 3, the secondary fugue countersubject, which in diminuted form will become the quaternary fugue subject, is presented twice in b. 4 as overlapping semibreves split between the right and left hands—first in the dominant and then in the tonic. Below is the secondary fugue countersubject from b. 19 transposed down an octave, with red notes indicating those taken by the right hand and blue notes those by the left in the first half of b. 4:

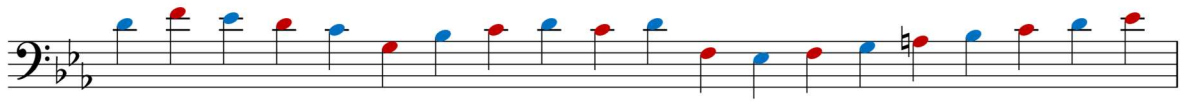

Figure 3.21 **Secondary fugue countersubject**

After the third ritornello at b. 5, the first six notes of the tertiary fugue subject from the pedal at b. 29 form the basis of an ascending additive ostinato at the fifth in b. 6:

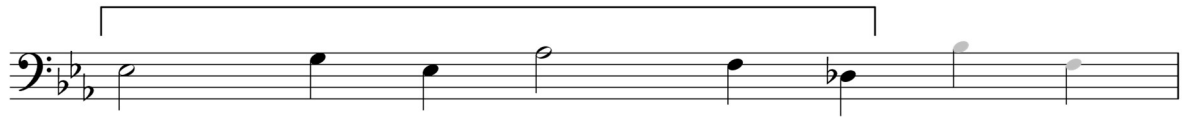

Figure 3.22 **Ostinato base**

After the fourth ritornello at b. 7, the quaternary fugue subject is introduced in b. 8, first in the subdominant and then in the dominant, each time with slightly different octave displacement. The vertical augmentation resulting from this displacement contrasts with the rhythmic diminution

of the secondary fugue countersubject that produces the quaternary fugue subject itself, and with its legato semibreve presentation in b. 4:

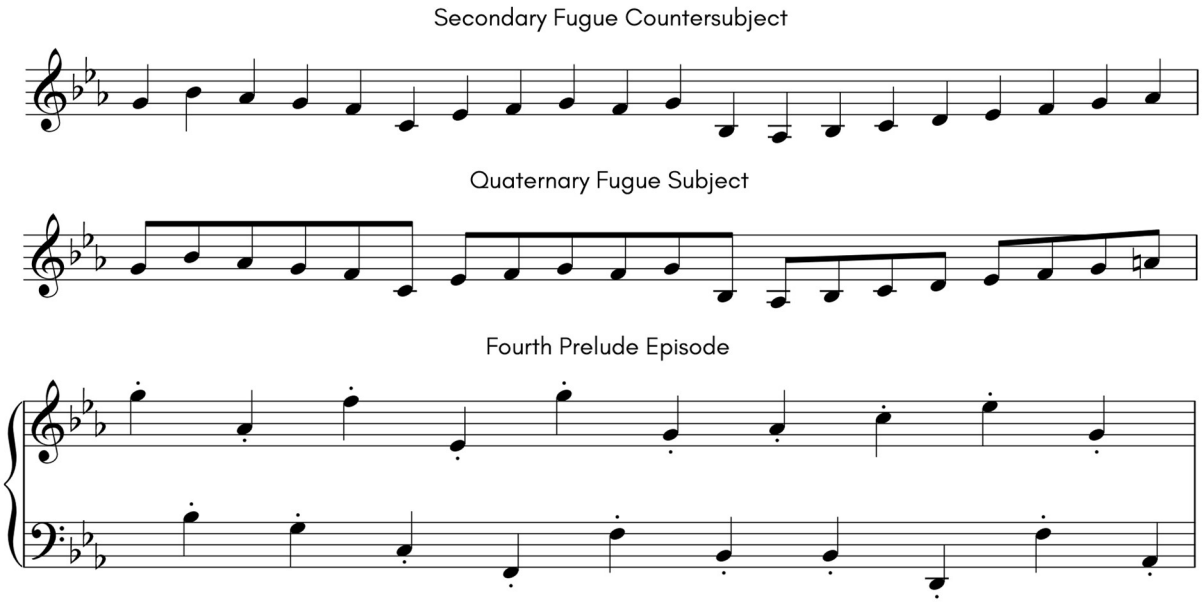

Figure 3.23 **Recurring fugue motif**

There is no ritornello after the fourth episode, which segues into the final prelude episode starting at b. 9, where various treatments of the gigue-like quintenary fugue subject are heard in canon between the right and left hand. The first fifteen notes of the canon are the quintenary fugue subject, and the second fifteen are the quintenary fugue subject transposed up a major third; the next thirty notes are this same unit inverted, the next thirty the unit in retrograde, and the next thirty the unit in retrograde and inverted:

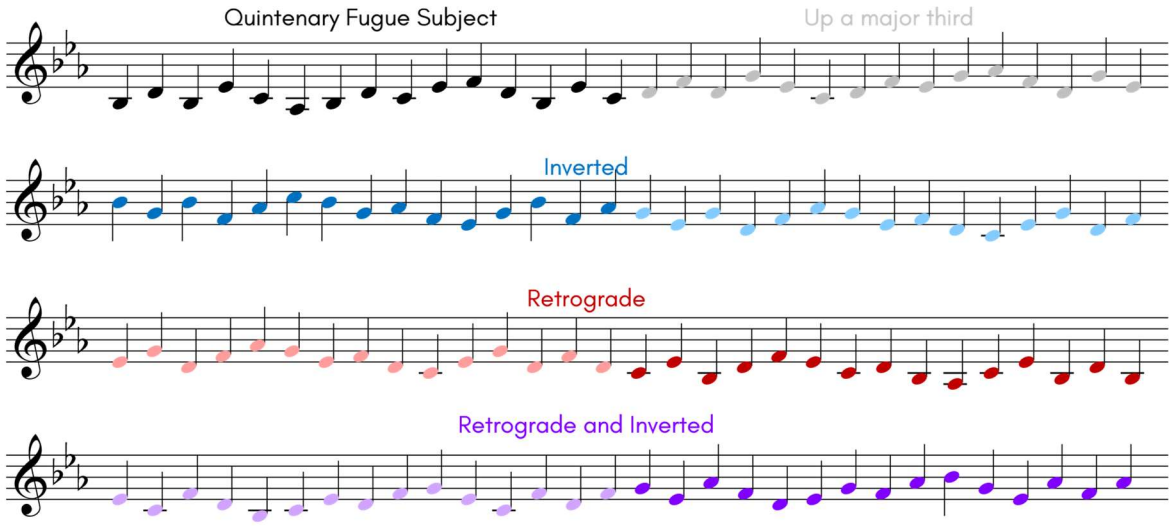

Figure 3.24 **Quintenary fugue subject transformations**

The prelude ends with a final ritornello, which is a repeat of the opening with the E♭ first inversion chord and double dotted rhythm an octave higher. Generally speaking, the acceleration of the five fugue sections is mirrored in the five prelude episodes, although, with the exception of the episode in bar six, the note values of the motifs have been lengthened in the prelude.

The fugue is written in five interrelated sections, all drawing on the primary fugue subject and the B♭–G–C–B♭–E♭ motif of the BWV 552 fugue.[36] The opening section of the fugue introduces the primary subject (S1), which recurs in various guises throughout. The pace is stately, emphasizing its expansiveness and the *alla breve* feel of the first two sections. At the start of the second section at b. 18, a new countersubject (CS2.1) that will later become the quaternary subject (S4) is heard in the alto below the countersubject from the first section (CS1.1). In the pedal, the first eleven notes of the previous subject (S1) become the new subject (S2), with the remainder forming the start of a new countersubject (CS2.2). The resulting quasi-stretto as A2 enters in the tenor at b. 19, combined with the *perpetuum mobile* crotchets of CS2.1, begins the section-by-section acceleration that progresses through the fugue. The remainder of section two is a gradual crescendo toward the beginning of section three at b. 27, when the BWV 552 fugue motif is heard in the pedal. Previous glimpses of the motif were heard at b. 15 in the rising pedal figure, at b. 20 in the soprano, and at b. 21 in the pedal, but b. 27 is the only point at which it is heard unaltered.

The tertiary fugue subject (S3) first heard in the pedal at b. 23 is a further truncation of S1, this time with rhythmic diminution, while the section's second countersubject (CS3.2) first heard in the pedal at b. 31 references the BWV 552 fugue motif as it appears in Bach's second section. Whereas the previous two sections functioned as an extended exposition of S1, this third section acts as a bridge to the final two sections: quavers are introduced for the first time, the BWV 552 motif is integrated properly, and earlier sectional material is developed.

[36] A complete fugue plan can be found in Appendix 2.

As already mentioned, the quaternary fugue subject (S4) comes from CS2.1, but section four's new countersubject (CS4.1) heard in b. 46 references back to CS3.2, continuing the BWV 552 motif's presence. At b. 53, a rhythmically adapted version of S2 enters in the soprano, followed by an answer at b. 55 in the bass. This same device is employed by Bach in the BWV 552 fugue, although it is not until the third and final section that he reintroduces the main subject in the pedal again. The upper-voices-only texture of Bach's second section is echoed here, with the majority of the fourth section played on the manuals, and the thinner texture being matched with a simpler registration.

The gigue-like quintenary subject (S5) relates to S3, and provides a lively close to the fugue. The episode starting at b. 69 features a canon between the left and right hand, the material for which is a compacted version of CS3.1 heard successively inverted, in retrograde, and inverted and in retrograde, as with S5 in the prelude. This canon occurs over a rhythmically altered version of S1 which leaps between octaves, pre-empting the toccata passage starting at b. 83, where S1 is heard once again in its original form in canon between the soprano and bass. After the final entries, the fugue ends with a short coda.

For this final piece, each Hauptwerk and Modular V voice part of the prelude and fugue was assigned its own stereo channel. As the forward and reversed playings of the piece occur in the middle of the performance, the crossfaded sampled and synthesized organ sound is roughly balanced, resulting in a doubling of each voice part. By this point, the clock drift is obvious, so while notes themselves sound in time, the polyphony is now out of sync. This preserves the integrity of the lyrical subject and countersubjects lines, but disrupts the voice leading, cadence points, and notated structural direction.

3.5 Reflection

3.5.1 Material Disposition

Anaglyph stereoscopy tricks the brain into perceiving a flat image as three-dimensional by using two misaligned images in different colours, usually cyan and red, one for each eye. When the images are viewed through a pair of anaglyph glasses with cyan and red lenses, the component in the corresponding colour is filtered out so that each eye sees only a single image, before being melded together in the visual cortex to give the impression of depth. The contrapuntal techniques in *Manual Works* and *Orgelwerke* use a similar sort of filtering that operates at two levels: the notated counterpoint and the electronics. At one level, contrapuntal elements from the work-templates are filtered to construct the new compositions; at the other, the new counterpoint is processed through the laptop or control box to produce the finished work. When the glasses are put on, i.e. when the music is heard in performance, the original work-template is experienced through these two layers of defamiliarization.

How this approach is used to comment on the organ itself differs between projects. By augmenting the contrapuntal scope of *Manual Works* with four-channel live electronics, the performative stature of the box organ is also augmented, and an instrument which usually only provides accompaniment becomes the centre of attention. The delay-based nature of these transformations taps into the established practice of using tape loops to thicken musical textures and create canons, here explicitly linking these approaches to their sixteenth and seventeenth-century progenitors. In contrast, *Orgelwerke* uses the electronics layer to decrease, not increase, the level of contrapuntal organization, as the clock drift acts as an entropy generator, undoing the carefully planned part writing. As things fall apart, the disconcertion of contrapuntal relationships and virtual pipe organ components sounding at the wrong time becomes uncomfortably apparent, as does the fact that their synchronization is usually taken for granted.

3.5.2 Mode of Mediation

Manual Works and *Orgelwerke* offer two perspectives on perceived sonic realness: the former's sparing use of live electronics with an acoustic instrument and human performer contrasting with the latter's wholly MIDI-orchestrated sampled and synthesized sound. *Manual Works* adheres to the principles of liveness and instrumentality espoused by Croft, d'Alessandro, and Noisternig, maintaining a close causal relationship between the sound of the box organ and what is diffused through the loudspeakers. Framing these loudspeakers as a four-part choir recharacterizes the electronic contrapuntal transformations mentioned above, with each voice part 'singing' their canons and rounds in conjunction with the organ. The success of this approach relies on the parsimony of the processing, maintaining space for the rigidity of the increasing delays and repetitions to be followed through to their logical conclusion while remaining intelligible to the listener.

Ostensibly, *Orgelwerke* would seem to be the less sonically real of the two projects, but the layers of discord, from the jarring temperaments to the semi-stochasticity of the clock drift, impart their own sort of liveness, critiquing the sterile perfection of digital loudspeaker organ sound. Displaying redundant 'scores' along with the *Orgelwerke* installation questions the agency and utility of organist versus organ, as while they contain the notes of the three pieces, they have limited practical utility for performance; the score standing in for Præambulum G-Moll is the Bärenreiter edition of Scheidemann's original, the score for Präludium und Fuge Es-Dur lists the hexadecimal MIDI commands used for playback, and the score for Præludium C-Dur is written in new German organ tablature.[37] The loudspeaker and control box design is reminiscent of the cuboid wooden construction of real pipe organ components, like bourdoun pipes, windchests, and trunking; while their layout alludes to a pipe organ's key dimensions, as the distance between the sixteen loudspeakers (two or four feet between the loudspeakers in a row, and eight or

[37] This gesture is made more pertinent by the fact that, in their original manuscript form, the pieces are indeed playable by an organist, as I composed them all at the organ rather than on a laptop. Their equivocal identity as installation/performance is not necessarily resolved by being presented in one guise or the other, but leaves the door open to future iterations, musically restating the questions of perceived realness and verisimilitude central to the project.

sixteen feet separating the two rows depending on available space) mirrors the size of foundational organ pipes.

3.5.3 Map of Mediation

Having been an organ scholar at an English university as an undergraduate, as well as member of an English cathedral choir as an adult, I have been part of the heritage that *Manual Works* embodies, but not *Orgelwerke*. As the projects unfolded, this aspect of individual locatedness manifested itself, yielding alternative articulations of personal authenticity and verisimilitude—of grain and genotext. My propinquity to one tradition coloured how I approached the source material, with *Manual Works* displaying a faux-historicism that is congruent, but *Orgelwerke* one that is incongruous. To sit in the quire of an English cathedral and listen to reimaginings of recognizable Tudor pieces played on an appropriate organ with sensitive live electronics, composed and performed by an English musician who themselves identifies with the music, is to hear a performative reconciliation of work-template, new composition, and instrument that resonates through time, site, and place. But encountering a sixteen-channel installation in an unexpected space that morphs from emulating the inside of a pipe organ case to recreating the sound of a century-old electronic organ, playing music that simultaneous alludes to the Germanic Baroque, neo-Baroque, and American 1960s synth culture, is to experience a deconstruction and juxtaposition that compounds their distinctiveness.

3.5.4 Telos

The intention was never for one project to feel more or less authentic and verisimilitudinous than the other, and I do not think this has been the result. Rather, they highlight the complexity of negotiating what may or may not be perceived as 'real music', to quote Carlos, and explicating the role that our own proximity to established canons play in this process. On the one hand, being familiar with a tradition makes it easier to spot an interloper, but that same familiarity also allows new meaning to be embedded in allusory works, and so an inauthentic artefact becomes more relevant—more real—to modern listeners than the original. On the other, unfamiliarity with a

tradition means a convincing fake may be mistakenly accepted as genuine, but any engagement with it will be superficial, and so verisimilitude becomes a barrier to deeper significance.

Overlapping sound cultures can cause interference patterns that confuse timelines, and it is easy to compartmentalize earlier artistic movements that actually occurred concurrently. In the same year and city that the world first heard sequenced analogue synthesizer music courtesy of Coupleux and Givelet, Sergei Prokofiev's Third Symphony was also premiered, Luigi Russolo gave his final public concert, and Jerome Kern and Oscar Hammerstein's *Show Boat* began its French run.[38, 39, 40] Our measure of authenticity and verisimilitude can be confused, too, and maybe that is a good thing. Allusory composition is a deliberate interference with the timeline, and a reminder that artistic linearity exists only in textbooks. We are aware of the creative messiness of our own era, but once practices pass into history, they are sometimes tidied for publication. Conjuring up imagined quirks, crossovers, and anachronisms can be refreshing, as can drawing attention to real ones. Like the fact that Coupleux, Givelet, and Duruflé 'switched on' Bach thirty-six years before Wendy Carlos did.

[38] Barrie Jones (ed.), *The Hutchinson Concise Dictionary of Music* (Routledge, 2014), p. 215.
[39] Katherine Leigh Axtell, 'Maiden Voyage: The Genesis and Reception of Show Boat, 1926-1932', PhD Thesis (University of Rochester, 2009), p. 6.
[40] James Rhys Davies, 'Luigi Russolo's Imagination of Sound & Music', PhD Thesis (Royal Holloway, University of London, 2017) p. 228.

Chapter Four
Signal and Noise

How do concepts of noise and space relate to the pipe organ, and the manner in which the intentionally pitched, unintentionally pitched, and non-pitched sounds that they produce interact with one another, their environment, and the listener?

