

1 **The Memory of Music and**
2 **Music of Memory:**
3 **A Portfolio of Original Compositions**

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7 **Julia E. Howell**

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10 **Volume 3 of 3: Academic Commentary**

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14 **Cardiff University School of Music**

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19 Presented in partial fulfilment of the requirements for the degree
20 Doctor of Philosophy (Music) in Composition

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1 **Summary of thesis**

2
3 The thesis explores through composition the processes of listening, remembering, storing,
4 and recalling music and the ephemeral nature of these same actions, recognising that musical
5 experiences can never truly be preserved. To explore preservation and entropy in memory and
6 music, the portfolio of works is guided by three research areas: multi-level systemisation in
7 compositional methods; reflection on the experience of music itself; and integration of acoustic
8 and electronic techniques. The research concepts draw from the fields of ecological
9 psychoacoustics, music cognition, memory studies, history of music technology, and philosophy
10 and aesthetics.

11 The thesis consists of three volumes with accompanying supplemental materials. The first
12 two volumes present a portfolio of original compositions, comprising sixteen works ranging
13 from three to twenty minutes and from soloist to large string ensemble, including six
14 electroacoustic pieces, with a combined duration of circa 100 minutes. Appendix One contains
15 one piece, *Artefacts* for symphony orchestra, the composition of which provided the foundation
16 for this project.

17 The third volume is a commentary on the portfolio (c. 27,000 words), providing context for
18 the works and their compositional processes in terms of conceptual and theoretical bases,
19 academic context, musical techniques and analysis, employment of electronic technology, the
20 influence of other composers and artists, and placement of my work within the field of
21 composition.

22 The commentary is divided into five parts. Part One covers research concepts and context;
23 Part Two examines structural use of systemisation and collage; Part Three outlines approaches to
24 harmony; Part Four describes the use of electronics in the portfolio, connecting these techniques
25 to the research concepts; Part Five presents a detailed description and analysis of three pieces
26 that illustrate a synthesis of the methods explored over the course of composing the portfolio.
27 The supplementary materials include recordings of the works and Max/MSP patches
28 accompanying the electroacoustic works.

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DECLARATION

This work has not been submitted in substance for any other degree or award at this or any other university or place of learning, nor is being submitted concurrently in candidature for any degree or other award.

Signed (candidate) Date26/06/2017.....

STATEMENT 1

This thesis is being submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy (Music) in Composition.

Signed (candidate) Date26/06/2017.....

STATEMENT 2

This thesis is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by explicit references. The views expressed are my own.

Signed (candidate) Date26/06/2017.....

STATEMENT 3

I hereby give consent for my thesis, if accepted, to be available for photocopying and for inter-library loan, and for the title and summary to be made available to outside organisations.

Signed (candidate) Date26/06/2017.....

1 **Acknowledgements**

2
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14 Orchestra of Wales, Jac van Steen, Frank Zielhorst, Cardiff University School of Music
15 Contemporary Music Group, Heather Roche, Xenia Pestova, David Beard, Thomas Wilkinson,
16 Sebastian Walker, Magnard Ensemble, Kenneth Hesketh, Signum Quartet, Michael Oliva, Dr. K
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29

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1 Introduction

2
3 'In the age of technological reproduction, we can sometimes experience an audible past, but we can do no
4 more than presume the existence of an auditory past.'¹
5

6 'In modern life, sound becomes a problem: an object to be contemplated, reconstructed, and manipulated,
7 something that can be fragmented, industrialized, and bought and sold.'²
8

9 My work in the portfolio presented here brings to the fore, simultaneously, the processes of
10 listening and remembering music and specific, time-delimited environments, and the fallibility,
11 ephemerality, and ultimate futility of these same actions— futility in the sense that specific
12 experiences with sound can never truly be accurately preserved. To explore this somewhat
13 paradoxical nexus of preservation and destruction, I have composed a portfolio of works guided
14 by three overarching research areas: systemisation and generative compositional methods,
15 reflection or commentary on the experience of music itself, and integration of acoustic and
16 electronic techniques. The portfolio contains sixteen works that range in duration and size of
17 instrumentation or ensemble, and represent varying compositional approaches informed by the
18 three research concepts mentioned. While experimenting with the approaches and methods
19 discussed in this commentary, my ultimate goal has been to mesh these methodologies with a
20 distinct compositional voice.

21 In addition to this methodological experimentation, my research and the works presented
22 here have been influenced by a range of related sources, including art forms and media outside
23 music. The work of some composers often categorised as postmodernist (or at least exhibiting
24 postmodernist characteristics or tendencies) and/or spectralist has been of particular interest to
25 me in completing this portfolio and commentary; most especially, the work of Luciano Berio,
26 Mauricio Kagel, Charles Ives, William Basinski, Laurie Anderson, Jonathan Harvey, Bernd
27 Alois Zimmermann, Brian Eno, Sofia Gubaidulina, Salvatore Sciarrino, Kaija Saariaho, and
28 Georg Friedrich Haas, among others, has proven particularly relevant to my work in the
29 portfolio. Additionally, the work of French composers Maurice Ravel, Henri Dutilleux, Tristan
30 Murail, Philippe Hurel, and Philippe Manoury has been of influence.

¹ Jonathan Sterne, *The Audible Past* (Durham, NC and London: Duke University Press, 2003), p. 19.

² *Ibid.*, p. 9.

1 In the portfolio, where I have used ‘found’ sources as inspiration for and/or elements
2 contained within pieces, I make no substantive distinctions between sound sources and musical
3 sources, and treat audio sources as roughly equal (for example, I make no categorical difference
4 between the treatment of voices and instruments, or human and inhuman sources). As in the
5 quotation above from Jonathan Sterne’s book on the archaeology of the auditory past, I have
6 treated sound sources as objects for examination and manipulation on an equal footing, since
7 listening and memory functions do not immediately create such categorical hierarchies, and
8 listening experiences and sound memories are formed of collections of near-random auditory
9 fragments grouped more by simultaneity and ecological factors than by source.³

10 The sources I have used have always been chosen with regard for my personal relationship to
11 them, for a number of reasons. Firstly, it has been more fruitful for me to work with sources with
12 which I already have some familiarity and past experience; secondly, I wished to avoid the wide
13 and potentially problematically appropriative reach of a plunderphonics-style approach,⁴ as this
14 is not a topic within the purview of this particular project; thirdly, I wished to reflect theories of
15 both collective and individual memory that posit amalgamation of past experiences as central to
16 individual and social identity formation;⁵ and finally, I do not believe that subjectivity and
17 nostalgia are wholly escapable in this manner of working, nor do they exclude the ability of a
18 listener entering into and engaging with a musical work,⁶ so I have not attempted to profess any
19 form of objectivity in choosing my pre-existing materials. This represents new methodologies in
20 my practice, and an exploration of Berio’s proposal of the composer as a kind of living text,

³ My understanding of this concept is a concatenation drawn from: Eric F. Clarke, *Ways of Listening*, (New York: Oxford University Press, 2005); Jonathan Sterne, *The Audible Past* (Durham, NC and London: Duke University Press, 2003); Bob Snyder, *Music and Memory: An Introduction*, (Cambridge, MA and London: The MIT Press, 2000); Gilles Deleuze, ‘Whitman’, in *Essays Critical and Clinical*, trans. by Daniel W. Smith and Michael A. Greco (Minneapolis: University of Minnesota Press, 1997); Joe Milutis, ‘The Biography of the Sample: Notes on the Hidden Contexts of Acousmatic Art’, *Leonardo Music Journal*, 18 (2008); Marshall McLuhan, *The Medium Is the Massage*, (London: Bantam Books, 1967; repr.: London: Penguin Books, 1997).