4.1 Background

Describing noise is easier than defining it, especially when noise itself is a constituent part of a sound work, and arriving at a set of universally agreed meanings is unlikely, because what constitutes noisiness depends on when and where it is encountered.[1] An operagoer shouting during an aria is noisy, but not necessarily a football fan at a match; electrical interference will render an analogue signal noisy, but a digital one can be reconstructed; and heavy traffic on the road outside would be noisy during the first few bars of Edvard Grieg's 'Morgenstemning i Ørkenen', but would become an integral part of John Cage's *4'33"*. What is striking about pipe organs is that they exhibit noisiness that conforms in some way to most definitions. Whether in the vernacular sense of something loud or unexpected, more nuanced conceptions concerning non-periodic, non-musical, and unwanted sound, or technical definitions pertaining to systems noise and information theory—pipe organs are noisy.

This chapter is not concerned with what exactly noise is, but how its being is contingent upon its surroundings.[2] Having mentioned information theory, it is useful to think in this way of the relationship between the intentionally pitched sound that pipe organs produce in their internal pipe space, the unintentionally pitched and non-pitched sounds that occur in the intermedial case space, and what listeners hear in the external building space. If the intentionally pitched

[1] See Aaron Cassidy and Aaron Einbond (eds.), *Noise in and as Music* (University of Huddersfield Press, 2013); and Mark Delaere (ed.), *Noise as a Constructive Element in Music* (Routledge, 2022).
[2] Two recent practice-based theses on the compositional implications of noise itself are Joseph Kay's 'Noise, Resistance, and Intertext in Helmut Lachenmann's Dal Niente (Interieur III) and Accanto', PhD Submission (University of Oxford, 2019), and Jonathan Higgins' 'Composing with Noise: Utilizing Noise as a Transformative and Generative Tool for Creative Sound Practice', PhD Thesis (City, University of London, 2021).

sound that exists in its purest form in the internal pipe space represents a message signal, then this signal must pass outwards through the intermedial case space and into the external building space to reach the signal receiver: the listener. At every stage, the message signal accrues additional sound, with the performative distance between the initial signal and this extra sound increasing to the point where there is no causal link between the two.

At the first stage, in the internal pipe space, the duality of signal and noise is apparent, as some organ pipes are designed to produce both pitched and non-pitched sound. Chiff and breathiness, both examples of non-periodic sound, contribute to flue stops' timbral character. When voicing pipes, deciding what proportion of wind becomes pitched sound and what does not is a subjective and highly skilled task, and one that illustrates the importance of non-periodic sound to the musical message signal. At the second stage, in the intermedial case space, the message signal picks up further non-pitched—and unintentionally pitched—sound, but unlike the chiff of a Rohrflöte or the twelfth of a Quintadena, this time it is unwanted. As well as visually screening mechanical innards, an organ case segregates the sound of the intermedial space from the external building space of the listener; particularly noisy organ blowers are usually encased in acoustic cladding, or even housed in the basement. None of this sound is incidental, as it is all generated while producing the message signal, and in the case of the clacking of mechanical trackers, is immediately linked to the sounding of intentionally pitched elements. At the final stage, the message signal emerges into the external space, where it contends with the acoustic properties of the building and the other sound that is there.

Not only are organ cases visual and sonic barriers, they are physical barriers that stop listeners from getting inside. This ensures the sequential transmission of the message signal, and the hermetic nature of each space. It also poses a compositional problem of how best to present an pipe organ's unintentionally pitched and non-pitched sound to an audience. One solution is to use microphones inside the organ case during live performance, but this means that audible instrumental causality is preserved, and the risk of a signal and noise hierarchy remains. The other

option is to pre-record sound material, and then diffuse it as a fixed-media work. The project described below uses this approach, exploring what would happen if a pipe organ's three contiguous spaces were to be collapsed into a single electronic one, and how this flattening might affect preconceptions about what constitutes signal and noise.[3] The pre-determined order of antecedent and consequent no longer obtains, and the composer is free to organize the whole gamut of pipe organ sound independently without the imposition of mechanical constraints. The chief benefit this affords is the ability to construct separate contrapuntal lines for all sounding elements, not just the pipes.

4.2 *Passacaglias for Organ*

Passacaglias for Organ is a sixteen-channel fixed-media work for live diffusion comprising three separate passacaglias, with each passacaglia utilizing different sound sources integral to a pipe organ's functioning, but whose perceptibility tends to be minimized both physically by organ builders and (sub)consciously in the mind of the listener. Each passacaglia has two sound components: a message signal in the form of the intentionally pitched B-A-C-H motif, and recordings of the unintentionally pitched and non-pitched sounding elements from inside the organ case. The ostinato-driven passacaglia form lends itself well to the presentation of a repeating message signal, and to the contrapuntal structuring of the material from each sounding element around that signal.

Unlike *Orgelwerke*, where the sixteen channels are used to emulate the inside of an organ case in three dimensions, eight spectrally filtered stereo tracks here create another sort of depth while maintaining the internal-intermedial-external flatness key to the project. The lowest frequency bands are diffused through the speakers toward the rear of the performance space,

[3] For discussion on acousmatic space, see Simon Emmerson, 'Aural Landscape: Musical Space', *Organised Sound* (Vol. 3, 1999), pp. 135-40; and Denis Smalley, 'Space-Form and the Acousmatic Image', *Organised Sound* (Vol. 12, 2007), pp. 35-58.

increasing through each pair, so that the front two are diffusing the highest frequency band. This alludes to the typical internal disposition of pipe organs, where the lowest frequency ranks of pipes are position toward the rear of the windchest and the highest at the front. The result is to reorganize the organ's sound material in a manner sympathetic to how its pitched sound is usually spatially structured, rather than its physical location inside an organ case.

Passacaglias One and Three were recorded on a small 1889 organ by Wilkinson of Kendal, but one that has since been converted to electric action. Passacaglia Two was recorded on a similar 1881 organ in a chapel nearby to the first and also by Wilkinson of Kendal, this one having been renovated by Henry Willis & Sons and still retaining its original mechanical action. For Passacaglias One and Three, there were five recording locations: inside the blower box, between the reservoir bellows and windchests inside the organ case, next to the mains transformer inside the organ case, in front of the façade in the chancel, and by the two power switches next to the console. Impulse response files were made for five different sites around the church: a small porch at the rear of the building, the vestry, the chancel, the partitioned north aisle, and the main body of the nave. For Passacaglia Two, all recordings were made either very close to the manuals, or directly in front of the keydesk with the centre panel removed to reveal the trackers and roller board.

4.2.1 Passaglia One

The first passacaglia centres on the apparatus of wind and sound production, i.e. the blower, reservoir bellows, windchest, and ultimately the pipes. The piece opens with the blower being switched on and coming up to speed, which subsequently forms the basis of the ostinato. From 00:00–05:00, the stereo XY blower microphone track crossfades into two mono left and right omnidirectional blower microphone tracks, one of which is pitch shifted to produce a justly intoned B–A–C–H motif, with the fundamental pitch of the blower being treated as 'B♭'. Each pitch lasts three seconds, establishing the triple meter of the passacaglia. From 05:00–10:00, the blower sound is filtered to foreground the motif, before receding back into the XY track from

10:00–13:00. The blower is switched off at 12:00, leaving the decelerating motor axle to emerge from the texture at 13:00, which has also been pitch shifted to echo the B–A–C–H motif.

Overlaying the ostinato are recordings of the reservoir bellows, windchests, and pipes being filled with air and then emptied. From 00:00–01:00, this filling and emptying is synchronized, but afterwards, the left-panned wind sound and right-panned pipe sound become independent. This is structured in one-minute sections, with the ratio of one to the other corresponding to the just Pythagorean ratios of a whole scale. For the first half of the piece, each section remains distinct from the next, but from 07:30, they crossfade into one another. Initially, the frequencies are slow enough to feel like a simple crescendo and diminuendo; as they increase, they become closer to that of a tremulant, eventually approaching the RPM of an organ blower.

TIME	REPS. PER MINUTE		REPETITION FREQUENCY		STOPS
	Wind	Pipes	Wind	Pipes	
0:00–1:00	1	1	0.016 Hz	0.016 Hz	Gamba
1:00–2:00	1	2	0.016 Hz	0.03 Hz	Stopped Flute (S.F.)
2:00–3:00	3	2	0.05 Hz	0.03 Hz	Open Diapason (O.D.)
3:00–4:00	3	4	0.05 Hz	0.06 Hz	Gamba + S.F.
4:00–5:00	9	8	0.15 Hz	0.13 Hz	Gamba + O.D.
5:00–6:00	9	16	0.15 Hz	0.26 Hz	S.F. + O.D.
6:00–7:00	27	16	0.45 Hz	0.26 Hz	Gamba + S.F. + O.D.
7:00–8:00	27	32	0.45 Hz	0.53 Hz	Gamba + S.F. + O.D.
8:00–9:00	81	64	1.35 Hz	1.06 Hz	S.F. + O.D.
9:00–10:00	81	128	1.35 Hz	2.13 Hz	Gamba + O.D.
10:00–11:00	243	128	4.05 Hz	2.13 Hz	Gamba + S.F.
11:00–12:00	243	256	4.05 Hz	4.26 Hz	Open Diapason
12:00–3:00	729	512	12.15 Hz	8.53 Hz	Stopped Flute
13:00–14:00	729	1024	12.15 Hz	17.06 Hz	Gamba

For the pipe sound, one stop from three of the four main stop classes was recorded in turn on the Great, with reeds being reserved for use in Passacaglia Three. All keys on the Great were wedged down using small pieces of wood, the relevant stop was left drawn, then the organ was turned on and off. From 05:00–07:30, the wind and pipe sound is filtered and panned to foreground the B–A–C–H ostinato, before being re-asserted from 07:30–10:00. The final diminuendo from 10:00–14:00 fades out the wind and pipe sound, and at 13:45 the sound of the pipes losing wind pressure accompanies the final slowing of the blower motor axle.

4.2.2 Passacaglia Two

Having been recorded on a mechanical action organ, the focus of Passacaglia Two is the sound produced by the keys, pedals, stops, trackers, and rollers. The piece is a loose theme and variations with five five-minute sections, and is in quintuple metre rather than the typical triple.

Section one (00:00–05:00): The first section introduces the ostinato, which again uses the B–A–C–H motif, but here all four pitches are gradually layered to sound at once while cycling through six different stops. The pitches sound an octave higher every section, until for the final one they are spread evenly across four octaves. The majority of the stops on the organ were of eight-foot pitch, and so three each were selected from the Swell and Great divisions. All pitches and stops were sampled separately, comprising a total of ninety-six samples, and then edited together to create the ostinato. The piece opens with a B♭2 crossfading over a five-second period into each of the six successive stop samples (00:00–00:30): 8′ Voix Céleste (Sw.), 8′ Salicional (Gt.), 8′ Rohrflöte (Sw.), 8′ Gedackt (Gt.), 8′ Open Diapason (Gt.), 8′ Oboe (Sw.). The stops are heard in order of their comparative loudness, but were attenuated or amplified to achieve uniformity, emphasizing their timbral relationships. At 00:30, A2 enters, followed by C2 at 01:00, and B♮2 at 01:30. From 02:00, the crossfade duration reduces by one second every thirty-second cycle, and at the same time the stops start to desynchronize, so that different timbres are heard together. Slowly, the B–A–C–H motif starts to become temporally discernible in the Oboe, which, despite attenuation, is still the most harmonically complex and strident stop. By

04:05, the samples are changing abruptly and the B–A–C–H motif is obvious. From 04:30–05:00, this process happens in reverse, so that by the start of section two the ostinato is again synchronized and crossfading over five seconds.

Section two (05:00–10:00): Most of section two is a duet between the Swell and the Great, with the Pedal entering at the climax toward the end. The whole ostinato is transposed up an octave so that B♭3 enters at 05:00 and so on, but apart from that, it remains the same. From 05:00–05:30, a crotchet crescendo commences the section, the microphones having been positioned a few centimetres away from the keys. At 05:30, the recording position moves in front of the roller board, as crotchets on the Great and quavers on the Swell commence. Throughout section two, the natural panning effect of upward gestures moving left to right (i.e. a chromatic 'scale' starting on the lowest note and finishing on the highest) and downward gestures moving right to left (i.e. the opposite) was retained. For clarity, passages played on the Great always move left to right (upward), and passages on the Swell right to left (downward). At 06:00, the downward Swell quaver gesture ends, but the upward Great crotchet gesture continues until 06:30, interspersed with snippets of reversed audio of the Swell quavers. At 06:30, a new upward quaver gesture on the Great begins concurrently with a downward semiquaver gesture on the Swell. The Swell gesture ends at 06:45, while the Great continues until 07:00, again interspersed with reversed Swell audio. At 07:00, a semiquaver gesture on the Great is accompanied by a triplet semiquaver gesture on the Swell; the Swell gesture ends at 07:10 and the Great at 07:15, with reversed audio of each being heard until 07:30. From 07:30–08:00, static demisemiquavers are heard alone on the Swell with no upward or downward movement, latterly being joined by static demisemiquavers on the Great from 08:00. From 08:00–08:30, the Swell demisemiquavers crossfade into reversed audio of themselves before dropping out at 09:00—the same happens to the Great demisemiquavers from 08:30–09:00. From 08:15–08:30, a downward quaver gesture enters in the Pedal, followed by an upward crotched gesture from 08:30–09:00. Contrasting with the rhythmic regularity of the manuals, the Pedal line is purposefully uneven. The sudden dropout

at 09:00 precedes the explicit reappearance of the B–A–C–H motif, and is emphasized by the reversed audio Great crescendos and the Pedal notes coinciding with each ostinato sample change. The section closes (09:30–10:00) with a reversed version of the opening audio heard from 05:00–05:30.

Section three (10:00–15:00): The middle section is the simplest, being constructed as a pyramid, and highlighting the midpoint of the piece at 12:30. A thirty-second episode of Great demisemiquavers from section two was stretched to five minutes and pitch shifted roughly to B♭, then rendered five times using progressively smaller FFT values and different EQ settings. Each rendering crossfades over thirty seconds into the next, starting with that which has the highest FFT value and emphasizes the lower frequencies (at 10:00), and finishing with the lowest FFT value and higher frequencies (at 12:30), before going in reverse order from 12:30–15:00.

Section four (15:00–20:00): The penultimate section concentrates on the sound of the drawstops being pulled out and pushed in. On the left and right stop jambs of the organ, there was one stop on each that caused all of the roller board trackers to rattle when pushed in; by pushing both in forcefully at the same time, the rattle could be made quite loud. Introduced from 15:00–15:30, this rattle repeats every five seconds and underpins the section, having had the percussive impact of the drawstops cropped out and the lower frequencies amplified. This amplification is reduced incrementally throughout, leaving the original rattle at 19:30–20:00. From 15:30–16:00, six different drawstops are heard, three from the left stop jamb and three from the right. The drawstops selected were those whose mechanical sound contrasted most with one another. At first heard every five seconds in sync with the rattle, from 15:30–19:00 there is a steady accelerando, so that by 19:00 the drawstops are heard every ½ second. At the same time, a low-pass filter is gradually applied. At 19:05, the drawstops and rattle halt, exposing what would be the B–A–C–H motif, but the high frequency of the ostinato makes it difficult to identify.

Section five (20:00–25:00): The final section brings together elements from the previous ones, climaxing at 22:30 and then fading away again. From 20:00–20:30, the original B♭2 ostinato opening is heard, being joined by an A3 at 20:30, a C5 at 21:00, and a B♮5 at 21:30, after which the crossfading and desynchronization pattern of the previous ostinatos remains the same. Following the final statement of the B–A–C–H motif from 24:00–24:30, the upper pitches fade out in turn from 24:30–25:00, and the sound of a drawstop ends the piece at 24:59. From 20:30–21:00, reversed audio of a close microphone version of the static Swell demisemiquavers from section two enters, crossfading into the original audio at 20:15 and then back again by 20:30. This pattern repeats with Great demisemiquavers from 21:00–21:30, louder staccato Swell demisemiquavers from 21:30–22:00, and then louder staccato Great demisemiquavers from 22:00–23:00. For this middle demisemiquaver passage, the reversed audio at 22:00 crossfades into the original by 23:00 rather than reverting back again. From 23:00–23:30, the louder staccato Swell demisemiquavers are heard again, this time with the original audio appearing first, then crossfading into the reversed audio at 23:15 and back again by 23:30. This reversed crossfading pattern repeats for the close microphoned static Great demisemiquavers from 23:30–24:00, and then the Swell demisemiquavers from 24:00–24:30. At 21:00, a stretched version of a fifteen-second excerpt from the drawstop accelerando in section four enters. A similar approach to that of section three is used, though here without any filtering, with six versions using progressively smaller FFT values crossfading into one another up to the midpoint of the section at 22:30, then back again to the highest value by 24:00. The final element is the original sample of the drawstop and tracker rattle from section four, heard now in its full and unedited form, which sounds at 21:30. Initially it repeats after ten seconds, then again one second earlier each time until, from 22:13–22:28, it sounds every three seconds. From 22:28–22:32, the midpoint is marked with a quasi hemiola, as the sample sounds three times with a two-second interval. After this, it returns to a three-second interval from 22:32–22:41, then increases by one second each time until a ten-second interval is reached again at 23:30.

4.2.3 Passacaglia Three

The last passacaglia is built around the three most prominent pitches produced by the organ's mains transformer, corresponding roughly to G2, D4, and B5, and opens with the sound of the mains power switch (which is separate from the blower switch) being turned on. Rather than using pitch changes, the triple meter ostinato is derived from the transformer recording cycling through the five different convolution reverbs of different locations around the church: the rear porch, the vestry, the chancel, the north aisle, and the nave. Each cycle lasts three seconds, with the previous one crossfading into the next, and the complete ostinato lasting fifteen seconds (00:00–00:15, 00:15–00:30 etc.).