⁴ I refer here to the work of John Oswald as discussed in Anne LeBaron, ‘Reflections of Surrealism in Postmodern Musics’, in *Postmodern Music/Postmodern Thought*, ed. Judy Lochhead and Joseph Auner (New York and London: Routledge, 2002), pp. 27 - 73 (pp. 49 — 54).

⁵ Maurice Halbwachs, *The Collective Memory*, cited in Astrid Erll, *Memory In Culture*, trans. by Sara B. Young (Stuttgart: J.B. Metzlersche Verlagsbuchhandlung und Carl Ernst Poeschel Verlag GmbH, 2005; repr.: Basingstoke: Palgrave Macmillan, 2011), pp. 15 - 18.

⁶ Katharine Norman, ‘Telling Tales’, in *Contemporary Music Review*, 10/2 (1994), pp. 103 - 109 (pp. 108 - 109).

1 containing their own individual library of musical and sonic pasts upon which they draw for
2 purposes of composition and interpretation.⁷

3 This commentary is divided into five parts that examine different aspects of the portfolio. In
4 Part One, I outline and define the three interrelated avenues of research (Chapter One constitutes
5 the entirety of Part One). In Part Two, I examine generative procedures explored in several
6 works that create structure on the local and macro levels by providing design principles for
7 motivic materials and form. Following this, I investigate the use of collage as a different method
8 by which to create compositional material and form, as well as to convey listening and memory
9 concepts (in Chapters Two and Three respectively). Part Three, consisting of Chapter Four,
10 examines categories of harmonic approach throughout the portfolio. Part Four discusses the use
11 of electronics— in Chapter Five, as compositional and analytical tool, and in Chapter Six as an
12 element of live performance. The final portion, Part Five, contains a substantial chapter (Chapter
13 Seven) detailing a set of three pieces, *Lost Museum*, which demonstrate a synthesis of techniques
14 and methods combining my research topics.

15 Certain ‘watershed’ works in the portfolio will be discussed at greater length than others, as
16 they served as primary research for specific concepts, and subsequent pieces trace their lineage
17 to results achieved there. These pieces illustrate certain research concepts, serving as exemplary
18 case studies. Additionally, while all of the pieces presented here contain some amalgamation of
19 techniques and concepts, some are more allied to particular topics than others, or served in
20 experimenting with techniques related to particular concepts; therefore, I will discuss some
21 pieces in detail in relation to specific topics but make more broad mention regarding other
22 aspects. A detailed listing of the works and their relevant history follows.

⁷ Luciano Berio, *Remembering the Future* (Cambridge, MA and London: Harvard University Press, 2006), p. 4.

Portfolio Contents

Title	Date	Instrumentation	Duration	Page Range	Track Listing	Recording Performers	Performance History
Volume One:							
<i>Phyllotaxis</i> (trio)	2013	Cl/vcl/pf	c. 6'30"	pp. 1 - 30	n/a	n/a	n/a
<i>Phyllotaxis</i> (sextet)	2016	Fl/ob/cl/bsn/hm/pf	c. 6'30"	pp. 33 - 57	1 - Excerpt, mm. 1 - 120 2 - Excerpt, fig. K - end	Magnard Ensemble, cond. Karen Ni Bhroin	Workshopped by Magnard Ensemble, 27 - 29 Jul 2016 Performed by Magnard Ensemble, cond. Karen Ni Bhroin, 29 Jul 2016 MusicFest Aberystwyth, Aberystwyth Arts Centre
<i>Night Studies</i>	2013 - 2017	String quartet	c. 15'	pp. 59 - 91	3 - Mvmt. 1 4 - Mvmt. 2 5 - Mvmt. 3 6 - Mvmt. 4 7 - Mvmt. 5	Mvmts. 1 - 3: Signum Quartet; mvmts. 4 - 5: Carducci Quartet	Workshopped by Carducci Quartet, 27 Nov 2013 (mvmts 1 - 2), 2 Apr 2014 (mvmts 3 - 5) Workshopped by Signum Quartet (mvmts. 1 - 3), 9 Nov 2016 Cardiff University School of Music
<i>Timestamp</i>	2014	A.sax/tn/via/pf/perc	c. 3'	pp. 93 - 99	8	Alex Davis, a.sax; Jack Lewis, tbn; Julia E. Howell, via; Matthew Poad, pf, Michael Hearty, perc	Performed by CMG, 15 Nov 2014 Cardiff University School of Music
<i>La sirène engloutie</i>	2014	Kingma b.f/ electronics	c. 8'	pp. 101 - 107	9	Carla Rees, flute; Julia E. Howell, electronics	Workshopped by rarescale, 26 Mar 2014 Cardiff University School of Music
<i>Afterimage</i>	2014	fl dbl a.fl/electronics	c. 5'	pp. 109 - 113	10	Sorcha Rudgeley, flute; Julia E. Howell, electronics	Performed by Laura Beardmore, 1 Aug 2014 rarescale Summer School, Harlaxton Performed by Sorcha Rudgeley, 28 Apr 2015 Cardiff University School of Music
<i>Moyennoù</i>	2014	SSA vocal trio	c. 4'30"	pp. 115 - 123	11	Katie Blackwell, soprano; Kate Robson, soprano; Mairwen Kirk, alto	Workshopped by Juice Vocal Ensemble, 11 Nov 2014 Cardiff University School of Music Performed by CMG, 26 Apr 2016 Cardiff University School of Music
<i>Lunar Echoes</i>	2015	a.fl/hp/electronics		pp. 125 - 139	12	Lisa Nelsen, alto flute; Gwenllian Llyr, harp; Julia E. Howell, electronics	Workshopped by Lisa Nelsen and Gwenllian Llyr, 25 Mar 2015 Cardiff University School of Music Performed by Lisa Nelsen and Gwenllian Llyr, 28 May 2015 National Museum Wales, Cardiff
<i>Sur le bord de l'eau</i>	2015	solo viola/electronics (one performer)	c. 11'	pp. 141 - 150	13	Julia E. Howell, viola and electronics	Performed by Julia E. Howell, 29 Sep 2015 Clear Cut 3, Cardiff M.A.D.E., Cardiff Recorded by Julia E. Howell, 13 Jun 2017 Cathays Community Centre Studios

Portfolio Contents (cont.)