A justly intoned B–A–C–H motif also features in Passacaglia Three, but each pitch only appears once here, and then glissandos into the next. The ≈G2 fundamental transformer pitch was treated as being 'B♭', with the left omnidirectional transformer microphone track acting as a 'pedal note' and staying at pitch throughout, and the right track spelling out the motif: 'B♭' at 00:00, 'A' at 03:45, 'C' at 07:30, 'B♮' at 11:15, and 'B♭' at 14:50. From 00:10–07:30, the higher frequencies of the ostinato tracks are filtered out, with the opposite happening from 07:30–14:55.

The pitches G2, D4, and B5 were recorded separately using the organ's 8′ Trumpet, but were not retuned to match the transformer or to make the intervals equal. The actual pitches of each Trumpet note were 99.1 Hz, 296.5 Hz, and 997 Hz. The Trumpet pitches are not looped, but were recorded for their full duration. Between 00:30–01:00, a high-pass filtered G2 starts to become discernible, followed by D4 at 03:45, and B5 at 05:37. The high-pass filter is reduced up until 07:30, but not so much as for the Trumpet to be heard in its original state.

At the 07:30 midpoint, the mains power switch is heard turning off, and the Trumpet cuts out leaving only the filtered transformer. Between 08:30–09:00, a low-pass filtered G2 starts become discernible, followed by D4 at 11:15, B5 at 13:07, and G1 at 14:04, with each resolving to its original unfiltered state by 14:50. The mains power switch being turned off is heard again at

14:55 as the Trumpet cuts out, briefly leaving the unfiltered transformer recording without convolution reverb, before the same switch is heard once more from inside the organ case next at 14:59.

The glissando B–A–C–H motif also appears in the Trumpet—synchronized with the transformer—with the stereo XY microphone track staying at pitch, and the left and right omnidirectional tracks spelling out the motif as indicated above. By the end of the first crescendo at 07:30, the six audible pitches roughly correspond to G2, A2, D4, E4, B5, and C♯5. By the end of the second crescendo at 14:50, the four audible pitches roughly correspond to G1, G2, D4, and B5.

4.3 Reflection

4.3.1 Material Disposition

When conversing in a crowded room, staying focussed on a single voice can be hard. Recently, it was discovered that our brains encode information differently depending on how loud a certain voice is and whether we are actively trying to listen to it:

> Glimpsed speech is encoded at the level of phonetic features for target and non-target talkers, with enhanced encoding of target speech in non-primary [auditory cortex]. In contrast, encoding of masked phonetic features was found only for the target, with a greater response latency and distinct anatomical organization compared to glimpsed phonetic features.[4]

While the study was concerned with spoken words rather than musical lines, it implies that signal and noise are more than abstract concepts, and our choice about which is which literally changes how sound is perceived at a given moment. Artistically, this choice can be influenced by purposeful organization and transformation of sound, as opposed to just incidental sounding.

[4] Vinay S. Raghavan et al., 'Distinct Neural Encoding of Glimpsed and Masked Speech in Multitalker Situations', *PLoS Biology* (Vol. 21, 2023), https://doi.org/10.1371/journal.pbio.3002128, accessed 25/07/23.

Passacaglias for Organ presents the listener with a simplistic premise: B-A-C-H motif as message signal and other sound as noise. But the motif is not always obvious, and is sometimes 'glimpsed' or 'masked'. How the listener reacts to this will change how the music unfolds, as while the motif is loaded with meaning and significance, there is musical interest in the wealth of other organ sound used. The contrapuntal organization of this material construes the various sounding elements of a pipe organ as polyphonic voices in their own right, and as equal contributors to the musical texture. To reiterate an earlier point, this project was not about defining noise, but about how its being is contingent upon its surroundings. The tangible partitions of a pipe organ maintain the intended boundaries of signal and noise, but by collapsing organ space, the act of listening becomes the determining factor. At a sonic level, this collapsing reveals timbral ambiguities, like the superficial similarity between the mains transformer and a filtered reed stop, or the desirable breathiness of a flute stop versus the undesirable leaking of wind sound. But there are other levels of noisiness, too.

4.3.2 Mode of Mediation

By collapsing organ space and presenting the project as a sixteen-channel fixed media work, the inherent site-specificity of the instruments was also collapsed, but remnants of their locatedness can be spied in the timbral characteristics of the stops and the impulse response files: the five stops that open Passacaglia Two are typical of nineteenth-century English organs, and the cycling transformer reverb ostinato of Passacaglia Three is unique to the church in which it was recorded. This identifies the sound not just as pipe organ sound, but as pipe organ sound that belonged somewhere, and so there is a divide between organ sound which is supposed to carry an internal meaning about what it is and where it came from, and that which is not. What is interesting is the ambiguity of this dividing line, and the role of intentionality in its drawing. A pallet and slider, cone, Barker leaver, and solenoid windchest all sound subtly different in operation, and this can locate them chronologically and geographically, but their sonic idiosyncrasies are incidental rather than being purposefully voiced like the organ pipes they

support. The B-A-C-H motif also encodes meaning, but as indicated above, it is noisy, unlike the comparative purity of an organ pipe's signal.

There is another effect of the project's spatial collapsing: the compounding of the semi-acousmatic nature of pipe organ sound. From an ecclesiastical perspective, this facet was historically seen as desirable, as it helped the congregation to imagine that 'the instrument spoke in the allegorical voice of the Creator himself.'[5] In later secular settings, this notion was turned on its head, and the theatricality of a Wurlitzer gradually rising from below literally placed the organist centre stage. So who is playing the organ here? Is it me (it is), or is the instrument speaking with the allegorical voice of J. S. Bach himself? This situation is accentuated by a 'classical' acousmatic performance format, one that uses static diffusion and fixed channels rather than creating a three-dimensional ambisonic space, tapping into an earlier tape music tradition from the previous century.

4.3.3 Map of Mediations

At the start of this chapter, I gave some contextual examples that affect perception of noise, but there is one I omitted, suggested by Joseph Kay, termed 'conceptual/connotative noise', which 'refers to the interference produced by association and memory (wanted, or unwanted) that inevitably shapes the experience of things, such that this type of noise becomes indistinguishable from the experience itself.'[6] When discussing the apprehension of music, there can be an assumption that the listener consciously decides which ideas are relevant to interpreting the sound they hear, as if selecting books from a library.[7] Kay's connotative noisiness is haphazard, and the listener is not fully in control of their process, like struggling to focus on a single voice in a crowded room. Unlike the exogenous noisiness of multiple aural sense impressions, this is a noisiness endogenous to the individual, and in here is triggered by the B-A-C-H motif.

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[5] Hans Davidsson, 'The Organ in Seventeenth-Century Cosmology' in Snyder, K. (ed.), *The Organ as a Mirror of Its Time* (OUP, 2002), p. 84.
[6] Kay, 'Noise, Resistance, and Intertext in Helmut Lachenmann's Dal Niente (Interieur III) and Accanto', p. 12.
[7] Per Dahl, 'The Listener's Perspective', in Mine Doğantan-Dack and John Dack (eds.), *Music and Sonic Art: Theories and Practices* (Cambridge Scholars Publishing, 2018), pp. 23-44.

Having been used by composers for over three centuries, including J. S. Bach himself, the B-A-C-H motif is one of organ music's most recognizable themes.[8] It is like a red thread, a temporal message signal connecting time, site, and place. Whether surreptitiously slipped into a piece or clearly designated as being a B-A-C-H composition, those four pitches act as a beacon, with all the baggage that entails. Yet there is no set structure, form, or type that unifies B-A-C-H compositions other than the motif, so to recognize it is to simultaneously be reminded of a single person, the high Baroque, and a jumble of subsequent stylistically diverse music. There is a connotative noisiness to the sonically distinct message signal that offsets the contrapuntal clarity of the ostensibly noisy non-pitched and unintentionally pitched sounding elements of a pipe organ, and so a tension between semiotic vagueness and timbral precision.

4.3.4 Telos

By sifting through the music's layers and decoding what is underneath, the listener is invited not to categorize what is signal and what is noise, but to consider how encountering organ sound at different times, sites, and places can change our perception of it. The act of listening is what constructs a sense of locatedness, but when confronted with a domineering instrument in an imposing setting, this truth can be lost. Gaining access to the workings of a pipe organ is a privilege usually reserved for organists and organ builders, but for anyone fortunate enough to have been inside one while it is being played, it is here where the sound is most alive, most immediate, and most exciting. The virtual access granted by *Passacaglias for Organ* retrains attention, and transplants organ sound from the confines of the external building space, a space which is physically expansive but conceptually limiting, into a realm which encourages the deconstruction of established sound hierarchies. This deconstruction requires an active cognitive decision on the part of the listener, but once made, it may be realized that far from interfering with the signal, noise enhances it.

[8] See Malcolm Boyd (ed.), *J. S. Bach (Oxford Composer Companions)* (OUP, 1999), pp. 50-55.

Chapter Five
Order and Reorder

What can pipe organ transcription and registration processes tell us about how the instrument's material disposition is perceived, and how might subverting them reconfigure assumptions about the agency of sounding bodies and the autonomy of works?

5.1 Background

Registering organ music is a subjective exercise, but one governed by conventions. Although there is room for personal expression, some stop combinations are deemed unacceptable, like playing both upper parts of a trio sonata on the same manual with a 16′ reed accompanied by just a mixture in the pedal, or performing the entirety of an organ symphony using only a solo 2′ piccolo. Exactly what makes a registration inappropriate depends on the context, but poor stop choices can cause organ music to sound odd, even jarring. Then again, unusual timbral combinations can be unexpectedly pleasing.[1] Some things are actively taught to new learners, like how to build up a *plenum*, but others are discovered gradually, and organists might not be able to precisely put into words a convention which they know to be widespread. An analogy is prenominal adjective order, where fluent English speakers can intuitively tell that 'large well-maintained North German Baroque organ' is correct, and 'Baroque well-maintained North German large organ' is not, but cannot necessarily explain why.[2]

Something similar is true when transcribing music for organ, likewise a subjective endeavour, but one that can be undone by insensitive treatment of the source material. Should the transcription try to preserve the scope and shape of the original, or should it be slimmed down and translated into a more organ-like version? The answer might depend on the size, era,

[1] J. S. Bach was reportedly fond of surprising listeners with bold registration: 'often he shocked organists when he wanted to play their instruments, for he drew stops in his own manner, and they believed it was impossible that the way he wanted it would sound well, but they afterward heard an *Effect* [sic] that astounded them'; Christoph Wolff and Markus Zepf, *The Organs of Johann Sebastian Bach: A Handbook* (University of Illinois Press, 2012), p. 140.
[2] Chris Westbury, 'Prenominal Adjective Order is Such a Fat Big Deal because Adjectives are Ordered by Likely Need', *Psychonomic Bulletin & Review* (Vol. 2, 2021), pp. 122–138.

and disposition of the instrument intended for performance, which in turn leads to more questions about differing ideas of what a pipe organ is supposed to be and what it is for: an imitative instrument that can stand in for an orchestra, a distinct instrument that makes its own unique sounds for its own repertoire, or both? Transcription and registration are intertwined, with the way that the notes are adapted to their new medium being bound to expectations of the alternative sounds that will be used to play them.

There are two categories of pipe organ music that succinctly express this dilemma—solo transcriptions of ensemble organ concertos, and arrangements of pieces made for automated organs—as they exemplify how perceptions of a pipe organ's material disposition are linked to the processes used to organize the sound being heard. Though not plentiful, examples by prominent composers can be found across the repertoire. During his time at the court of Prince Johann Ernst of Saxe-Weimar, J. S. Bach made keyboard transcriptions of other composer's concertos, notably four concertos from Antonio Vivaldi's *L'estro Armonico*, and C. P. E. Bach and Franz Joseph Haydn composed sets of pieces for musical clock in the second half of the eighteenth century. George Frederick Handel produced both, and his organ concertos and musical clock pieces were written at roughly the same time, from the mid-1730s to mid-1740s.[3] The work-templates used for the projects documented below were therefore taken from this portion of Handel's oeuvre.

The pieces chosen, and Handel's output in general, encompass a range of eighteenth-century composition practice, including arrangement, borrowing, improvisation, keyboard reduction, self-borrowing, and transcription. They are like an intersection of intersections, and the fluidity with which Handel's music was reworked by himself and others contrasts with the physical permanence of the pinned cylinders used by the musical clocks and barrel organs, some of which still survive, sparking debates about the usefulness of these cylinders to historically

[3] William Malloch, 'The Earl of Bute's Machine Organ: A Touchstone of Taste', *Early Music* (Vol. 11, 1983), pp. 172-183.

informed performance.[4] These organ concertos and musical clock pieces have an essence that can be traced back to an originating work, but their musical and instrumental structures have been reorganized repeatedly by Handel and others, not all of which he interacted with personally. Disentangling these knotted threads into something Händel-Werke-Verzeichnis-friendly is the task of musicologists, but how to respond creatively to these same conundrums is the subject of this chapter, my intention being to add yarn to the tapestry rather than unpick it.

The changes that inherited music undergoes as it is reinterpreted by successive generations is revealing, but when that music is purposefully reworked into novel configurations, a society's perception of the contemporary format is also encoded in the new version of the work. In their respective transcriptions of the sinfonia from J. S. Bach's cantata 'Wir danken dir, Gott, wir danken dir' (BWV 29), Marcel Dupré's and Alexandre Guilmant's treatment of the organ is quite unlike Bach's.[5, 6] The transcriptions are interesting enough, but hidden behind the notes on the page is an echo of how nineteenth-century French musical society conceptualized the material disposition of a pipe organ, what it should sound like, and how it should be used. Dupré's and Guilmant's original organ works were specifically written for such instruments, and so lack this secondary angle, but the process of transcribing Bach's music made explicit through transformation what was implicit in their own pieces.[7]

As in the previous chapter, where the focus was on context as much as phenomena, the emphasis here is on what the act of reworking can tell us about established conventions surrounding the instrument. There is an underlying process to organ registration and transcription, but one that can be invisible to those who are doing it. The two projects documented below,

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[4] See Emily Joye Baines, 'The Ghost in the Machine: The Role of Mechanical Musical Instruments as Primary Sources for Eighteenth-Century Performance Practice in England, and an Examination of the Style(s) Contained Therein', DMus Thesis (Guildhall School of Music & Drama/City, University of London, 2017).

[5] Marcel Dupré (arr.), 'Sinfonia de la 29ème Cantate', *Oeuvres Complètes pour Orgue de J. S. Bach Vol. XII* (S. Bornemann, 1941), pp. 81–89.

[6] Felix Alexandre Guilmant (arr.), *BWV 29: Sinfonia aus der Ratswahlkantate 'Wir danken dir Gott wir danken dir'* (Wolfgang Haas, 2010).

[7] To a lesser degree, the same can be said about preparing modernized or nationalized editions of earlier organ music. In the previous century, John Dykes Bower and Walter Emery were responsible for producing a comprehensive series of J. S. Bach's organ works for Novello, but the editorial markings are aimed at British performers playing British cathedral instruments of the period, disrupting the implicit locatedness of Bach's music.

Organ Concerto (after Handel) and *Clock Sync*, may be thought of as musical breaching experiments, and as attempts to disrupt process to see what is underneath.[8] The compositional challenge was to do this subtly, in such a way as to nudge the listener and loosen preconceptions, but not be uncomfortable and drive them in further like a finger trap. The solution was to use a set of rigid, predefined, and transparent processes to reorganize the notes and stops, making it possible to grasp how the original pieces had been transformed. The result is a musical traversing of ostensibly familiar territory, with snatches of Handel audible in the distance behind the redrawn contours of the new works. The first project is for a single human performer playing a large pipe organ without electronics or augmentation, and the second is for an automated OSC-capable hyperorgan.

5.2 *Organ Concerto (after Handel)*

The London printer John Walsh the younger released three sets of Handel's organ concertos: the 'First Set' Op. 4 (HWV 289-294), published 1738, whose preparation and editing was overseen by Handel; the 'Second Set' (HWV 295a, 296a, 297-300), published 1740 also with Handel's input and featuring two new concertos, HWV 295a and 296a, and four transcriptions from his *Twelve Grand Concertos* Op. 6; and the 'Third Set' Op. 7 (HWV 306-311), published 1761, whose assembly was completed posthumously by Walsh.[9, 10] The concerto used as the template for *Concerto (after Handel)* is HWV 296a, and it was chosen for two reasons. Firstly, Handel's notes lent themselves well to the transformations I wished to effect, and the feel of each movement was already suited to what would be their new iterations. Secondly, it underwent several transformations in Handel's own hands. Having started life as an orchestral organ concerto in 1739 (HWV 296a), it was used as the basis for a concerto grosso (HWV 329) the same year, then published for solo keyboard in

[8] Anne Rawls, 'Harold Garfinkel', in George Ritzer (ed.), *The Blackwell Companion to Major Contemporary Social Theorists* (Blackwell, 2003), pp. 122-131.
[9] Donald Burrows, *The Cambridge Companion to Handel* (Cambridge University Press, 1997), pp. 193-207.
[10] Donald Burrows, *Handel* (OUP, 2012). pp. 330-338.

Walsh's 1740 'Second Set', and latterly incorporated into a pasticcio organ concerto c. 1743–1746 (HWV 296b).[11]

The original five-movement plan of HWV 296a was retained for *Concerto*, but the movement iterations used for reworking were taken from different sources: the first from HWV 329, the second from Johann Kuhnau's sonata from which Handel borrowed, the third and fourth from the orchestral version of HWV 296a, and the fifth from Walsh's solo keyboard version of HWV 296a. Each movement, apart from the second, uses a pre-determined process to reorder the notes according to properties like duration, pitch, or motif, with the stipulated registrations being correspondingly process-driven to solidify the transformations. These complementary sets of processes are at once arbitrary and considered, in that they take their cues from some aspect of the original movement, but do not deviate from the process until completion, even when that same cue is erased as a result.

By integrating the stops into the processes, they no longer serve a purely colouristic role, and their material properties contribute to *Concerto* as much as the notes. As the processes themselves are, essentially, the new work, so registration becomes a structural element. They also blur the distinctions between pipe organ as *concertino* or *ripieno*, and as imitation orchestra or stand-alone instrument. In order to facilitate the stop processes, *Concerto* is written for a large instrument with at least four manuals and pedals. This alone is a transformation, as excepting HWV 306, Handel's organ concertos were written for smaller instruments with no pedals and limited stops. This was a practical constraint rather than an aesthetic decision, as British organ-building lagged behind continental Europe, and Germany in particular, at the time.[12]

5.2.1 Notes by Duration and Stops by Length

The concerto grosso version of HWV 329's first movement is scored for concertino two violins, violoncello, and cembalo, and ripieno two violins, viola, violoncello, violone, and cembalo. The

[11] Burrows, *Handel*, pp. 564, 567.
[12] Terence Best, 'Handel and the Keyboard', in Burrows (ed.), *The Cambridge Companion to Handel*, p. 222.

impetus for the reordering process came from a recurring chromatic acceleration motif, where the note values halve twice over two bars:[13]

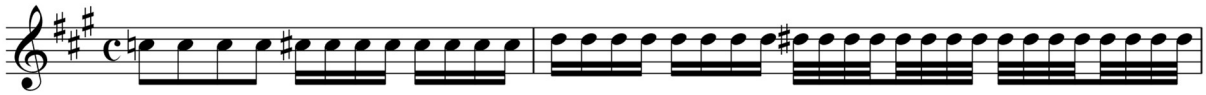
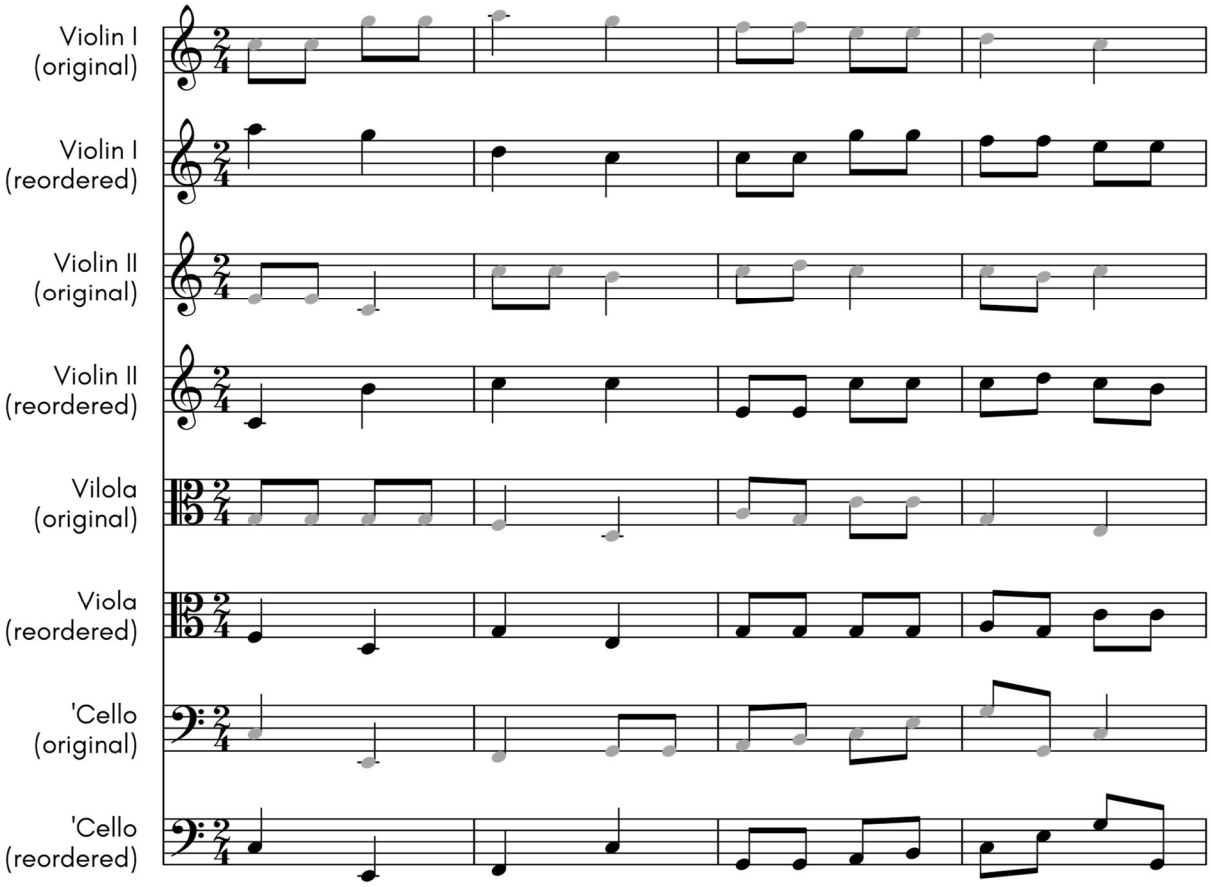


Figure 5.1 **HWV 329, first movement, violin 1, bb. 25-26**

The first stage of rendering the new movement was to separately reorder the notes of each instrumental part, excluding realization of the figured bass or editorial *ad libitum* suggestions, to create four main sections: a crotchet section, a quaver section, a semiquaver section, and a demisemiquaver section. These individual parts were then layered on top of one another section by section, creating a pyramid effect whereby the texture becomes denser toward the middle of that section before thinning out again. Overlapping with these note value sections are dotted note passages which bridge the gap from the greater to the lesser note values.



[13] Handel uses a similar fugue subject in HWV 325, which, interestingly, Richard Taruskin suggests has been defamiliarized; see Taruskin, 'Handel and "Defamiliarization"', *Oxford History of Western Music Vol. 2* (OUP, 2005).

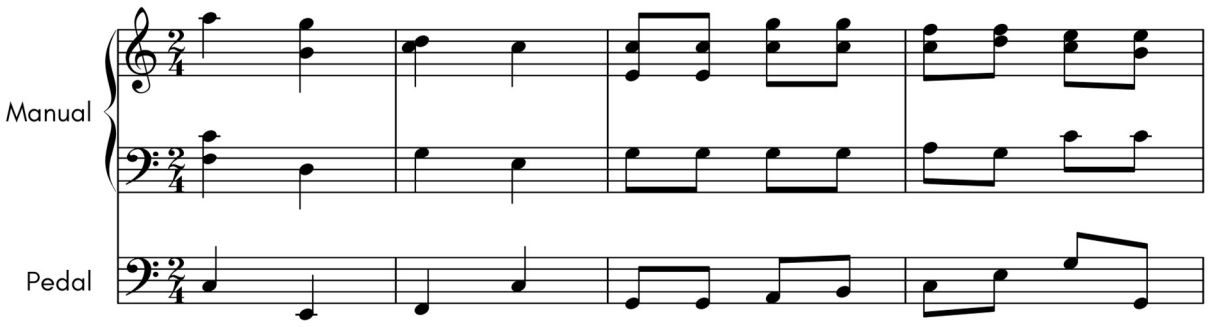


Figure 5.2 **Reordering process demonstrated with string quartet to organ version of 'Twinkle, Twinkle Little Star'**

Registration reflects note value throughout, with the longest values using the largest ranks: the opening minim introduction uses a 32′ stop for the pedal and 16′ for the manual, the crotchet section 16′ for pedal and 8′ for manual, and so on. For the dotted notes, solo reed and mutation stops are used, emphasising the rhythmic disagreement with the tactus.

5.2.2 Organo ad Libitum

The *organo ad libitum* passages of Handel's organ concertos are almost a genre themselves, and executing them successfully requires familiarity with improvisatory practice of the time.[14] In the case of a whole movement being *ad libitum*, modern performers may, according to taste and proficiency, insert a short piece from a different Handel work, improvise on a Handelian theme, or improvise freely.[15] With *Concerto*, I took this as an opportunity to reference Handel's propensity for borrowing from other composers, and inserted the complete first movement of Kuhanu's third sonata from *Frische Clavier-Früchte*, left in its original key of F major, from which Handel took the theme for the third movement of HWV 296a.[16]

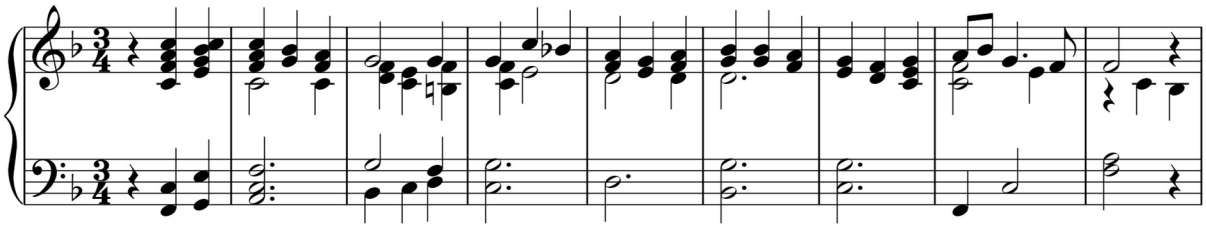


Figure 5.3 **Kuhnau, *Frische Clavier-Früchte*, third sonata, first movement, bb. 1-9**

[14] HyeHyun Sung, 'Handel's *Organo ad Libitum*: A Study of Adagios in his Organ Concertos', Doctoral Essay (University of Houston, 2016).
[15] For example, Simon Preston and Trevor Pinnock, 'Organ Concerto No.14 in A HWV 296, II. Organo ad libitum: Fuga. Allegro', *Handel: Complete Organ Concertos* (Archiv Producktion/Deutsche Grammophon, 1984) [CD]; and George Malcolm and Neville Marriner, 'Handel: Organ Concerto No.14 in A HWV 296, 2. Allegro', *Handel: Orchestral Works* (London/Decca, 2000) [CD].
[16] Johann Kuhnau, *Frische Clavier-Früchte* (Breitkopf & Härtel, 1901), pp. 82-83.

As mentioned above, Handel's organ concertos were written for a smaller instrument with no pedals and limited stops, whereas *Concerto* requires a larger instrument with at least four manuals and pedals. Just as the notes of this movement allude to the earliest musical origin of the work, so the simple registration harks back to that which Handel is likely to have used.[17] The lack of processes sets this movement apart from the rest, and its incongruence highlights the fact that where once these would have been an opportunity for spontaneous, sometimes dazzling, demonstrations of contemporary musical taste, they are now, like Shakespearian sword fights, unavoidably anachronistic no matter how talented the performer.

5.2.3 Notes by Pitch and Stops by Class

In this movement, the orchestral organ concerto version of HWV 296a is scored for two oboes, two violins, viola, organ, and basso continuo. Unlike the Kuhnau sonata which is largely homophonic, Handel adds solo organ passages of semiquavers and triplet quavers. The process impetus here came from the undulating stepwise profile of Kuhnau's original theme, borrowed by Handel, and referenced in the semiquavers and triplet quavers.

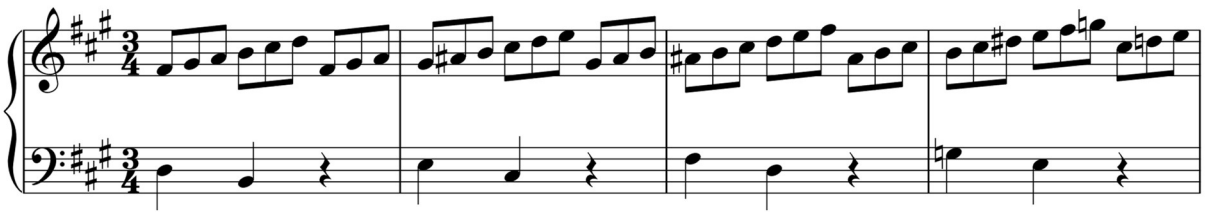
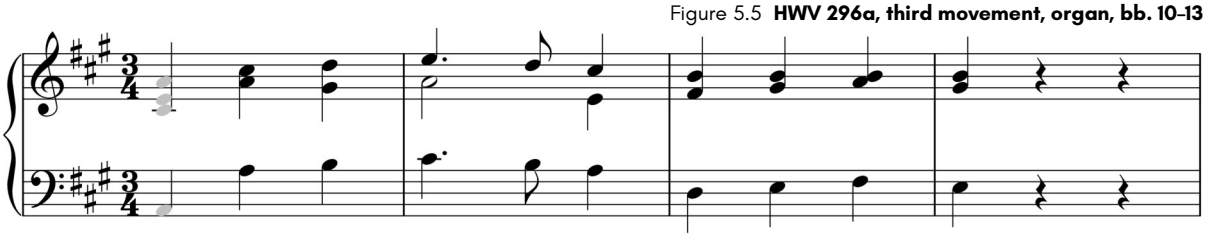


Figure 5.4 **HWV 296a, third movement, organ, bb. 87-90**

Rather than reordering all the notes in one go as with the first movement, they were subdivided into sections, then reordered lowest to highest or vice versa within each section. These sections correspond to the phrases and gestures of the original; e.g., bb. 1-10 of the original become b. 1 of the new version, and bb. 10-13 become b. 2.

Figure 5.5 **HWV 296a, third movement, organ, bb. 10-13**



[17] Graham Cummings, 'Handel's Organ Concertos (HWV 290-93) and Operatic Rivalry', *GFH Journal* (Vol. 1, 2007) pp. 1-29.

For the longer phrases and longer note values, the decision whether to reorder the notes up or down was based on the overall direction and feel of the music; e.g., bb. 1-3 of the new version have an upward trajectory that is balanced by the downward trajectory of bb. 4-6. For the semiquavers and triplet quavers, the notes were reordered in smaller units, and the decision on their direction based on whether the final note of the unit was higher or lower than the first.

Relating to how the notes move through pitch classes, the registration cycles through stop classes. At first this happens slowly, with stops from the same class drawn on all divisions: bb. 1–8 flutes, bb. 9–15 reeds, bb. 16–18 principles, bb. 19–22 strings. From bb. 23–26 this happens more rapidly, and finally at bat 27 stops of different classes sound together. The primary effect of this process is to decouple stops from transcribed parts, in that registration is not used to demarcate which passages ought to be perceived as *tutti* or *soli*, it instead unfolds in its own way according to the predetermined order. Typically, distinctive timbres might be used to pick out interesting lines, but here that relationship is reversed. Reordered with only traces of motif, the notes now serve as carriers of the timbral nuances discernible as stops of the same class sound together.

5.2.4 Notes Simultaneously and Stops Combined

The penultimate 'grave' of HWV 296a is another example of *organo ad libitum*, comprising a series of simple chord progressions with figured bass.

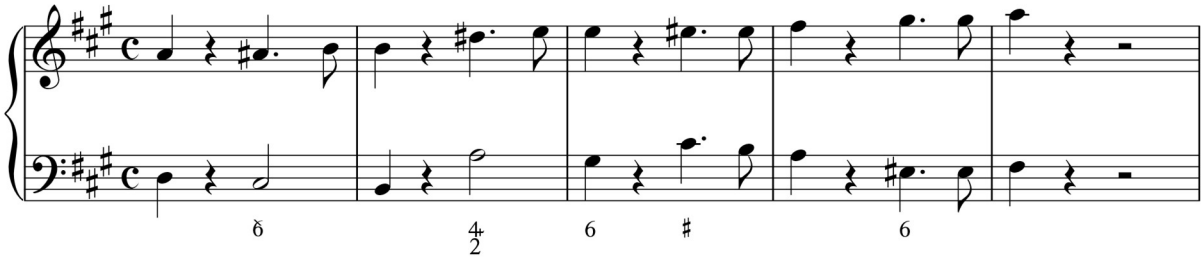


Figure 5.6 **HWV 296a, fourth movement, organ, bb. 1-5**

In 5.2.2, I cited two recordings showing different solutions to filling the gap, but the same performers' renditions of this movement are alike, with flourishes in the right hand overlaying the figured cadences. Having so far used processes that separate and reorder things, this movement

combines and overlays things. The printed notes, ignoring the figured bass, are tied to become four cluster chords, each sounded using a different stop class and rank length.

5.2.5 Notes by Bar and Stops by Division

The final movement uses Walsh's solo keyboard reduction of HWV 296a, almost all of which is in only two parts. The absence of orchestration makes the motific units, their development, and repetition stand out on the page, and this was the impetus for the process used. The original movement was reordered by bar, with related motifs and figures grouped together in ten sections in the order that they appear, marking a chronology of how they develop and repeat. In the first section (bb. 1–8), the reordered bars are played unaltered, but in the next three sections, the original motif rhythm is preserved while the notes are combined with one another. In section two (bb. 9–20), the notes that originally occurred during each crotchet beat are combined; in section three (bb. 21–31) the notes that occurred during each minim beat are combined; and in section four (bb. 32–45), the notes that occurred during the whole bar are combined. During each of these, the pedal plays an augmented version of the primary motif from that section.