Title	Date	Instrumentation	Duration	Page Range	Track Listing	Recording Performers	Performance History
<i>Paper Imitation</i>	2015 - 2016	f/b.cl/vln/vlc/pf	c. 10'	pp. 153 - 197	14	Lontano Ensemble, cond. Odaline de la Martinez	Workshopped by Lontano Ensemble, 11 Nov 2015 Cardiff University School of Music New version commissioned and performed by Lontano Ensemble, cond. Odaline de la Martinez, 11 Nov 2016 6th Annual London Festival of American Music The Warehouse, London
<i>Triskelion</i>	2016	solo harp	c. 3'	pp. 199 - 203	15	Lucy Fflur Jones	Workshopped by Gwenllian Llyr, 28 Jul 2016 MusicFest Aberystwyth, Aberystwyth Arts Centre Performed by Lucy Fflur Jones, 6 Dec 2016 Cardiff University School of Music
<i>Lost Museum I:</i>	2015	solo double bass	c. 4'	pp. 205 - 208	16	Thomas Goddard	Performed by Thomas Goddard, 7 Dec 2015 Cardiff University School of Music
<i>Lost Museum II: Photo Booth</i>	2016	Kingma b.f/b.cl/pf	pp. 211 - 228	17	Carla Rees, b.fl; Heather Roche, b.cl; Xenia Pestova, pf; Julia E. Howell, electronics	Workshopped by Carla Rees, Xenia Pestova, and Heather Roche, 17 Feb 2016	
<i>Lost Museum III: Llyn</i>	2016	f/vla/electronics	c. 7'	pp. 231 - 238	18	Hope Vaughan-Hughes, fl; Julia E. Howell, vla; Julia E. Howell, electronics	Cardiff University School of Music Performed by Sebastian Walker and Thomas Wilkinson, 4 Mar 2016
<i>And am I born to die?</i>	2017	string trio	c. 6'	pp. 241 - 247	19	Louise Charron, vln; Julia E. Howell, vla; Elin Haf Taylor, vlc	National Museum Wales, Cardiff Recorded by Hope Vaughan-Hughes and Julia E. Howell, 14 Jun 2017 Cathays Community Centre Studios Performed by Louise Charron, Julia E. Howell, Elin Haf Taylor, 3 Mar 2017 National Museum Wales, Cardiff
Volume Two:							
<i>Carried on the Air</i>	2016	string ensemble w/2 vln	c. 3'	pp. 1 - 14	20	First version: ESTA Workshop Day participants Revised version, excerpts: Orion Orchestra, cond. Kelvin Lee	Commissioned for and performed by participants of ESTA Workshop Day, 7 Feb 2016 Cardiff University School of Music Read by Orion Orchestra, cond. Kelvin Lee, 30 Jul 2016 MusicFest Aberystwyth, Aberystwyth Arts Centre
Appendix One:							
<i>Artefacts</i>	2012 - 2014	symphony orchestra	c. 18 - 20'	pp. 19 - 53	23	Bruckner Orchester Linz, cond. Dennis Russell Davies	Workshopped by BBC NOW, cond. Jac van Steen, 3 Feb 2014 and 24 Mar 2014 Hoddinott Hall, Wales Millennium Centre, Cardiff Performed by Bruckner Orchester Linz, cond. Dennis Russell Davies, 7 Sep 2014 Grosse Konzerthaus, Ars Electronica Festival Der Grosse Saal, Bruckner Haus, Linz
					Total Duration: c. 120'		

N.B.: The abbreviation CMG refers to Cardiff University School of Music's Contemporary Music Group

Part One - Research Aims

Chapter One - Research Aims and Context

The portfolio has been guided throughout by three main research concepts: 1) the design of systems that generate musical materials which result in multiple levels of structure; 2) reflection upon the experience of listening and remembering music; and 3) the integration of acoustic and electronic techniques. It is useful to distinguish the three areas for purposes of analysing different aspects of the portfolio, but in reality, there is a significant degree of overlap and interaction between the three. Compositional methodologies and concepts relating to the three questions usually coexist simultaneously within the portfolio works.

Systems designed to structure the work at multiple structural levels

Throughout this portfolio, an important principle I have attempted to follow, wherever possible, is to ensure that conceptual aspects of the pieces permeate multiple musical aspects of each piece: rhythmic, melodic, harmonic, textural, structural; this is especially a concern in relation to pieces that deal with extramusical concepts (e.g. in cases where the topic or reference treated in a piece does not inherently contain musical ideas and therefore becomes subject to transformational processes during composition). While each piece is a result of a subjective viewpoint and remains open to various interpretations (and I leave discussion of the efficacy of the works' musical communication for another time), it is my intention to try and encode as much as possible of the concepts within the pieces in order to bestow a strong internal and independent logic upon them.

For the most part, this has taken the form of designing systems that are derived from the overarching concepts and which inform rhythmic, melodic, harmonic, and structural aspects. These systems are procedural and generative, specific to each work though possessing

1 similarities across different pieces, and can be combined with other compositional tools and
2 employed with varying degrees of flexibility. This approach is not entirely dissimilar to Iannis
3 Xenakis' generative compositional procedures outlined in *Formalized Music*.⁸

4 I see intriguing points of connection between systemised, procedural, and generative
5 compositional processes and electronic sampling, as well as techniques of duplication and
6 transmission more generally. Likewise, there are strong similarities to memory processes, which
7 have, in turn, formed the models for technological and electronic reproduction and transmission
8 techniques—a point to which I will return in the next section of this chapter.

9 Indeed, sampling is rarely a process of maintaining and transmitting a perfect duplicate of the
10 original. Degrees of distance are introduced as the sample is divorced from its source;
11 recontextualising and truncating the original changes its perceptual and semiotic value, and new
12 variations are introduced. Far from static, samples (or borrowings of any kind) become subject to
13 processes that can be described as procedural, generative, or evolutionary, acquiring a life and
14 'biography' (to borrow the term in this context from Joe Milutis) all their own.⁹ This effect has
15 been widely noted regarding images and visual art, from surrealist collage¹⁰ to digital imagery¹¹
16 and memes,¹² where copies of images tend to acquire traces and artefacts of their journeys from
17 context to context and through various editing processes.

18 In music, there are numerous examples where these transformative procedures have been
19 employed, with varying degrees of intentionality. Some examples which I have studied in
20 connection with the portfolio include the following: the recontextualised chord sampled from a
21 recording of Stravinsky's *Firebird* and integrated into the first digital sampler, the Fairlight
22 Computer Musical Instrument, which subsequently became an ubiquitous and foundational
23 sample in numerous hip-hop tracks;¹³ William Basinski's piece *Disintegration Loops*, consisting
24 of an electronic version constructed from repeated tape loops that were accidentally left copying

⁸ Iannis Xenakis, *Formalized Music: Thought and Mathematics in Composition*, ed. Sharon Kanach, rev. edn. (Stuyvesant, NY: Pendragon Press, 1992).

⁹ Joe Milutis, 'The Biography of the Sample: Notes on the Hidden Contexts of Acousmatic Art', *Leonardo Music Journal*, 18 (2008), pp. 71 - 75.