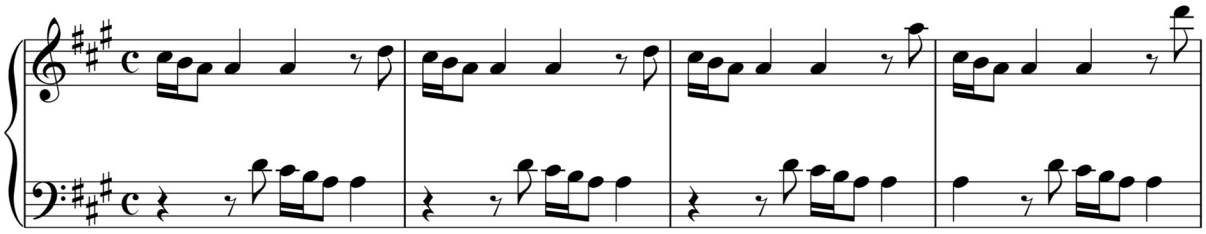


Figure 5.7 **Bb. 32–35 of *Concerto* prior to combining the notes into chords**

In sections five (bb. 46–52), six (bb. 53–58), and seven (bb. 59–68), the motifs are presented using either an additive or subtractive choral approach, the former holding the notes as they are sounded, and the latter starting with a cluster chord and releasing notes to create a 'negative image' of the original motif. Again, the pedal plays the primary motif of the section, but this time in minims, having accelerated from breves in the second and third sections, and semibreves in the fourth.

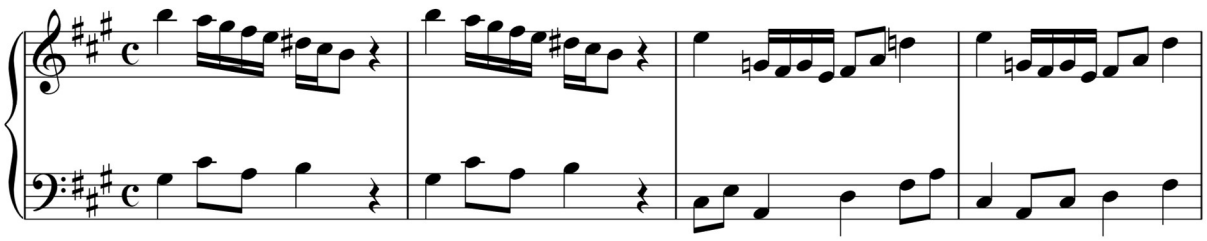


Figure 5.8 **Bb. 57–60 of *Concerto* prior to combining the notes into chords**

The final three sections use a similar method to the first four, but this time the original motif rhythm is not preserved, and in section eight (bb. 69–74) the combined notes are simply held for a crotchet duration, in section nine (bb. 75–83) a minim, and section ten (bb. 84–95) a semibreve. The pedal acceleration continues, with the sectional halving of note values contrasting with the doubling of values heard in the manual parts: pedal crotchets appear in section eight, quavers in section nine, and semiquavers in section ten. As indicated in the score, the registration is essentially a giant terraced crescendo, requiring the performer to carefully work out in advance the order in which every stop on the organ should be drawn.

5.3 *Clock Sync*

Handel had an interest in novel and mechanical instruments in life, producing several sets of pieces for John Clay's musical clocks, and after his death, the organist and mechanic John Langshaw made barrel organ versions of Handel arrangements by John Christopher Smith Jr.—including two organ concertos.[18] Despite Handel's status as a pivotal figure in British music, his pieces for musical clock remain comparatively under-researched; none were included in Friedrich Chrysander's original *Händel-Gesellschaft*.[19] Though challenging for music historians, these uncertainties made the pieces ideal for the final project.

> Summarizing the available evidence, then, to date, we have four different sets (thirty-eight pieces, some of which are duplicates, though slightly varied) attributed to Handel, the majority of which

[18] Donald Burows, *Handel* (OUP, 2012), pp. 266, 273.
[19] Charles Ditto, 'Handel's Musical Clock Music', *Fontes Artis Musicae* (Vol. 44, 1997), p. 272.

> are arrangements of opera arias. We have contemporary manuscript copies for Sets 1, 2, and 3, but only a modern scription of Set 4. There have been several publications of parts of this body music. We have two clocks: one that plays Set 3, the Christie's or Braamcamp Handel/Clay organ clock, and one that plays Set 4, the Windsor Castle Handel/ Clay organ clock. There are no clocks found that play Sets 1 or 2. In the large body of Handel scholarship, no single source completely documents all four sets of music.[20]

Clock Sync uses Pieter Dirksen's transcriptions of the Windsor Castle Clock versions of Set 4, containing ten pieces, five of which are of dubious provenance and do not have HWV numbers.[21] The project's title alludes to the conceptual synchronization of the musical clock pieces with Handel's music, and to the lack of WAV decoder board synchronization that characterized *Orgelwerke*, as the processes used here also explore the interrelations of automation, temporality, and togetherness.

Clock Sync is the shortest of the five projects, intended to bookend this thesis and recapitulate the compositional ideas introduced in previous projects. Dirksen's transcriptions of Set 4 were arranged for the Utopa Baroque Organ and Sauer organ at Het Orgelpark, both played on Reaper via a MIDI to OSC application developed by Wouter Snoei that allows the user to control the two organs from a laptop simultaneously.[22] Each piece lasts around one minute, and presents a miniaturized iteration of one or more processes heard elsewhere. Although it is possible to play the Utopa and Sauer organs using just MIDI or just OSC, the former is limiting due to inherent constraints, whereas the latter is complex due to the lack of standardization. Snoei's application provides a third way, offering what is essentially a 16-voice MIDI orchestration interface that capitalizes on the hyperorgan's OSC versatility, and which can be easily operated with most DAWs.

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[20] Ibid. pp. 279-280.
[21] Pieter Dirksen (trans.), *George Frideric Handel: Twenty Pieces for a Musical Clock (c. 1738)* (The Diapason Press, 1987).
[22] For an introductory video on the organs' capabilities and the combined hyperorgan console, see https://vimeo.com/560750664, accessed 06/08/24.

5.3.1 '11 [Air]'[23]

The first piece uses the complete unedited transcription, with the right hand played on four different Utopa flute stops (Gemshorn 4', Weit Pfeiffe 2', Rohrflott 4', Waldflott 2'), and the left hand played on another four flute stops (Burdun 16', Rohrflott 8', Quintathen 8', Gedackt 8'). The parts played on the 16', 8', and 2' stops were transposed, so that all eight parts sound at 4' pitch. As with *Orgelwerke*, the eight parts start off synchronized, but drift as the piece progresses. Unlike *Orgelwerke*, this drift is controlled, with each part set to play at a slightly different speed in Reaper. Accentuating this disintegration, the attack velocity of all parts gradually decreases as the drift increases, causing the pipes to speak more slowly.

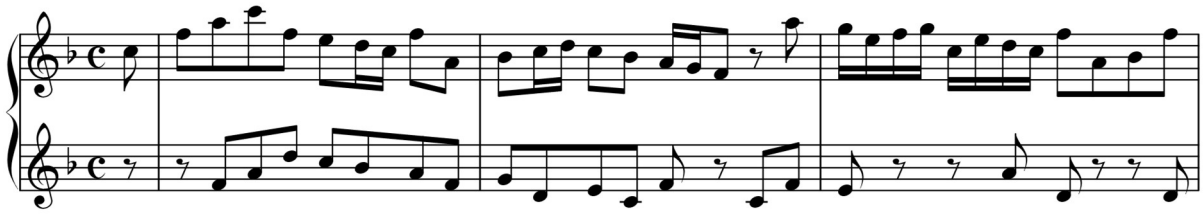

Figure 5.9 **11 [Air] (original transcription), bb. 1-3**

5.3.2 '12'

The second piece is a mirror image of the first, but using different processes. Although the notes of the original transcription remain the same, here they are distributed between the two organs by pitch class (as with Præambulum G-Moll), mimicking the C/C# division of a windchest: C, D, E, F#, G#, and A# all are played on the Sauer, while C#, D#, F, G, A, and B are played on the Utopa. The separate pitch class parts start off unsynchronized, gradually coming together by the end of the piece. Instead of decreasing attack velocity, the organs' staccato function is used, so that initially the pipes barely have time to speak, but by the end are speaking normally.

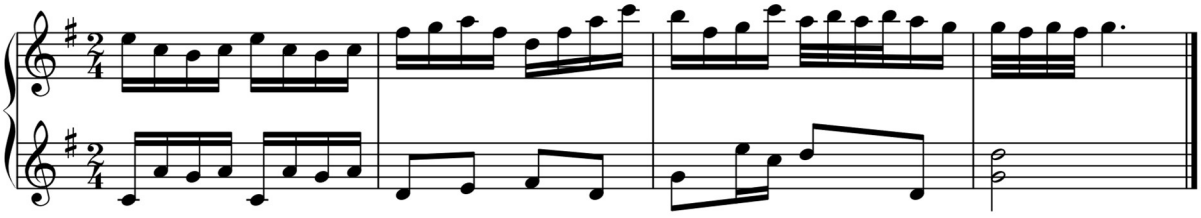

Figure 5.10 **12 (original transcription), bb. 41-44**

[23] The title numbers and names refer to those in the collected volume of Dirksen's transcriptions of both the Braamcamp and Windsor Castle clocks, the first ten pieces in the volume being the Braamcamp transcriptions, and the second ten being the Windsor Castle transcriptions which were used for *Clock Sync*.

5.3.3 '13 [Gigue]'

The third piece uses a similar canon filtering process to Ut, Re, Mi… in *Manual Works*, but without live electronics. The original transcription is played on the Sauer organ, using a quieter registration (Lieblich Gedeckt 16', Konzert-flote 8', Travers-flote 4', Flautino 2') with the swell box shut. The Utopa provides the canon filtering, using a louder parallel registration (Burdun 16', Principal 8', Octav 4', Weit Pfeiffe 2') where each stop plays a delayed and 'filtered' portion of the original: the Flautino 2' plays the notes between F#5-C6 with a two-quaver delay, the Octav 4' plays the notes between C5-F5 with a four-quaver delay, the Principal 8' plays the notes between F#4-B4 with an eight-quaver delay, and the Burdun 16' plays the notes between C4-F4 with a sixteen-quaver delay.

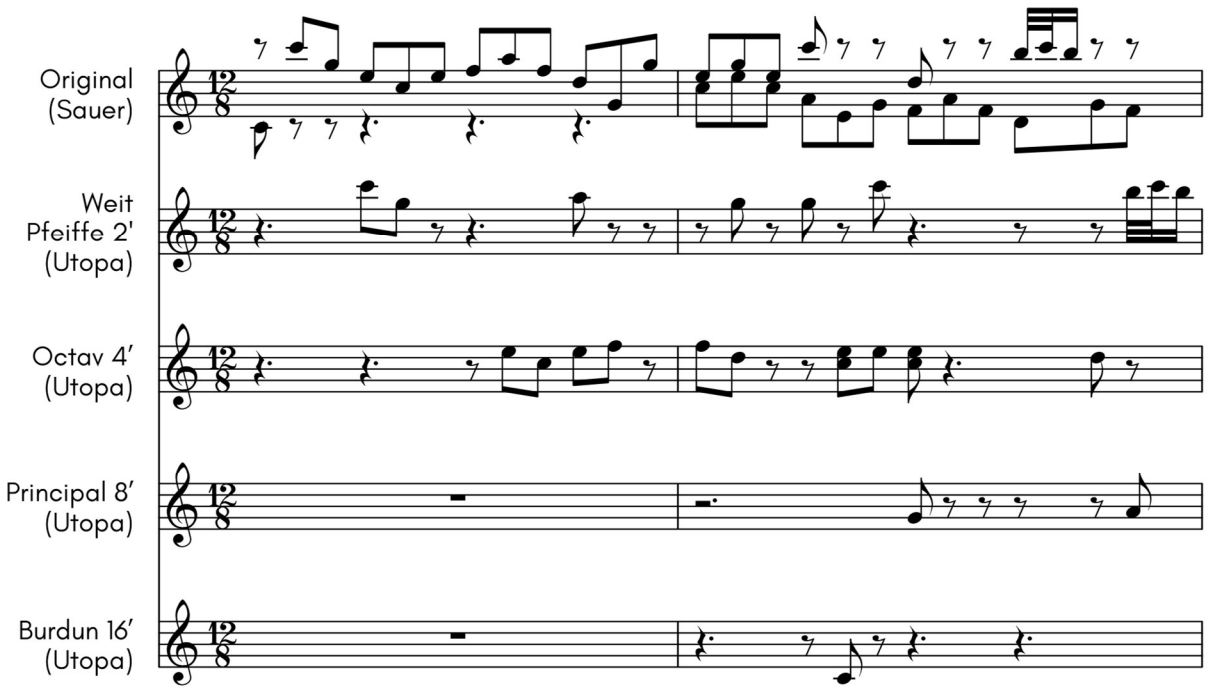

Figure 5.11 **3. '13 [Gigue]', bb. 1-2**

5.3.4 '14'

The fourth piece superimposes transformed variations, like 'O Mistress Mine' in *Manual Works*, layering retrograde, inverted, and retrograde inverted versions of the original on top of one another. Each of the four parts is played on a different Hauptwerk mixture on the Utopa organ (Sexquint altra 2 fach, Cymbel 3 fach, Cornett 4 fach, Mixtur 5 fach), with the parts swapping

every few bars, so that the transformed variations are passed around the four mixtures. Additionally, the original version is played in its entirety on the Sauer's Oboe 8', transposed up an octave, crescendoing toward the midpoint of the piece to emerge from the texture, then diminuendoing again toward the end.

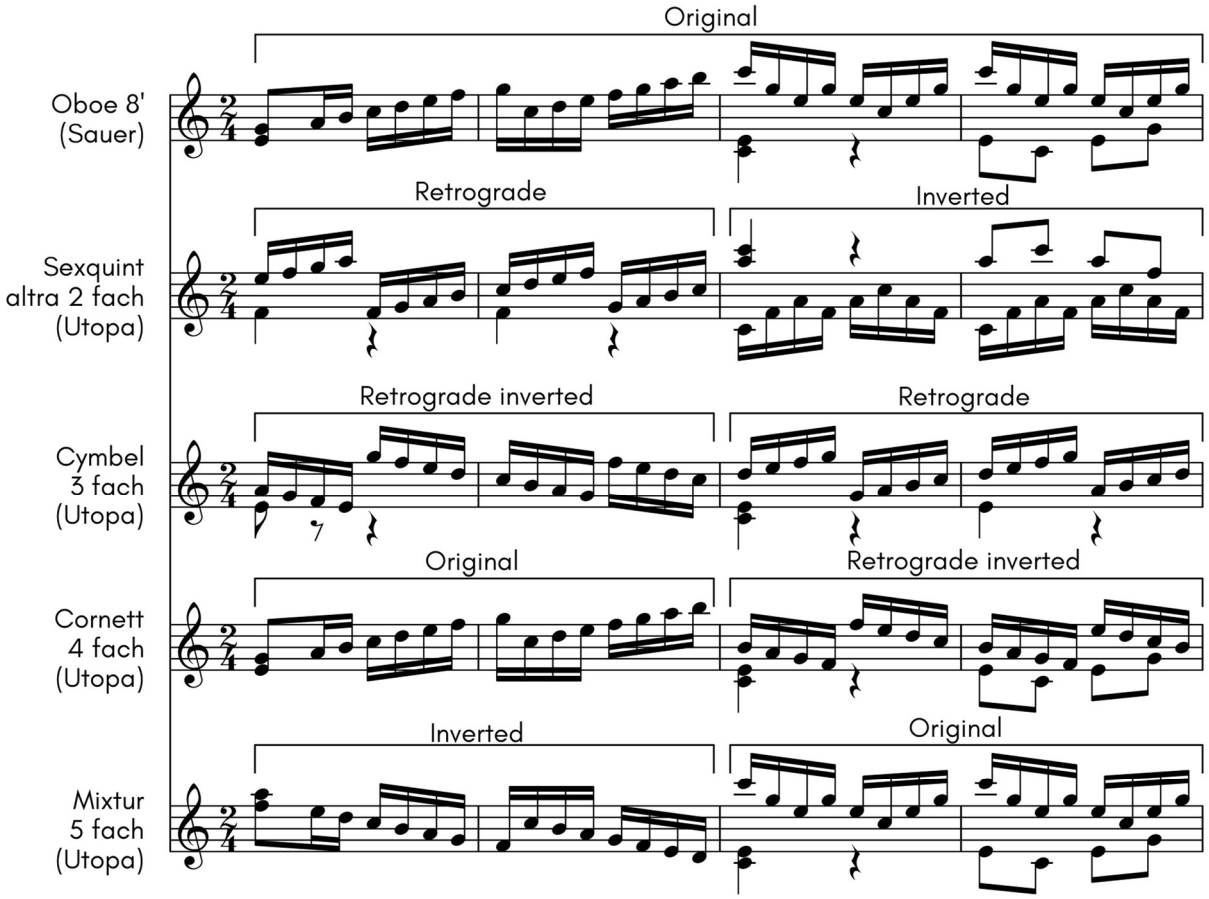

Figure 5.12 **4. '14', bb. 15–18**

5.3.5 '15 [Allegro]'

The fifth piece uses a combination of the cumulative chordal and negative image processes heard in the fourth and fifth movements of *Concerto*, as well as the motif filtering from Fantasia in *Manual Works*. The original transcription was divided into eight equal sections of forty-three semiquavers, with the notes of the first four sections being sounded and held until the middle of the piece, and then the notes of the next four sections released in turn until none are sounding by the end. The held notes are played on the Sauer, with the right hand and left hand of the sections played on a different string registration and at a different octave to thicken the texture,

resulting in a terraced crescendo effect that builds to a shimmering wall before thinning out again. The Utopa also uses strings alone, but picks out the notes as they are sounded (in the first four sections) and then released (in the next four sections) to create a pizzicato effect.