¹⁰ Anne LeBaron, (p 27).

¹¹ Hito Steyerl, 'In Defense of the Poor Image', *The Wretched of the Screen* (Berlin: Sternberg Press, 2012), pp. 31 - 45.

¹² Brian Feldman, 'The Triumphant Rise of the Shitpic', *The Awl*, 17 December 2014 <<https://theawl.com/the-triumphant-rise-of-the-shitpic-e25d8e5af9bc>> [accessed 17 December 2014].

¹³ Robert Fink, 'The Story of ORCH5, or, the Classical Ghost in the Hip-Hop Machine', *Popular Music*, 24/3 (2005), pp. 339 - 356.

1 for many hours, resulting in decay and transformation, and an acoustic version transcribed and
2 orchestrated from the electronic piece (adding further transformation and distancing from the
3 original);¹⁴ a similar installation piece, *No Sharps, No Flats* by Alex Braden, Emily Francisco,
4 and Adam Richard Nelson Hughes, involving numerous tapes running continuously until they
5 wear out;¹⁵ and several pieces involving collage techniques which are conceptually adjacent to
6 these concepts of paradoxical continuity (transmission, reproduction, preservation) and decay or
7 metamorphosis (sampling, mash-up, recontextualisation, juxtaposition, procedural or
8 evolutionary transformation of a particular source), which I will address further in later sections.
9

10 **Reflection and/or commentary on the experience of music itself**

11

12 My second aim is to compose music that reflects and/or comments in some way on the
13 experience of listening to and/or remembering music. These two functions, listening and
14 remembering, are inextricably intertwined. The sounds that we actively notice, interpret, and
15 store in memory are conditioned by our existing memories— our listening is shaped by our
16 listening history.¹⁶ I wished to draw attention to the intermingling of hearing, listening, memory
17 processes, and environmental connections as a primary feature of all of the works in the
18 portfolio. Through varying approaches to this aspect in different pieces, I have experimented
19 with different forms of representation of this audition - memory confluences that are more or less
20 overt. While this nexus of perception and mind is often explored in art, in everyday experience it
21 is rarely a fully conscious phenomenon; therefore, I have found it worthwhile to examine this
22 through my compositional process, and in turn invite listeners to participate.
23
24
25

¹⁴ Anthony Tommasini, 'Contemplation Drawn From Magnetic Tape Flaking Away', *The New York Times*, 12 September 2011 <<https://nyti.ms/2tdgJ63>> [accessed 7 June 2013].

¹⁵ Margaret Carrigan, 'A Cassette-Based Symphony That Erodes with Time', *Hyperallergic*, 26 April 2016 <<https://hyperallergic.com/294017/a-cassette-based-symphony-that-erodes-with-time/>> [accessed 3 May 2016].

¹⁶ Clarke, p. 24. See also Snyder, pp. 23 - 25.

1 **Memory and perceptual concepts**

2
3 In order to create music according to the afore-mentioned rubric of reflection and
4 commentary upon the experience of music, I have drawn on several concepts of memory and
5 perception. These have encompassed a number of areas of theory and confluences of discipline.
6 Some territories explored include the following: theories of ecological perception drawn mainly
7 from the work of Eric F. Clarke, including perceptual learning, adaptation,¹⁷ and affordances;¹⁸
8 cognitive psychology of music, primarily the thorough summation of the key concepts provided
9 by Bob Snyder, including features of auditory perception and cognition such as the tripartite
10 schema of echoic/early processing, short-term, and long-term memory function¹⁹ as well as
11 phenomena such as auditory streaming²⁰ and grouping;²¹ technology as an extension of human
12 memory, ostensibly expanding the capacity of perception and memory, as well as technology as
13 externalised, inhuman memory storage, as elucidated in detail by Jonathan Sterne; and finally,
14 collective and cultural memory studies regarding identity formation (individual and social) and
15 mediation and transmission of the past, particularly the work of Maurice Halbwachs and Aleida
16 and Jan Assmann as summarised by Astrid Erll.²²

17 These different strands of the study of memory and psychoacoustics have been investigated
18 with a particular theme in mind: the fascinating contradictions between attempts to store,
19 preserve, and interpret music, and the imperfections, fallibility, ephemerality, and mediating and
20 transformative processes, of these same pursuits. Berio writes that, in contemporary times where
21 ostensibly all of musical history could potentially be made available through various media of
22 transmission (notation, recording, aural/oral transmission of various types), we

23
24 'have at our disposal... an immense library of musical knowledge, which attracts or intimidates us, inviting
25 us to suspend or to confound our chronologies. For over a century composers have been taking
26 metaphorical trips to the library, to take stock of its endless shelves... a library that is unable to offer
27 coherence, but can receive it from the right visitors. Today that library has become boundless. Rather like
28 Borges' "Library of Babel," it spreads out in all directions; it has no *before* nor *after*, no place for storing
29 memories. It is always open, totally present, but awaiting interpretation.'²³

¹⁷ Clarke, pp. 17 - 32.

¹⁸ Ibid., pp. 36 -38.

¹⁹ Snyder, pp. 3 - 18.

²⁰ Ibid., pp. 143 - 145.

²¹ Ibid., pp. 32 - 46.

²² Astrid Erll, *Memory In Culture*, trans. by Sara B. Young (Stuttgart: J.B. Metzlersche Verlagsbuchhandlung und Carl Ernst Poeschel Verlag GmbH, 2005; Basingstoke: Palgrave Macmillan, 2011).

²³ Berio, p. 9.

1
2 Yet at the same time as this virtual flattening of time and space and profusion of resources
3 exists, it is also true that we cannot truly access the past; in Halbwachs' words,

4
5 'a remembrance is in very large measure a reconstruction of the past achieved with data borrowed from the
6 present, a reconstruction prepared, furthermore, by reconstructions of earlier periods wherein past images
7 had already been altered.'²⁴
8

9 Recordings or other forms of storing musical information outside human memory are not
10 immune from this, as they become artefacts with a life and history of their own, subject to
11 entropy and decay or recontextualisation (intentional or otherwise).²⁵
12

13 **Overview of collage techniques**

14

15 While cellular and generative methods have often been employed primarily to create
16 structure on a local level that in turn can generate larger structures, I have also used collage or
17 borrowing as a means of creating structure on a large scale. I use the term collage broadly, to
18 include any combination or juxtaposition of pre-extant materials, and not only to denote a
19 stream-of-consciousness effect. Different pieces use borrowing or collage (in more or less the
20 traditional sense of cut-and-paste or mash-up) in varying ways and in varying degrees.

21 Anne LeBaron has argued convincingly that there is a strong link between the use of musical
22 collage as a postmodernist tendency and the surrealist practice of automatic writing;²⁶ Glenn
23 Watkins posits further that collage is often used as a means of relinquishing or at least calling
24 into question the authorship of the composer.²⁷ However, the use of collage in music is broad and
25 versatile, and in many cases is not an abdication of authorship (pursued at times by both John
26 Cage and Pierre Schaeffer in divergent directions),²⁸ but conversely a means of exerting
27 compositional authority or building structure by manipulating carefully selected borrowed
28 materials in a highly controlled manner.²⁹ Stravinsky, Berio, Kagel, Zimmermann, Schnittke, and

²⁴ Halbwachs, *The Collective Memory*, cited in Erll, p. 17.