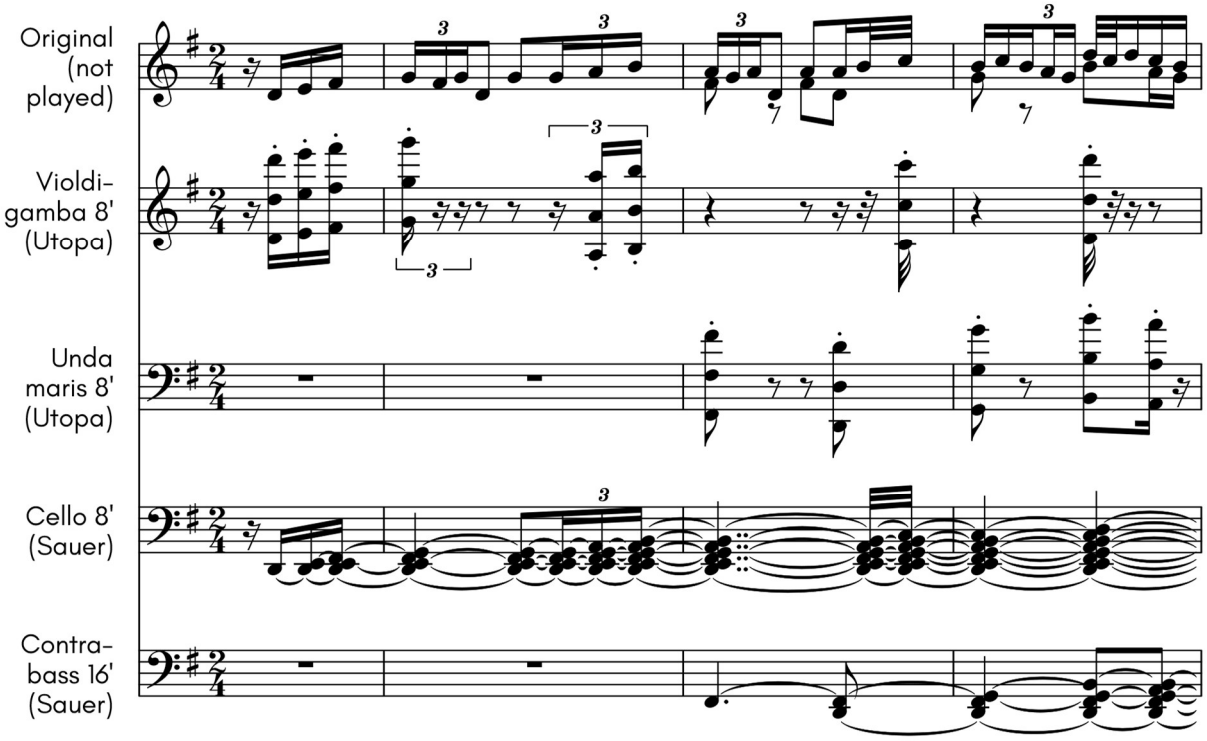

Figure 5.13 **5. '15 [Allegro]', bb. 1–4**

5.3.6 '16 [Va godendo]'

The sixth piece reorders the notes of the original left-hand part by duration as in the first movement of *Concerto*, and the right-hand phrases by pitch as in the third movement. The registration pairs similarly named stops on each organ (e.g. Principal 8'), with each pitch class in the right hand assigned two corresponding flue stops, and the left hand played on quiet reed stops at increasing octaves: opening dotted minims lowest and final semiquavers highest.

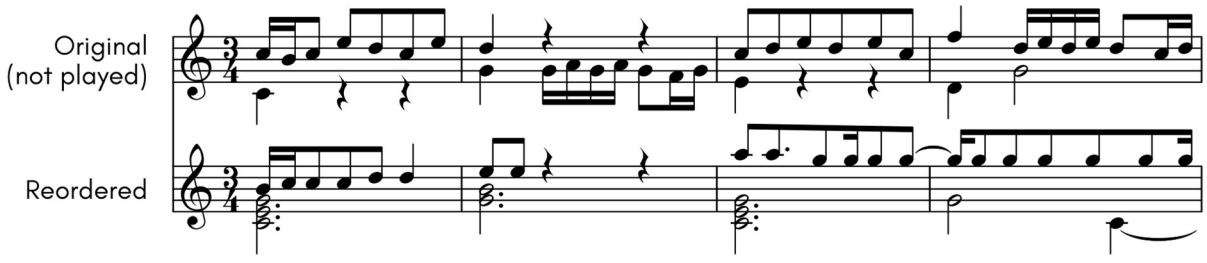

Figure 5.14 **6. '16 [Va godendo]', bb. 1–4**

5.3.7 '17 [In mar tempestoso]'

The seventh piece employs the Utopa organ's dynamic wind function and adjustable tremulants to create a similar effect to Passacaglia One in *Passacaglias for Organ*, only here it used programmatically. 'In mar tempestoso' translates as 'in a stormy sea', and the original overlays running semiquavers in the left hand with a florid melody in the right. In *Clock Sync*, the original semiquaver or quaver notes of each crotchet beat are combined into a cluster chord, and the feeling of being tossed around on musical waves is emulated by gradually increasing the depth and frequency of the Hauptwerk and Oberwerk tremulants, while also cyclically decreasing and increasing the wind supply to create another series of waves. Simultaneously, the original left-hand semiquavers are played on the Sauer down four octaves as the swell box opens and shuts.

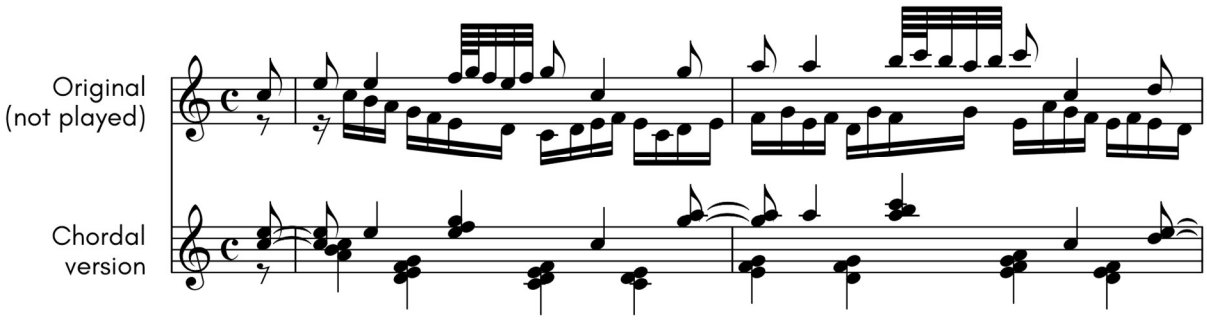

Figure 5.15 **7. '17 [In mar tempestoso]', bb. 1-3**

5.3.8 '18 [Dell'onda i fieri moti]'

The eighth piece alludes to the mathematical elements of *Passacaglias for Organ*, utilizing the highest and lowest pitches that the two organs can produce to encode the notes of the original transcription. The right-hand part plays only a G#6 on the Utopa Sufflott 1', which equates to an actual pitch of G#9; the left-hand part plays a C2 and C3 on the Sauer Contra-bass 32', which equates to actual pitches of C0 and C1. Akin to how MIDI notes are assigned a numerical value, a simplified version of the notes in the right-hand melody were assigned a number between one and eleven. To indicate which note occurs at that juncture in the original score, the corresponding number of repeating G#6s are played during a single crochet beat. In the left-hand part, a simplified version of the original notes are expressed using Pythagorean ratios, with one number being indicated by repeated C2s, and the other by repeated C3s.

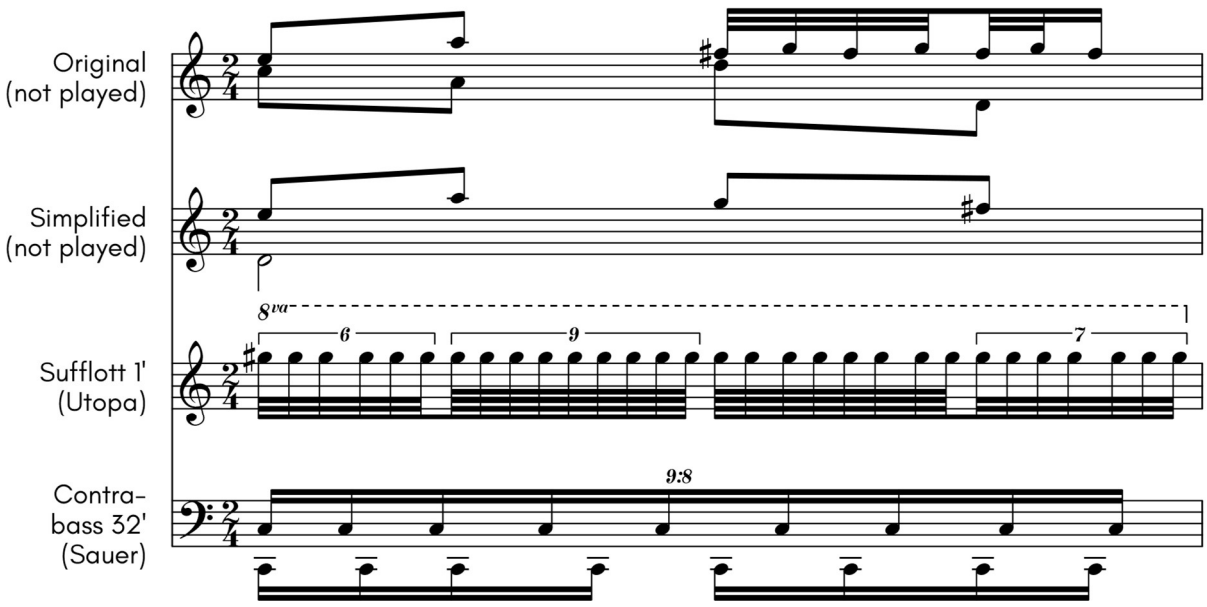

Figure 5.16 **8. '18 [Dell'onda i fieri moti]', b. 7**

5.3.9 '19 [Fifth Air]'

The penultimate piece uses only the rhythm of the original, with the right-hand part rhythm being played on the Utopa, and the left-hand part on the Sauer. Every note on each organ is sounded at once to play the rhythms, but so briefly as to barely allow the pipes to speak, with the resulting percussive effect being reminiscent of rapid drum sequencing. Starting with the highest stops on the organs, additional stops are added each bar, generating the same gradual terraced crescendo as the final movement of *Concerto*.

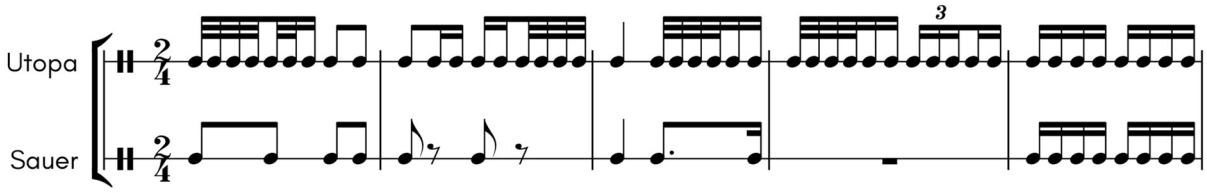

Figure 5.17 **9. '19 [Fifth Air]', bb. 23-27**

5.3.10 '20 [Sixth Air]'

In the final piece, the original transcription is underlaid and overlaid with augmented and diminuted versions of itself, the notes of the left-hand part being doubled in one voice and quadrupled in another, and the notes of the right-hand part being halved in one voice and

quartered in another. To keep the piece the same duration as the original, the augmented lower parts are layered, but also partially truncated to give the impression of staggered entries. Combined with the original transcription and the two diminuted versions, which enter a quarter, half, and three quarters of the way through the piece respectively, the overall effect alludes to species counterpoint exercises which introduce decreasing note values and increasingly elaborate part writing by degree. Registration is again structural, with the lowest quadrupled part played on 32′ stops, and the highest quartered part played on mutations and mixtures.

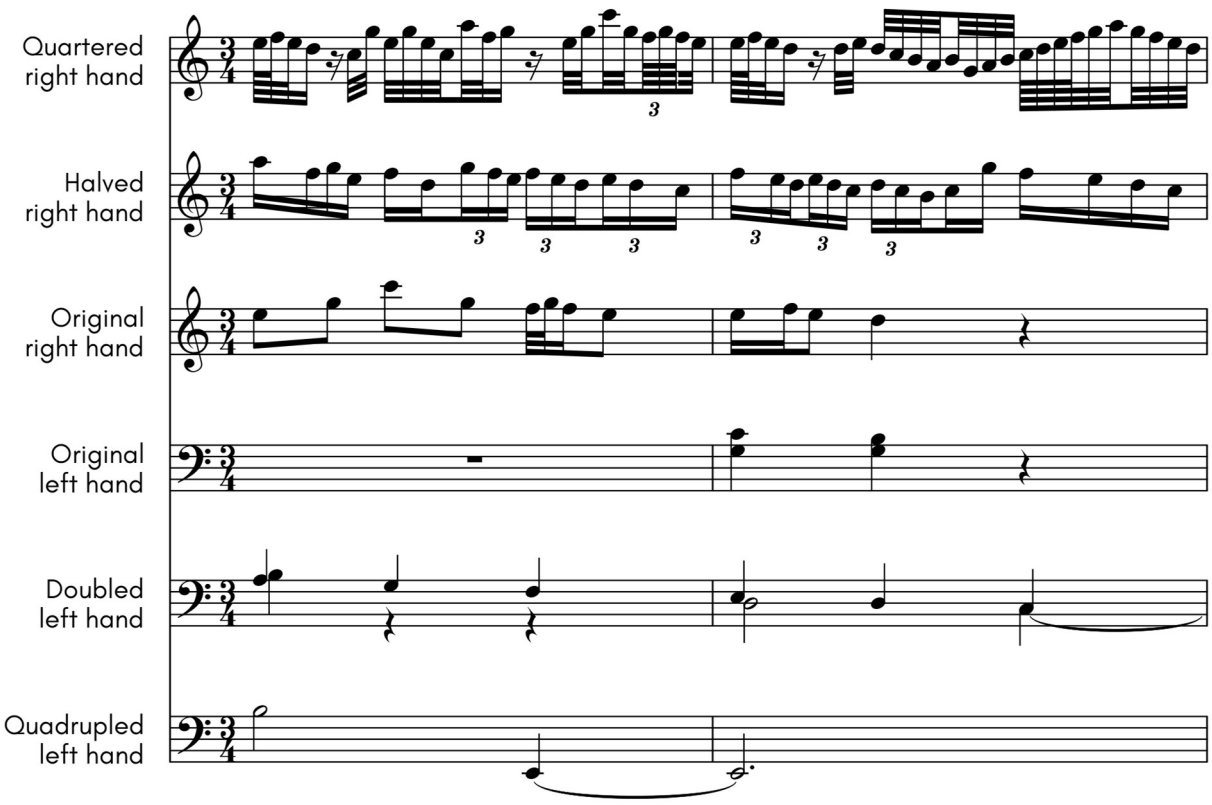

Figure 5.18 **10. '20 [Sixth Air]', bb. 34–35**

5.4 Reflection

5.4.1 Material Disposition

Like filling out a spreadsheet and clicking 'sort by value', the notes and stops are presented as work-template data that have been processed, the idea being to draw attention to the metadata instead. By metadata, I mean the registration and transcription conventions mentioned in **5.1**, which inconspicuously govern how pipe organ music is usually treated. The processes described above may be likened to a microtome knife that cuts through custom to reveal what is inside, with the resulting slices being put under the microscope of performance. By applying a series of processes and providing multiple samples for the musical microscope, it is possible to shine light on this obscured information. The earlier reworkings of Handel and subsequent editors did something similar, the difference being that they obeyed convention rather than breaking with it.

Despite being written for a human performer, *Concerto* uses processes that are designed to feel mechanical. Rather than the inanimate organ being brought to life by the touch of the organist, the animate organist is reframed as a conduit mediating the processed musical code of the score into sonic output. But it is hard to play an instrument robotically for five movements, and it is likewise difficult to erase all traces of an original composer. This was not the aim of *Concerto*, and had it been achieved would lessen its effect. The intention was to hover over liminality. Innate human musicality will be glimpsed during performance, and vestiges of Handel remain; occasional fragments of motif are left intact owing to their original shape or order, and the underlying triple time of the third movement, for example, is inescapable no matter how the phrases are slurred. As a counterpoise, despite being unconstrained by human limitations, *Clock Sync* avoids abandoning the human-centric score object entirely, using compositionally restrained processes heard in other projects which go beyond what a single organist is capable of playing, but not belabouring the fact. Like Clay and Langshaw's surviving barrels, proximity to humanizing process is maintained, and MIDI/OSC capability is used not to diminish the absent

performer, but to explore, expand, and exaggerate the effects available to the hyperorganist at the console through composition, like delay, staccato, or sustain.

5.4.2 Mode of Mediation

As well as reconfiguring the relationships between notes, *Concerto* and *Clock Sync* reconsider the connectivity between organist and organ. In his 1945 book *Phenomenology of Perception*, Maurice Merleau-Ponty writes:

> It is said that an experienced organist is capable of playing an organ with which he is unfamiliar and that has additional or fewer keyboards, and whose stops are differently arranged than the stops on his customary instrument. He needs but an hour of practice to be ready to execute his program. … The whole problem of habit here is one of knowing how the musical significance of an action can be concentrated in a certain place to the extent that, in giving himself entirely to the music, the organist reaches for precisely those stops and pedals which are to bring it into being.[24]

The passage goes on several pages, and it tends to be referenced by musicologists in discussions of agency, gesture, and the bodily experience of performing.[25] This chapter is less concerned with debating the agency of organist versus organ as it is with the compositional factors that govern these interactions, and Merleau-Ponty's observation is useful as it implies a degree of universality that reaches beyond time, site, and place. Though pipe organs are uniquely located, their performative conventions are transferable to an extent. Merleau-Ponty asks where these conventions, these habits, reside, but *Concerto* and *Clock Sync* asks what they are, and what replacing them with something else does to organ music—testing the boundaries of organ-process and organist-process, of composition-process and performance-process.

An enduring criticism of pipe organs is that they lack the expressive potential of, say, flutes or trumpets. Even the responsiveness of tracker action instruments has been shown to be

[24] Maurice Merleau-Ponty, *Phenomenology of Perception* (Routledge, 2005), pp. 167-168.
[25] e.g. Rhonda Siu, 'Expression and Silence: Music and Language in Merleau-Ponty's Existential Phenomenology', *Revista Portuguesa de Filosofia* (Vol. 74, 2018), pp. 1093-1116; and Michael R. Kearney, 'The Phenomenology of the Pipe Organ', *Phenomenology & Practice* (Vol. 15, 2020), pp. 24-38.

more complex than once supposed.[26] Some hyperorgan designs seek to remedy this, but they come with a catch.[27] While they promise the expressive potential of a wind instrument, their MIDI capability presents the audience with a new problem: who is playing? In the previous chapter, I touched on the semi-acousmatic nature of organ sound, but with a 16-channel fixed media work, the identity of the performer is a hypothetical, as it is obvious the organ is not being played live. But as hyperorgans (and loudspeaker organs) can be MIDI and OSC-capable, hearing a permanently installed instrument sounding in a church or concert hall no longer guarantees that a human is operating it in real-time. This is not unlike the organ and live electronics issues discussed by Noisternig and d'Alessandro mentioned previously, but here additionally challenges the separation of automated instruments like barrel organs, fairground organs, and musical clocks, and the ones that are normally played by people.[28]

5.4.3 Map of Mediations

Above, I have referred to Handel as the assumed creator of the work-templates, but we know that he used at least one theme of Kuhnau's, that five of the clock pieces are probably not his, and that other borrowings could yet be identified. This leaves a spectrum of connectedness, and several routes by which the notes heard have arrived at the ears of the listener. At one end, there is the first movement of *Concerto*, which started life as an original Handel composition, was reordered by me, then performed live by an organist. At the other, we have the clock pieces of uncertain authorship, pinned by Clay (or an assistant), transcribed by Dirksen, transformed and arranged by me, then performed by an organ, which was facilitated by those who wrote its code. Questions of authorship and autonomy relating to works performed by machines are more familiar when discussing computer music and algorithmic composition, as these are overtly defined by process and technology, but the projects documented above have sought to address this from a different, archaic, angle.

[26] Alan Woolley, 'The Organ: A Dangerously Inexpressive Musical Instrument?', *The Diapason* (October, 2013), pp. 23-29.
[27] John Henry Forster, 'Hyperorgans: What's the Hype?', *British Institute of Organ Studies Reporter* (Vol. 47, 2023), pp. 78-83.
[28] The Logos Foundation in Ghent has long pioneered automated instruments, and the musical duo Gamut Inc. have created several innovative works for automated hyperorgan.

In 3.5.1, I used anaglyph stereoscopy as an analogy, and here, another visual allusion is apposite: a random-dot autostereogram. This type of stereogram will be familiar to most people, comprising a seemingly random collection of dots, often encountered on a large poster, in which a stereo pair of images is concealed. When the eyes focus on an imaginary point behind or in front of the actual autostereogram surface, the hidden pair are perceived as a single illusory three-dimensional image. The aural effect of the compositional processes described is similar. The reordered notes might sometimes sound random, but they are carefully organized, and concealed within are echoes of Handel. When viewing an autostereogram, people must either purposefully cross their eyes, or allow their vision to gradually unfocus to see the hidden image. Likewise, aurally unfocussing by listening to something else during performance, like traffic noise outside, or entering a deep meditative listening state that reaches beyond the immediate notes can achieve the same thing. In this moment, the phantasmagorical Handel swims into focus, and the listener is invited to compare this illusion with the memory of his actual music recalled in their mind's ear.

5.4.4 Telos

Though pipe organs and their repertoire are uniquely located in time, site, and place, they are connected by commonalities which shape practice even when they are invisible. Writing on hyperorgans, Hans Fidom observes 'we need a new type of musician that understands what the hyperorgan is about. The fact that it sets no rules, that it enables anything that a musician could dream to do with organ pipes, can actually be quite overwhelming, if not frightening.'[29] Given their digital flexibility and OSC capability, many constraints associated with traditional pipe organs do not apply to hyperorgans, but the similarity of their primary user interfaces, i.e. keyboards, pedals, and stops, can limit the scope of performative interactions. The transferability of habit captured by Merleau-Ponty can become a hindrance, with organists blinkered by the baggage they carry with them. The goal of *Concerto* and *Clock Sync* was never to judge these

[29] Hans Fidom, 'Breaking Rules: Rethinking Organ Interfaces', *Keyboard Perspectives* (Vol. XII, 2019-2020), p. 63.

conventions, but to respond creatively to expose the role of various compositional and physical processes that yield pipe organ music, and how they can at once be transcendental and self-limiting. What set the work-templates used for the projects apart was the convergence of multiple such processes relating to how pipe organ notes ought to be arranged and sounded. As mentioned at the start of the chapter, these work-templates embody compositional flux, and the projects would have been less meaningful had they used ones existing in a single, definitive, autograph version.

Throughout, I have been careful to use the words 'reconfigure', 'reorder', and 'rework' rather than 'remix' for two reasons: firstly, to avoid tacitly implying there are parallels between eighteenth-century composition practice as exemplified by Handel, the processes I have used on his works, and, say, the music of J Dilla; and secondly, to shift focus away from myself and onto the source material and realities with which it is intertwined.[30] The application of techniques described above might seem blunt, as it is hard to slice and dice a dead composer without getting messy, but the music they produce is enlightening rather than horrifying. By using Handel's musical ghost as a device to comment on the spectre of convention, the listener is encouraged to regard the permanence of intangible norms as being, like the reimagined composer, an illusion. Yet it is only through unfocussed listening that the bigger picture is seen, or rather, the greater music is heard, and it is the processes described above which generate the musical autostereogram to facilitate this. Though less theatrical than a séance or Ouija board, this summoning is more profound, as the musical habits we are calling upon do not reside on some other plane of existence, they reside within ourselves.

[30] Stefan Sonvilla-Weiss, 'Good Artists Copy; Great Artists Steal', in Eduardo Navas, Owen Gallagher, and Xtine Burrough (eds.), *The Routledge Companion to Remix Studies* (Routledge, 2014), pp. 54-67.

Chapter Six
Canon as Cartella

I opened this thesis with an exposition of time, site, and place, going on to suggest that defamiliarizing historic templates in a manner parallel to organological research and the reconstruction of historic organs can lead to a reappraisal of locatedness. The five projects I have completed show how this is possible, and here, I will bring together the various strands running through my work, tying them in to the four primary research questions and overarching goals of this doctorate: **6.1** gives written answers to these questions, putting into words what was demonstrated in the projects, and summarizing the compositional procedures that have been deployed; **6.2** offers some closing thoughts on the idea of canon as cartella, and how this might be applied to other situations.

6.1 Answers

The previous three chapters centred on separate thematic questions that informed their projects and discussion, but behind all were the primary research questions derived from Tresch and Dolan's four axes. The projects themselves are the responses to these questions, but below I will make some observations about how my compositional approach unfolded.

6.1.1 Material Disposition (Time)

How can contrapuntal techniques be developed in a contemporary context to achieve expanded goals, like spotlighting the mechanical formalism and functioning of the pipe organ, and how can musical form and structure be used to sound out the material form and structure of the instrument itself?

Counterpoint underpinned all five projects, and each chapter offers a different take on its potential. The aim was to devise a set of expanded techniques derived from earlier pipe organ music, casting them as a common language to facilitate a dialogue with the past, and then use them to probe the configuration of the instrument. I see similarities between the intricate

polyphony of the sixteenth and seventeenth centuries and the complicated apparatus of a pipe organ—the carefully constructed linkages that transmit a finger's kinetic energy via circuitous routes to open a pallet is not unlike the forward momentum of an energetic voice part over the course of a fugue—and I wished to express this sentiment within the projects. Unlike the quote from Marin Mersenne in 2.3.1, my allegory is secular, marvelling at the mechanical rather than revering the divine. If the templates' form and structure represent the carpentry encasing and supporting a pipe organ, then the techniques detailed below are its mechanism.

Chapter Three's projects, *Manual Works* and *Orgelwerke*, used a two-stage system whereby the pastiche counterpoint written in the score was augmented by a secondary layer. In *Manual Works*, this is provided by live electronics, and in *Orgelwerke* by the control module. For example, in 'II. Ut, Re, Mi…' from *Manual Works*, the four parts played on the box organ are filtered and delayed before being diffused separately through each loudspeaker, creating an additional level of contrapuntal arguments. In *Orgelwerke*, the lack of clock synchronization transforms what starts as orderly polyphonic lines into a morass. This two-stage approach serves in *Orgelwerke* to illustrate how important synchronization is to the internal workings of an organ and to the internal order of a prelude and fugue, while in *Manual Works* it draws attention to the perceived realness of processed pipe organ sound.

In Chapter Four's *Passacaglias for Organ*, counterpoint cohered the intentionally pitched, unintentionally pitched, and non-pitched sound that pipe organs make. The premise was to treat all sound sources as polyphonic voices in their own right, and present gestures that were musically aware of the roles these sources typically play in the production of intentionally pitched sound via the pipes. Through sensitivity to voice leading, balance, and symmetry, as well as utilizing basic devices like augmentation, diminution, retrogradation, and inversion, the material was interwoven as a unified whole. This technique was, in one sense, most literal of the five projects, as it involved applying principles historically connected to one subset of pipe organ sound to others.

The final projects of Chapter Five, *Concerto (after Handel)* and *Clock Sync*, used rigid pre-defined processes to reorder the notes of the templates, and so rearrange the original contrapuntal relationships into new ones. These processes also included stops, as the projects sought to make registration a structural element, with the material properties of particular organ pipes dictating how and when they were sounded. Unlike *Passacaglias for Organ*, where counterpoint was used to explicate sonic relationships inside the organ case, this technique recasts the attributes of sounding bodies as the basis for a contrapuntal device. The result is a polyphonic fabric whose structure comes simultaneously from the reordered notes of the template and the size and shape of the objects that will sound them.

6.1.2 Mode of Mediation (Site)

In what ways do different presentations of pipe organ sound affect apprehension of the instrument, e.g. how do human, automated, and semi-automated performances using acoustic, electronic, and electroacoustic sound shape listener perception of pipe organ agency?

Every project used a different combination of the aforementioned formats: *Manual Works* is a set of electroacoustic pieces for human performer, *Orgelwerke* is an installation using only sampled and synthesized pipe organ sound, *Passacaglias for Organ* is a fixed media work using pre-recorded pipe organ sound, *Concerto (after Handel)* is a pipe organ concerto for human performer, and *Clock Sync* is an automated set of hyperorgan pieces. Writing for multiple iterations of the 'same' instrument allowed me to experiment with the affordances of each, while also acknowledging that audience reactions to the apparentness of these affordances will influence what they think they are hearing. I have already cited Croft on liveness, and d'Alessandro and Noisternig on its heightened importance due to the semi-acousmatic nature of pipe organ sound, and here I will outline how these factors contributed to the projects.

The perceived realness of pipe organ sound comes from the cumulative grain of the many thousands of sounding bodies that comprise the instrument: not just the pipes, but all the components which facilitate sound production, their miniscule imperfections and idiosyncrasies,

and the magnification effect of them sounding together. I mentioned in Chapter Three that the reason loudspeaker organs can sound unreal is not because they are imperfect, but because their sound is too perfect and lacks grain. Something similar is true of automated MIDI and OSC works, where superhuman sequencing and flawless execution can sound unreal. Altering the balance between the two, i.e. acoustic versus electronic sound and human versus automated renditions, creates different performative scenarios that act as a commentary on the agency of the pipe organ.

For *Manual Works*, the scenario frames a diminutive box organ as the primary instrument of the performance space. Box organs normally provide accompaniment and are rarely used for recitals, and so live electronics literally augment its sound as well as conceptually amplifying its stature. *Orgelwerke* is entirely electronic in that all sound is sampled or synthesized, and the sixteen tracks are sequenced rather than having been recorded live. Despite this, the music remains within set parameters, as the three preludes and fugues in their original form are playable by an organist on an acoustic instrument, and the electronic sound emulates a pipe organ. This scenario is about how the vestigial constraints of a pipe organ direct a performance in which the instrument itself is not physically present. *Passacaglias for Organ* is ostensibly similar, also being a sixteen-channel fixed media work, but it is about overcoming agential limitations rather than adhering to them. The sonic spaces inside an organ case are usually inaccessible to listeners, but they are where the sound is most alive, and so the scenario here is how greater agency over the gamut of pipe organ sound is made possible by circumventing its physical boundaries and standard control pathways. *Concerto (after Handel)* is the only project for pipe organ alone played by a human performer, and so it is fully governed by such boundaries and pathways. The scenario highlights the compositional and performative conventions associated with them, and the circumstances in which the organist's agency over instrument (and vice versa) arise. *Clock Sync* continues this train of thought, but from the opposite perspective. Unlike *Orgelwerke*, these Handel arrangements are physically impossible for a person to play, but

compositionally they retain a humanizing connection, and this scenario comments on the greater agency of hyperorgans being hindered by ingrained conventions.

6.1.3 Map of Mediations (Place)

What can the use of historic pipe organ compositions as templates reveal about the interconnectivity of canon, instrument, and people, and how these linkages are embedded within pipe organ culture?

The cost and size of most pipe organs means that they are seldom owned by individuals, and their lifecycle (funding, commissioning, design, construction, installation, maintenance, performance, renovation, dismantling, removal, and recycling) can involve thousands of craftspeople and musicians over hundreds of years. This is unlike smaller, portable, instruments, some of which are defined by ownership and their belonging to individuals. Stradivarius violins, for example, are typically named after the people who commissioned them or played them for long periods, and lists are kept of famous violinists associated with each instrument. The custodianship of working pipe organs is often shared between several groups, with organists being musical custodians responsible for exploiting its full performative potential, institutional committees being legal custodians that have an obligation to set aside funding and ensure the instrument is useable, and organ builders being technical custodians entrusted with carrying out appropriate maintenance and not altering things arbitrarily without consultation.

This sense of collective ownership and instrumental community is especially true for innovative pipe organs, the ingenuity of which can draw diverse musicians together from far afield who then contribute a part of themselves to the ongoing evolution of pipe organ culture. My use of templates echoed this by treating the established pipe organ canon as something owned as much by a tradition, an instrument, and a community of practice as the composers who wrote each piece. In part, my stance was a response to the well-rehearsed debates surrounding the autonomy and ownership of earlier works, like J. S. Bach's secular organ music, if there is such

a thing. Did those composers think their music belonged to them, the congregation, their patrons, the church, or God?

Depending on how they were used, the templates traced different mediations between canon, instrument, and people within each project. In Chapter Three, the templates were pastiched, with the distance between origin and imitation becoming a means to measure other gaps, like my cultural proximity to the English Virginalist School and distality from the North German Baroque Organ School, the void between pipe organ sound and loudspeaker organ sound, and the performative gap between a person playing a pipe organ with live electronics in a cathedral and an electronic installation using pipe organ sound in a gallery. In Chapter Four, the passacaglia form and B–A–C–H motif acted as unifiers, mapping the sonic connectivity of a pipe organ's sounding components, while associating the music with the symbolically charged, if disparate, genre of B–A–C–H pieces. In Chapter Five, the templates were reordered, allowing the previous mediation map, i.e. the myriad reworkings by Handel and his editors along with the pipe organ's performative conventions, to be seen from a new angle.

6.1.4 Telos (Locatedness)

In what ways can the techniques and procedures issuing from the previous questions be leveraged to expose interrelations between the objective properties of time, site, and place, and the subjective reactions to them through which a sense of function, purpose, and ends arise?

In their article, Tresch and Dolan actually use the pipe organ as an example of shifting telos, charting how its role within society has changed during the last few centuries, although its history spans over two millennia.[1] Accompanying the telos of an instrument is that of its canon, both in terms of the how and why of individual works, and the historiographical ends of the narrative that has been constructed around that canon. As laid out in Chapter Two, triangulating the time, site, and place of performances can help uncover the telos of instrument and canon,

[1] John Tresch and Emily I. Dolan, 'Toward a New Organology: Instruments of Music and Science', *Osiris* (Vol. 28, 2013), p. 295.

as it is an emergent property that cannot exist in abstraction. On their own, the objective attributes of time, site, and place are not enough to generate a sense of locatedness or telos, and it is only through musical acts that notions of what instruments and canons exist for is reified.

All of my projects questioned the telos of canon and instrument in some way, and this was expressed by the thematic questions at the start of the project chapters: *Manual Works* the purpose of a box organ and the relevance of the English Virginalist School, and *Orgelwerke* the same for loudspeaker organs and the North German Baroque Organ School; *Passacaglias for Organ* the function of the unintentionally pitched and non-pitched sounding bodies of a pipe organ, and the identity of the B–A–C–H motif; and *Concerto (after Handel)* and *Clock Sync* assumptions about how a pipe organ ought to be used, and the ends of music that has been altered many times. Their intention was not to replace one sense of telos with another, or to make claims about the correct interpretation of function, purpose, and ends, but to encourage listeners to hear the complex web of which they are a part, and their constructive role in its being.