²⁵ Sterne, p. 332.

²⁶ LeBaron, pp. 27 - 73.

²⁷ Glenn Watkins, *Pyramids at the Louvre* (Cambridge, MA and London: The Belknap Press of Harvard University Press, 1994); in particular, see pp. 1 - 10 and 398 - 412.

²⁸ Milutis, p. 72.

²⁹ C. Catherine Losada, 'Between Modernism and Postmodernism: Strands of Continuity in Collage Compositions by Rochberg, Berio, and Zimmermann', *Music Theory Spectrum*, 31/1 (2009), pp. 57 - 100 (p. 59);

1 Rochberg, among others, have often tended towards this means of employing collage principles
2 (a prime example being Berio's *Sinfonia*).³⁰

3 I see my own use of collage or 'found object' practices from a slightly different, though not
4 opposing, angle: something more akin to music as micro-autobiography, though not quite linear
5 and perhaps more suggestive than fully representational (in the sense of communicating in a
6 near-literal manner a particular environment, event, thought or emotion). My intention is to
7 direct the listener's viewpoint to a specific concept or experience through the lens of my own. In
8 this way, I am in fact asserting authorial control by my use of collage. As a photographer might
9 invite a viewer to 'look through' the photographer's own eyes, I invite the listener to hear
10 through my ears. This is similar to Walter Benjamin's equating the audience of a film with the
11 point of view of the camera.³¹

12 While I do believe I exercise this control over my compositional material, I do not believe it
13 is possible for the composer's intentions to control the listener's experience of a piece, as each
14 listener brings their own unique listening history to the performance in quite a literal sense— the
15 processing of heard music travels down existing neural pathways and interacts with existing
16 memories.³² At the same time, each hearing of a piece is changed by its environment and
17 performance format, visual and gestural aspects, and variations in performance, in addition to the
18 listener's own contribution of individualised history and hearing the piece afresh if not for the
19 first time.³³ Thus a definitive, idealised version of a work is not practically achievable— even the
20 score is not necessarily an immutable, unequivocal representation of the piece, nor can
21 realisations of the score be regarded as perfect, unaltered duplicates of the notation. It is
22 precisely this ephemeral, multifaceted, and adaptive quality of musical experience— to use
23 James J. Gibson's term, affordances³⁴— which I intend to bring to the listener's attention.

see also Björn Heile, 'Collage vs. Compositional Control: The Interdependency of Modernist and Postmodernist Approaches in the Work of Mauricio Kagel', in *Postmodern Music/Postmodern Thought*, ed. Judith Lochhead and Joseph Auner (New York and London: Routledge, 2002), pp. 287 - 299 (p. 288).

³⁰ J. Peter Burkholder, 'Borrowing', in *Grove Music Online* in *Oxford Music Online* (Oxford University Press) <<http://www.oxfordmusiconline.com/subscriber/article/grove/music/52918pg13>> [accessed 6 April 2014].

³¹ Walter Benjamin, 'The Work of Art in the Age of Mechanical Reproduction', *Illuminations*, trans. Harry Zohn, ed. by Hannah Arendt (New York: Harcourt, Brace & World, 1968; repr. New York: Schocken Books, 2007), pp. 217 - 252 (p. 228).

³² Snyder, pp. 23 - 25.

³³ Clarke, p. 24.

³⁴ *Ibid.*, p. 36 - 37.

1 Ultimately, it is less important that the listener fully understands or recognises the specific
2 referential material in my pieces or whether the personal memories I incorporate can be
3 considered as translatable to the perception of others. The effect of *déjà entendu* invites the
4 listener to examine the memory objects as they are presented, but leaves room for this
5 hypothetical audience member to find their own affinities, to recognise the references I have
6 incorporated, or to experience the material as self-contained. This aligns with C. Catherine
7 Losada’s postulation that, for many compositions, juxtaposition is not a rejection of connections
8 but an embrace of associations.³⁵

9 A question that arises with each new piece is the level of context I deem necessary for the
10 audience to be able to understand and engage with the work. I believe it will not be beneficial to
11 adopt a definitive overarching principle applicable to each and every work. I tend towards the
12 perhaps somewhat equivocal stance that the works will be effective regardless of the level of
13 context provided (whether this context comes in the form of programme notes or other
14 communications I provide, the audience’s own personal contexts, or a combination of these
15 sources), and by simply furnishing different affordances for the listener based on the context
16 present at the time of their listening experience. In effect, while I presume to assert authorial
17 control within the compositions, I do not seek to be highly prescriptive regarding the rules of
18 engagement for the listener. This fits well with Katharine Norman’s framing of the composer as
19 storyteller and the listener as equal participant in the performance:

20
21 ‘Surely our creative, imaginative, “intelligent” listening reception is as much a part of the performance as
22 the composer’s interpretation... In relating what we hear to what we already know, we continue to make
23 use of “everyday” listening, but we “expand” this listening into a musical activity. And this creativity of
24 reception— another aspect of performance— is encouraged by the experiential quality of the material...we
25 are listening in *through* the composer’s interpretive performance of the sounds— an essentially emotional
26 remembrance of experience... It seems that the way we make the related experience of stories our ‘own’
27 may have less to do with simple recognition than with an underlying emotional empathy that involves us
28 with the teller’s public “remembering” of events... We accept, and emotionally incorporate, an
29 interpretation of events which we haven’t ourselves experienced and personally remembered...’³⁶

30
31 For most compositions in which portions of extant material have been used, the palette of
32 sources has been restricted to those with which I have a personal connection and history of

³⁵ Losada, p. 59.

³⁶ Norman, pp. 106 - 108.

1 experience. Naturally, this is partly for reasons of personal interest and emotional connection,
2 and partly due to familiarity on a detailed level with the relevant recordings or traditions. But
3 beyond these considerations, I also wished to take care that the compositions in question are
4 clearly a representation of my own memories of, reflections upon, and engagement with the
5 specific sources rather than an impressionistic portrayal or pastiche. This pursuit is related to
6 Maurice Halbwachs' conception of memory as taking a primary role in identity formation, and
7 said identity attaining its unique, individual character by the specific nature of one's combination
8 of memories more than any individual, singular identifying feature.³⁷ Pieces that most strongly
9 exemplify this approach include *Artefacts*, *Night Studies*, *Afterimage*, *Sur le borde de l'eau*, and
10 *And am I born to die?*. For certain specific compositions, I have deviated slightly in approach,
11 intentionally using more 'distant' and/or less specific source materials to convey a sense of
12 remove or otherness (without aiming to specifically deal with issues of otherness in a central
13 way). Within this portfolio, *Paper Imitation* and *Lost Museum I: Lamentation* fit the latter
14 description.

15

16 **Scope of 'reflective space'**

17

18 The portfolio, for the most part, presents for the listener's consideration musical objects
19 which are relatively limited in scope and usually function on the scale of short-term memory
20 processes (which occur over 3 to 12 seconds on average)³⁸ as a means of examining wider
21 concepts by extension, as opposed to large-scale, immersive environments comprising numerous,
22 highly heterogeneous classes of materials. I see this as an analogous framework to Walter
23 Benjamin's observation in relation to photography,

24

25 'by close-ups of the things around us, by focusing on hidden details of familiar objects, by exploring
26 commonplace milieus under the ingenious guidance of the camera, the film, on the one hand, extends our
27 comprehension of the necessities which rule our lives; on the other hand, it manages to assure us of an
28 immense and unexpected field of action.'³⁹

29

30 In other words, the intention is to create a lens for exploration of elements that might
31 otherwise escape perception, creating a space for reflection and examination by the perceiver:

³⁷ Halbwachs, cited in Erll, pp. 15 - 18.

³⁸ Snyder, p. 47.

³⁹ Benjamin, p. 235.

1
2 ‘with the close-up, space expands; with slow motion, movement is extended. The enlargement of a
3 snapshot does not simply render more precise what in any case was visible, though unclear: it reveals
4 entirely new structural formations of the subject.’⁴⁰
5

6 The photographic or cinematic concept above also relates to Pierre Schaeffer and Michel
7 Chion’s modes of listening: in particular, *écoute réduite* (reduced listening) in which the focus
8 shifts from sound as a vehicle of auditory information about its source to the traits of the sound
9 itself.⁴¹ But whereas reduced listening involves abstracting sound completely from the context
10 and environment of its source, the photographic or cinematic analogy is more apt in regards to
11 my work, as the pieces in the portfolio intentionally preserve and centre vestiges of their context
12 and environment. The concept of examining aspects of one’s environment (whether in the
13 present or in the immediate past as accessed through memory or technology) informs my use of
14 both collage/borrowing and electronic technologies, in a similar way to the photographic and
15 cinematic concepts described by Benjamin.

16 While some works focus specifically on limited, detailed elements, several pieces do employ
17 large-scale architecture built upon blocks of motivic material. The works contained in the
18 portfolio run a gamut between more limited and more expansive approaches in terms of the
19 scope and unity of materials; with each piece, it was necessary for me to delineate the scope
20 afresh.
21

22 **Integration of acoustic and electronic elements**

23

24 As this portfolio is primarily concerned with deriving new compositions via reflection upon
25 and usage of sounds from the past, an attempt to include, however indirectly, the means of
26 transmission of these sounds (namely, sound reproduction technology) naturally followed. These
27 technologies have been invented expressly as an extension of human perceptual and mnemonic
28 capabilities, and are largely modeled upon these same physiological and neurological
29 functions.⁴² They optimistically promise a high-capacity, less fallible external memory, and a

⁴⁰ Ibid., p. 236.

⁴¹ Michel Chion, *Audio-Vision: Sound on Screen*, ed. and trans. by Claudia Gorbman (New York: Columbia University Press, 1994), p. 29; Michel Chion, *Guide des objets sonores: Pierre Schaeffer et la recherche musicale*, (Paris: Éditions Buchet/Chastel, 1995), p. 33.

⁴² Sterne, pp. 32 - 85.

1 means of instant access to the past. Ultimately, the fulfilment of this promise is partial at most, as
2 the specific context and environment of the original, live sound source can of course never be
3 completely accessed again, and sound reproduction technologies invariably mediate and alter the
4 original sounds. Jonathan Sterne writes:

5
6 ‘Recording is a form of exteriority: it does not preserve a preexisting sonic event as it happens so much as
7 it creates and organizes sonic events for the possibility of preservation and repetition. Recording is,
8 therefore, discontinuous with the “live” events that it is sometimes said to represent (although there are
9 links, of course). Like the body embalmed, recorded sound continues to be able to have a social presence or
10 significance precisely because its interior composition is transformed in the very process of recording. This
11 unique transformation of the interior to facilitate the functioning of the exterior is one of the defining
12 characteristics of sound recording’s so-called modernity. If the past is, indeed, audible, if sounds can haunt
13 us, we are left to find their durability and their meaning in their exteriority.’⁴³
14

15 This seeming paradox of preservation of ephemeral sound events causing different types of
16 alteration and transformation is intriguing and worthy of examination through composition,
17 especially when one considers the medium of a sound’s reproduction as part of the history and
18 identity of that sound as opposed to a simple duplicate.⁴⁴ The transmitting technologies
19 themselves become a source of auditory or other information, adding to the specific listening
20 experience of the sound in question: ‘Sound-reproduction technologies are artifacts of particular
21 practices and... can be considered archaeologically’;⁴⁵ furthermore, they ‘[encapsulate] a whole
22 set of beliefs about the age and place in which [their creators] lived.’⁴⁶

23 Within the portfolio, I have used electronics and the interaction between electronic and live
24 elements to reflect these concepts, while the actual technologies of the past themselves are not
25 physically present or necessarily centred in the works. Instead, the focus is upon what traces are
26 left, and what alteration occurs, in sound that has been acted upon by technology. This can be
27 seen in numerous works, including *Night Studies*, *Timestamp*, and *Sur le borde de l’eau*, among
28 others. One slight exception is *Lost Museum II: Photo Booth* where the sounds of wax cylinder
29 rotations are present in the final work— though the wax cylinders themselves, or the machines to
30 play them, are not physically present.

⁴³ Sterne, p. 332.

⁴⁴ Here, I treat sounds and music identically as auditory sources, without defining a boundary or distinction between them as categories of auditory information.

⁴⁵ Sterne, p. 7.

⁴⁶ *Ibid.*, p. 9.

1 Collage and electronic audio technologies

2
3 There are significant connections between musical collage and electronic audio recording,
4 editing, and production— allowing for overlap between the second and third research topics in
5 the portfolio. The connection between the two has been well documented and elucidated by
6 numerous writers. Anne LeBaron links trends of surrealist collage and automatism in the visual
7 arts beginning in the 1920s to more recent currents of collage employment in music (specifically,
8 from *musique concrète* onwards); she argues, that while layering and collage were already
9 certainly present in music by the advent of recording technology (particularly in the works of
10 Ives, Varèse, and Satie), it was not prevalent until audio technology developed enough to make
11 sampling, splicing, rearranging, overdubbing, and similar techniques available widely as
12 compositional and orchestrational tools.⁴⁷ As the pace of development of audio technologies
13 accelerated and the possibilities for widespread and immediate mass distribution increased,
14 electronic tools, processes, and concepts have become commonplace even when electronics are
15 not directly employed in any fashion (to give one example, Ligeti's acoustic compositions
16 indirectly influenced by electronics, such as the Sonata for Viola Solo, which incorporates
17 processes of looping, sampling, acoustic analysis and time manipulation that seemingly imitate
18 electronic processes).⁴⁸ These techniques in relation to the creation of collage have been explored
19 by a large number of other composers, including Pierre Schaeffer and others' *musique concrète*
20 works, Daphne Oram's 'Oramics' pieces, Karlheinz Stockhausen's *Telemusik*, Jonathan Harvey's
21 *Mortuos Plango, Vivos Voco*, Philippe Hurel's *Flash-Back*, Michael Daugherty's *Elvis*
22 *Everywhere*, numerous works by Olga Neuwirth such as *Lost Highway*, Andrew Norman's
23 recent *Play*, and the work of electronic musician and composer Colleen, to name but a few
24 instances.