6.1.5 Compositional Approach

Stepping back, the primary research questions yielded a set of techniques and procedures that operate on four levels: 1) the structural organization of pipe organ sound with counterpoint, 2) the construction of performative scenarios presenting different iterations of that sound, 3) the interrelation of elements mediated by those performances, and 4) the sense of function, purpose, and ends arising from the mediations. The defining characteristic here is defamiliarization, which preserves some aspects of recognizability while reconfiguring others. Alone, their effect is superficial, but combined, they constitute a holistic compositional approach. Moving between levels, from organization to presentation to mediation to ends, the defamiliarizing becomes more pronounced until a threshold is reached, prompting a keener awareness of locatedness.

At the first level, three types of contrapuntal technique were utilized, sometimes together: those which were technologically augmented, universally applied, and process-driven. Technological augmentation adds extra polyphonic layers either through live electronics or

automation, permitting secondary treatments of material to be realized. Universal application refers to intentionally pitched, unintentionally pitched, and non-pitched sound all being organized with the same underlying contrapuntal strategy, giving a uniformity of structure. And process-driven counterpoint takes cues from an existing source, either musical material or the material properties of sounding bodies, to order notes into predefined patterns that reflect but re-present that source.

At the second level, there were two variables: organist (i.e. whether the projects featured human, automated, or semi-automated performances), and organ sound (i.e. whether it was acoustic, electronic, or electroacoustic). This gave thirteen possible performance scenarios, of which I used five: human electroacoustic (*Manual Works*), automated electronic (*Orgelwerke*), semi-automated electroacoustic (*Passacaglias for Organ*),[2] human acoustic (*Concerto*), and automated acoustic (*Clock Sync*). The guiding principle at this level was less is more, and that pared-back scenarios focussing on the affordances of certain combinations offer greater rewards than overawing audiences with everything all at once, much like restrained but inventive registrations can be equally as exciting as just pulling out all the stops. This economy of presentation aligns with the desirability of contrapuntal economy of material, and makes space for agential considerations being a key part of the listening experience.

At the third level, a variety of templates were selected to fulfil the project requirements, with their treatment also being directed by two variables: material (i.e. was the template's motific material reused extensively, alluded to generally, or not at all), and organization (i.e. was its form and structure replicated exactly, followed loosely, or not at all). Some pieces kept the same combination of variables throughout, while others exhibit several. The degree of template resemblance is like the zoom of a telescope, with the new music making connections with an era, a school of composition, a composer's oeuvre, a compositional type, or a specific piece.

[2] 'Semi-automated' in the sense that I originally played and recorded the organ myself, but, having organized the sound material, presented the performance as a static multichannel diffusion.

By way of a final reflection, it is useful to situate this compositional approach within the broader field of twenty-first-century music. In **1.3**, I discussed five recent pipe organ works that influenced me, and here I will briefly mention some contemporary composers and artists whose practice addresses similar themes using other instruments or ensembles. The Norwegian-Irish composer Eric Skytterholm Egan frequently references earlier music in his work, utilizing a range of techniques which defamiliarize specific templates to create new pieces.[3] Egan's music is mostly acoustic, but occasionally incorporates tape, and is defined by a 'keen interest in reshaping facets of our musical past, and a desire to challenge the expectations of the listener by "offering the unexpected within familiar musical ground".'[4] The English composer Martyn Harry also appears on two CDs which explore the relationship between old and new, both in terms of the material on which he draws and the instruments used for performance.[5, 6] The first, *At His Majesty's Pleasure*, was commissioned by the early music ensemble His Majestys Sagbutts & Cornetts; the second, *50-50* was created in collaboration with French composer David Chalmin and Baroque ensemble Le Concert de L'Hostel Dieu.[7, 8] A precedent for the multichannel formats I chose may be seen in Canadian artist Janet Cardiff's *Forty Part Motet (A reworking of "Spem in Alium" by Thomas Tallis 1573)*, which has been heard around the world in diverse venues.[9] Bridging the gap between installation and performance, Cardiff's work allows listeners to experience the immediacy of singers' voices in a way that is impractical during a live performance. As for the continuing influence of Handel on today's music scene, the London Handel Festival has previously commissioned new works to complement those comprising the festival's Baroque core, and the Handel Hendrix House hosts a variety of contemporary and classical events throughout the year.[10]

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[3] Eric Skytterholm Egan, 'Works', https://www.ericsegan.org/works, accessed 30/01/25.
[4] Egan, 'Bio', https://www.ericsegan.org/bio, accessed 13/02/25.
[5] Martyn Harry and His Majestys Sagbutts & Cornetts, *At His Majesty's Pleasure* (Sfz Music, 2012) [CD].
[6] Martyn Harry, David Chalmin, and Le Concert de L'Hostel Dieu, *50-50* (Aparté, 2022) [CD].
[7] The Oxford Research Centre in the Humanities (TORCH), 'Professor Martyn Harry At His Majesty's Pleasure World Premiere', https://www.torch.ox.ac.uk/event/professor-martyn-harry-at-his-majestys-pleasure-world-premiere-hmsc-keble-early-music-festival, accessed 30/01/25.
[8] Faculty of Music, University of Oxford, 'Professor Martyn Harry 50-50 CD launch / French Television Broadcast', https://www.music.ox.ac.uk/article/professor-martyn-harry-50-50-cd-launch-/-french-television-broadcast, accessed 30/02/25.
[9] Janet Cardiff, 'The Forty Part Motet', https://cardiffmiller.com/installations/the-forty-part-motet/, accessed 30/01/25.
[10] London Handel Festival, 'Spring Awakenings', https://www.london-handel-festival.com/wp-content/uploads/2023/11/LHF-brochure-07-11-23-combined.pdf, accessed 14/02/25.

6.2 Conclusion

Writing on retrospective borrowings across organ repertoire, Joy Schroeder offers an analytic take on both the purported and hidden motivations behind referencing other composers' work, ranging from the adversarial (Harold Bloom's 'anxiety of influence') to the heritable (Joseph Straus' 'generosity theory').[11] My own motivations do not fit neatly into these categories, at least in part because I have used entire work-templates rather than excerpted passages or snippets of motif, instead capitalizing on the significance of historic works and composers as cultural artefacts to cogitate on the formation and perception of canon and instrument.

As explained in Chapter Two, pipe organs are like a palimpsest, both physically and conceptually. Once built, they instantiate what it was thought a pipe organ should be at a specific time, site, and place, before the next generation of organists and organ builders erase some things from the old blueprints for their new instrument while retaining others. The compositional approach described above resonates with this, and is a companion to the organological endeavours of Tresch and Dolan, Peters and Cressman, Watson, and others. It does so by treating its templates like historic organs—as things to be studied, emulated, and built upon—while also asking how they came to be. In other words, it treats the pipe organ canon as a cartella. This is a slate that can never be wiped clean, recording all that has been written and overwritten, and is like Walter Benjamin's Angel of History being propelled forward with its gaze forever backward.[12, 13] But far from being terrifying or tragic, the cartella can be revelatory.

Defamiliarization is the lens which makes this revelation possible, and is the creative equivalent of removing and x-raying parts from historic organs to discover what they are made from, how they were fashioned, and why they work. We are accustomed to hearing these pieces in their established setting, which reflexively normalizes that setting, but by escaping from habit

[11] Joy Schroeder, 'Music Borrowing in Organ Literature Through History: Couperin, Bach, Brahms, Ives, Alain, and Cage', PhD Thesis (University of Oregon, 2020), pp. 247–255.
[12] Walter Benjamin, *Illuminations* (Schocken Books, 2007), pp. 257–258.
[13] Susan Handelman, 'Walter Benjamin and the Angel of History', *CrossCurrents* (Vol. 41, 1991), pp. 344–352.

and re-sounding them in novel ways, we can know more of how it was brought about. I am certainly not the first person use defamiliarization: musique concrète and acousmatic listening situations defamiliarized sound in the previous century, and one of the examples Schroeder provides in her thesis, John Cage's *Some of The Harmony of Maine (Supply Belcher)*, uses chance operations to defamiliarize an earlier template. What I am arguing for is the role that these kinds of techniques, when applied across a range of settings, can have in shaping our perception of an entire canon.

Formation and perception of canon and instrument do not occur spontaneously, but through gradual and collective normalization. Conceiving of canon as cartella is a doorway to moving beyond the concealments of habitualization, guiding the listener toward an enlightened vantage point. This vantage point is what Helmut Lachenmann refers to as 'dialectical structuralism', stating that he conceives of beauty as the 'rejection of habit'.[14] Lachenmann's 'musique concrète instrumentale' is one way to arrive at this position, some characteristics of which may be heard in *Passacaglias for Organ*, while the other projects demonstrate alternative routes to rejecting habit.[15, 16] To adopt this viewpoint entails a fundamental change in perception, a parallax shift in the Žižekian sense, necessitating an alternative understanding of authorship rooted in the pipe organ's musical culture being, historically, an improvisatory one.[17] The cartella belongs to all organ composers, linking individuals across time, site, and place, and creating new organ works makes them a temporary custodian of the imagined tablet rather than its outright owner in perpetuity.[18] Again, it is defamiliarization which effects what Žižek would call a 'short circuit', confusing the identities of new music and old music, of works and templates, and

[14] Helmut Lachenmann, 'On Structuralism', *Contemporary Music Review* (Vol. 12, 1995), pp. 97, 99-100.
[15] Helmut Lachenmann, 'Klangtypen der Neuen Musik', *Musik als Existentielle Erfahrung* (Breitkopf & Härtel, 1996), pp. 1-20.
[16] For a detailed discussion on the rejection/refusal of habit, see Alistair Williams, *Music in Germany since 1968* (Cambridge University Press, 2013), pp. 75-124.
[17] And for many, it still is. See David Maw and Thierry Escaich, 'Improvisation and Composition in the French Organ Tradition: An Interview with Thierry Escaich', in Eric F. Clarke and Mark Doffman (eds.), *Distributed Creativity: Collaboration and Improvisation in Contemporary Music* (OUP, 2017).
[18] Since 2019, Damien Riehl and Noah Rubin have created billions of algorithmically generated twelve-note melodies, which they have then released into the public domain to curtail problematic copyright infringement lawsuits in the popular music industry. Though somewhat tongue-in-cheek, their efforts raise questions about the size of musical units over which it is meaningful to claim ownership; http://allthemusic.info/, accessed 02/09/24.

reminding us that we participate in creative practice communally rather than directing it individually.[19]

One objection to the concept of cartella might be that it traps us in the past, that by forbidding the erasure of precedent, it denies us the luxury of suspending our disbelief and pretending that radical new music is unlike anything that has been heard before. But this is not the case, and the forward momentum of Benjamin's Angel of History has a counterpart in Derek Parfit's Child in the Wood, which shows how the cartella can project us into the future:

> Suppose that I leave some broken glass in the undergrowth of a wood. A hundred years later this glass wounds a child. My act harms this child. If I had safely buried the glass, this child would have walked through the wood unharmed. Does it make a moral difference that the child whom I harm does not now exist?[20]

Parfit's simple thought experiment asks whether our moral obligations differ toward those who are alive now and those who do not yet exist, but it may be repurposed and given a musical slant to question the artistic relationship we have with our contemporaries versus our successors: when a lost work unperformed during a composer's life is discovered centuries later, is our excitement at hearing it for the first time any less than attending a premiere by a living composer? By writing on the same figurative surface as the next generation, which is both the surface of the past and of posterity, the cartella forges a connection with the future. If, by resurrecting historic work-templates, we can collaborate with the (un)dead, what is to say the unborn will not one day, in turn, collaborate with us?

* * *

My work has focused exclusively on the pipe organ, but what might this approach offer in other contexts? For the composer, defamiliarizing historic work-templates compels them to locate their

[19] Slavoj Žižek, *The Parallax View* (MIT Press, 2006).
[20] Derek Parfit, *Reasons and Persons* (Clarendon Press, 1986), p. 356.

practice on a timeline, and so every act of composition doubles as a meditation on how they and their community of practice arrived at its present state. For the listener, this can foster a critical listening that reassess the significance of musical artefacts, leading to a new appreciation of their place within a canon. Early music ensembles routinely commission new works, while ancient venues around the world host regular concerts, and a compositional approach such as this offers a route to engaging with diverse historical topics through performance. Concerning methodology, Tresch and Dolan's axes could be interpreted in any number of ways to design research questions and inform a compositional approach that reframes instruments and music, and it is not unlikely their work will inspire others.

All new music can be analysed in relation to what came before. As Lydia Goehr observes, 'changing the established forms is no less a kind of connection with the tradition than defending the established forms', but this need not be a binary exercise of delineating that which rejects that past versus that which clings to it.[21] Viewing generations of composition as existing on a sliding scale offers another way, acknowledging that creative practice exists in a state of flux, responding to where music has been and where it is going. From this perspective, established canons consist less of autonomous works crafted by individuals and exhibited in imaginary museums as they do public monuments commissioned by communities, designed by composers, carved by musicians, and displayed outside in the town square. Some monuments are left to grow old, others are periodically renovated, and sometimes they are dismantled and recycled into new ones. Their weathered stone and tarnished metal might be cleaned up, wholly refashioned, or reintegrated just as it is, slightly worn with an attractive patina. The compositional approach advocated for by this doctorate is grounded in such a metaphor, offering a route to writing for the pipe organ that brings into focus multiple facets of its identity. In doing so, boundaries are blurred, old music becomes new, and the monument sounds.

[21] Lydia Goehr, *The Imaginary Museum of Musical Works*, p. 95.

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Appendix 1

Wikipedia Fugue Plan

	Exposition		**Codetta**	**Exposition**		**Episode**	**Mid-Entries**		**Episode**	**Mid-Entry**	**Episode**	**Final Entries**		**Coda**
	Tonic	Dom.		Tonic	Dom.		Relative Key	Relative Dom.		Sub-dom.		Tonic	Tonic	
S	S	CS1		CS2	A		CS1	CS2		S		CS1	F	
A		A		CS1	CS2		S	CS1		CS2		S	CS1	
B				S	CS1		CS2	A		CS1		CS2	S	

Præludium C-Dur (Prelude, Fugue, and Chaconne) Fugue Plan

	Exposition		**Codetta**	**Exposition**		**Episode**	**Mid-Entries**		**Episode**	**Mid-Entry**	**Episode**	**Final Entries**		**Coda**
	C	G	G → C	C	G	G → Am	Am	Em	Em → F	F	F → C	C	C	C
	bb. 7–10	11–14	15–16	17–20	21–24	25–28	29–32	34–36	37–40	41–44	45–48	49–52	53–56	57–58
S		A	F	CS1	CS2	F	F	A	F	CS2	F	CS1	S	F
A	S	CS1	F	CS2	F	F	S	CS1	F	A	S*	CS2	CS1	F
T			F	S	CS1	F	CS2	F	F	CS1	F	F	CS2	F
B			F		A	F	CS1	CS2	F	F	S*	S	S*	F

Key: A = answer, CS1 = countersubject 1, CS2 = countersubject 2, F = free counterpoint, S = subject, S* = inverted subject.

Appendix 2

	Section 1						Section 2							Section 3					
	E♭	B♭	B♭ → E♭	E♭	B♭	B♭ → E♭	E♭	B♭	B♭ → Cm	Cm	Gm	Gm → E♭	E♭	E♭	E♭ → A♭	A♭	A♭	A♭	A♭
	Bar 11	12	13	14	15	16–17	18	19	20–21	22	23	24–25	26	27	28	29	30	31	32
S					A1	F	CS1.1	CS2.1	F	S2	CS2.2	F	S2	CS2.2	F				A3
A				S1	CS1.1	F	CS2.1	F	F	CS1.1	A2	F	F	F	F	F		S3	CS3.1
T		A1	F	CS1.1	CS1.2	F	F	A2	F	CS2.1	F	F	CS1.1	F	CS3.1	F	A3	CS3.1	CS3.2
B	S1	CS1.1	F	CS1.2	F	F	S2	CS2.2	F	F	F	F	CS2.1	BWV 552	F	S3	CS3.1	CS3.2	F

Section 3								Section 4									
A♭ → Fm	Fm	Fm	Fm	Fm	Fm → E♭	E♭	E♭	A♭ → B♭	E♭	B♭	B♭ → E♭	E♭	B♭	B♭ → E♭	E♭	E♭	B♭	B♭	B♭ → E♭
33–34	35	36	37	38	39–40	41	42	43–44	45	46	47	48	49	50–52	53	54	55	56	57–60
F	S3	CS3.1	CS3.2	F	F	S3	CS3.1	F	S4	CS4.1	F	F	A4	F	CS4.2		A4	CS4.1	F
F	CS3.2	F	S3	CS3.1	F	F	F	F		A4	F	CS4.1	F	F	S4	F	F	CS44.3	F
F	F	A3	CS3.1	CS3.2	F	CS3.1	F	F				S4	CS4.1	F	CS4.1	CS4.3	F	F	F
F				A3	F	CS3.2	A3	F									CS4.2		F

Section 4		Section 5																
E♭	E♭	E♭	E♭	E♭	E♭	E♭	E♭ → B♭m	B♭m	E♭m	B♭m	E♭m	E♭	B♭m	B♭m	E♭m	B♭	E♭	E♭
61	62	63	64	65–66	67	68	69–76	77	78	79	80	81–90	91	92	93	94	95	96–98
S4	F				S5	CS5.1	F	S5	CS5.1	CS5.2	F	F	F	F	F	S5	CS5.1	F
F	F		A5	F	CS5.1	F	F	F	A5	F	CS5.2	F	F	F	F	F	A5	F
CS4.3	F	S5	CS5.1	F	F	CS5.2	F	F	CS5.2	F	A5	F	F	F	F	CS5.1	F	F
F	F					A5	S1*	CS5.2	F	S5	F	S1*	S5	F	A5	F	CS5.2	F

Key: A = answer, CS = countersubject 1, F = free counterpoint, S = subject, S* = adapted subject.