25 The abundance and commonplace nature of electronic audio technologies (aided in no small
26 part by genres of music and sound art previously considered outside the realm of art music
27 becoming more interconnected as a postmodernist tendency)⁴⁹ has undoubtedly altered the way

⁴⁷ LeBaron, pp. 33 - 34.

⁴⁸ György Ligeti, Sonata for Viola Solo, ED 8374 (Mainz: Schott, 2001).

⁴⁹ Jonathan D. Kramer, 'The Nature and Origins of Musical Postmodernism', in *Postmodern Music/Postmodern Thought*, ed. Judy Lochhead and Joseph Auner (New York and London: Routledge, 2002), pp. 13 - 26 (pp. 16 - 17).

1 musical collage is conceptualised and composed.⁵⁰ In my own works, as in those mentioned
2 above, these links are intrinsic to compositional process and audible result, whether electronics
3 are used directly or not. As I will discuss further in Chapters Five and Six, electronics are
4 employed alongside other tools as part of compositional methodology, and often are treated as
5 part of the instrumentation and orchestration of pieces, whether as a standalone instrument in
6 itself, an extension of another instrument, or an admixture of the two. This has often resulted in
7 works that present a collage (in the literal senses of layering and/or employing blocks of
8 materials) created of live and electronic elements, with a blurred boundary between the sources.
9

10 **Liveness**

11
12 When dealing with the use of borrowed materials, recordings, various technologies, and
13 electronics in various ways throughout this portfolio, some questions of approach arise.
14 Specifically, why no acousmatic⁵¹ electronic pieces, improvisatory works, or environmental
15 soundscapes been included?⁵² There are a few reasons for not exploring these avenues in this
16 portfolio. Firstly, there are the pragmatic choices that have kept the scope of the portfolio within
17 manageable bounds regarding time and topic. Accordingly, I have retained focus entirely on
18 integration of electronic and acoustic techniques, rather than electronic techniques alone, and
19 while several works contain degrees of flexibility, there are no instances of improvisatory scores.
20 Exploring the different effects of improvisatory versus fixed notation in relation to memory
21 concepts is a fascinatingly rich area, but would have been tangential to my delineated research
22 questions, necessitating a large research project in itself. Secondly, as already noted, I wished to
23 assert my compositional voice and authorship within the works, which caused me to steer away
24 from using sound sources in less mediated, more direct ways. Furthermore, the works in the
25 portfolio are designed for live performers, rather than intended to be recorded listening
26 experiences; with recordings, the listener has a greater level of control over some aspects of the

⁵⁰ Simon Waters, 'Beyond the Acousmatic: Hybrid Tendencies in Electroacoustic Music', in *Music, Electronic Media and Culture*, ed. Simon Emmerson (Aldershot: Ashgate, 2000), pp. 56 - 83 (pp. 76 -77).

⁵¹ Acousmatic meaning music or sound that does not have a directly visible source, such as an instrument. Chion, *Guide des objets sonores*, p. 18.

⁵² I should note, however, that I do not consider there to be a hard boundary between music and soundscape, and the latter need not be considered a wholly separate genre. See, for example, Arielle Saiber, 'The Polyvalent Discourse of Electronic Music', *PMLA*, 122/5 (October 2007), pp. 1613 - 1625.

1 experience (volume, pausing or altering playback, choosing where and how the recording is
2 transmitted, engaging in other activities while listening, etc.). By translating borrowed recorded
3 material back to live performance, I am removing such controls from the listener in order to
4 present my interpretive, performative voice, as well as that of the players, while inviting listeners
5 to alter their mode of engagement. This relates to Norman's framework of composers and
6 performers as storytellers and the audience as creative interpreters who are additionally
7 collaborative performers of the work.⁵³

8 While I have incorporated non-musical sounds (e.g. sounds not originally conceived or
9 presented as music, such as sounds produced by natural sources) and treated them as equivalent
10 to musical sound, my second research concept focuses upon the experience of music; hence, I
11 have tended to give primacy to sounds that are conventionally musical. Finally, I was interested
12 in experimenting with the effects created by re-embodiment of disembodied recordings— recordings
13 that capture (in mediated form) a specific performance, but have been abstracted from that
14 human, embodied, time- and environment-delimited original source. This approach adds extra
15 layers of distancing, mediation, and polyvalence (or multiple potential meanings or
16 interpretations) to the pieces, while also providing a refocusing on acoustic, live features,
17 interpreted by the performer(s) and listener(s) in new and unpredictable environments. The
18 dialogue between live performance and electronic elements calls into question which sources are
19 more live, more present, and more embodied than one another.⁵⁴

20 An important aspect relating to liveness connects to Marshall McLuhan's notion of
21 'environment' and 'anti-environment' in relation to art:

22
23 'Environments are not passive wrappings, but are, rather, active processes which are invisible... Anti-
24 environments, or counter-situations made by artists, provide means of direct attention and enable us to see
25 and understand more clearly.'⁵⁵
26
27

28 In effect, by re-translating electronic sources to acoustic ones, or transforming them into new
29 electronic versions, I am, from one perspective, removing the sources from their environment
30 and placing them into an anti-environment: from a space where the nature of the recording itself
31 might be perceived as secondary to the content of the recording, certain aspects of the recording

⁵³ Norman, pp. 105 - 106.

⁵⁴ Milutis, p. 72. See also McLuhan, p. 63.

⁵⁵ McLuhan, p. 68.

1 ignored or given less focused listening attention, or the presence of the recording media itself
2 completely bypassed in consciousness in favour of focusing upon the transmitted content.⁵⁶ From
3 another perspective, I am translating or borrowing from one anti-environment (the recording,
4 which has already been divorced from the original performance in order to frame that particular
5 sound experience in a particular way) to another (my piece, where I draw attention to specific
6 aspects, qualities, or new renderings of the recording). This relates again to Schaeffer and
7 Chion's modes of listening, in particular the concept of 'reduced listening', in which focus is
8 given to traits of a sound rather than consideration of its source:

9
10 'In "everyday" listening, sound is always treated as a vehicle. Reduced listening is therefore an "anti-
11 natural" mode, which goes against one's conditioning. The act of disregarding our habitual references in
12 listening is a voluntary and artificial act which permits us to elucidate a great number of phenomena implicit
13 in our perception.'⁵⁷
14

15 Schaeffer and Chion's 'anti-natural' *écoute réduite* is, however, a degree of abstraction
16 beyond that evident in the pieces in the portfolio. Instead, I intend to combine such focused,
17 abstracted attention with the modes of causal, everyday, referential listening and recalling, as
18 described by Chion in connection with film.⁵⁸ I am inviting the listener to pay heightened
19 attention to what is a normal combination of listening processes in the context of live music
20 (causal, referential, and reduced modes) by creating hybrid environments/anti-environments
21 through re-translation to more or less live, embodied sources.

23 **Electronic technologies and memory**

24

25 I was intrigued by the parallels between physical memory processes in the brain (such as
26 echoic processing, auditory groupings, or short-term memory storage limits, to name a few) and
27 technological processes such as sampling and looping. Jonathan Sterne has documented in his
28 study of early audio reproduction technologies that the development of such technologies and
29 devices has always closely mimicked anatomical understanding.⁵⁹ Therefore, it is hardly

⁵⁶ Clarke, pp. 3 - 16.

⁵⁷ Chion, *Guide des objets sonores*, p. 33. Translation my own.

⁵⁸ Chion, *Audio-Vision*, p. 33 - 34.

⁵⁹ Sterne, pp. 32 - 85.

1 surprising that technologies such as computer software for audio recording manipulation should
2 form close correspondences with brain functions associated with sound processing.

3 Audio technology is often conceptualised as a form of external memory and a tool for
4 preservation that abstracts sound as a reproducible object untethered from a specific, local,
5 temporally-limited source,⁶⁰ but technology always mediates and transforms, and traces of it
6 make their way into the sound itself, keeping it within the progression of time and history instead
7 of preserved in pure form outside of it. Yet it also, by virtue of its accessibility, gives the sound
8 object a transhistorical and geographically unbounded aspect.

9 Traces of an object's technological transmission history are inescapable even when the desire
10 is to preserve for posterity an unchanging and 'accurate' version of the object. 'Perfect
11 transmission' has been described as a 'myth' by Rosa Menkman as the introduction of 'noise'
12 can never be fully avoided.⁶¹ In the case of audio recordings, this can take the form of distortions
13 of pitch, timbre, or tempo, noise artefacts such as hissing or crackling, decay of storage media
14 resulting in audible alteration or erasure, unintentional background sounds introduced into the
15 recording, etc. This effect can be seen in action across all forms of reproduction technologies; for
16 example, even digital image files, which ostensibly are intended to remain identical regardless of
17 how many times they are copied, tend to accumulate traces of their travels across the internet or
18 other transmitting technologies in the form of screenshots, visible compression/decompression
19 artefacts, watermarks, etc.⁶²

20 My pieces deliberately aim to incorporate their transmitting media, not in a direct or literal
21 fashion, but treated as an integrated part of a source's make-up, on equal footing with other
22 parameters such as pitch, rhythm, timbre, etc. There are relevant analogs in digitally-based visual
23 art that have been of influence to my practice. The work of Hito Steyerl, among others, focuses
24 upon the visibility of the producing or transmitting technologies or media which occurs within
25 these genres of digital arts. A prime example is her recent installation *Factory of the Sun*,
26 described in an exhibition text as follows:

27
28 Hito Steyerl's immersive three-dimensional grid is modeled on motion-capture studios, where body
29 movements are recorded and translated for use in computer-generated imagery. The video on view within

⁶⁰ Ibid., p. 65.

⁶¹ Rosa Menkman, *The Glitch Momentum* (Amsterdam: Institute of Network Cultures, 2011), p. 12.

⁶² Steyerl, pp. 32.

1 also features a motion-capture studio. In that one, workers are forced to dance in order to generate
2 sunlight—though they also dance as a form of resistance to their data-mined servitude. The video shifts
3 between mock newscasts, drone footage, and personal narratives, moving between different levels of reality
4 like a video game. Simultaneously playful and critical, the work hints at the utopian potential of the Internet
5 while also critiquing its use for surveillance and economic exploitation.⁶³

6
7 While I do not intend a specific stylistic comparison with these genres of visual art, my aim
8 and approach is conceptually akin: to make the means of transmission part of the fabric of the
9 work alongside, and on equal footing with, the material contained within it—⁶⁴ ‘a shift in focus
10 from the signified to the signifier’.⁶⁵ Steyerl, in her writing and work, makes the further point
11 that rather than regarding objects such as images and sounds as degraded or distorted by
12 transmission in a negative way, the entropic changes⁶⁶ that occur as a result should be viewed as
13 part of the object’s story and material presence.⁶⁷ In my works, I aim to represent this process of
14 entropy and change (whether caused by passage of time, mediation by memory, or technological
15 processes) in a direct way.

16 Music that links electronic technologies and memory processes, as my works often do, has a
17 lengthy, established history and I do not present my overall approach as entirely novel— a few
18 predecessors in this area who have influenced my practice include Laurie Anderson (especially
19 *Songs and Stories from Moby Dick*), William Basinski (*Disintegration Loops*), Salvatore
20 Sciarrino (*Efebo con radio*), works by Gavin Bryars and Steve Reich, and a range of others.
21 Nevertheless, this portfolio does present aspects that are distinctive and personal: the particular
22 confluence of generative and borrowing procedures combined with the focus on mnemonic
23 concepts; the transformative methods, usually making use of electronics, employed with
24 borrowed materials; and a ‘subtractive’ general approach to harmony (conceptually akin to
25 subtractive synthesis in electronic music) with a tendency to modality, standing in contrast to

⁶³ Whitney Museum, ‘Hito Steyerl’, in *Dreamlands: Immersive Cinema and Art, 1905 - 2016*, 28 October 2016 - 5 February 2017 <<http://whitney.org/Exhibitions/Dreamlands>> [accessed 2 May 2017].

⁶⁴ The direct correlations to visual art here and elsewhere may not seem fully apposite to a discussion of auditory perception or music, and indeed, different media and different modes of perception should not always be treated as equivalent or interchangeable. However, as other art forms have been of great influence to my work in a direct sense, and concepts applying to visual media have long proven useful frameworks for considering and contrasting certain aspects of sound and music, the connections to visual media are a worthwhile if not holistic solution for addressing certain points.

⁶⁵ Waters, ‘Beyond the Acousmatic’, p. 70.

⁶⁶ By entropic changes, I mean those brought about by decay and a breakup of intended order or construction.

⁶⁷ Steyerl, p. 38.

- 1 many collage- or memory-based pieces that employ an approach of harmonic saturation,
- 2 chromaticism, or post-tonality.
- 3

Part Two - Structural Aspects

Chapter Two - Systemisation of methods for creating multi-level structures

Motivic development and generative systems

As discussed during Chapter One, a primary concern at the commencement of this portfolio was the development of systematic ways of working within my practice. In particular, I started out by researching various methods of procedural generation, from analog methods such as following mathematical operations to computer-based methods. While originally this pursuit was intended to result in the design of overarching principles which could be applied to any work in the portfolio, for several reasons outlined in the following discussion these methods have become one set of multiple flexible ways of composing, dependent on the needs and aims of individual works.

A piece which served as a preliminary investigatory exercise of these concepts and which illustrates my employment of them is *Phyllotaxis*; in the next section I analyse and critique this piece in order to explore these ideas and my conclusions regarding them.

Concepts in *Phyllotaxis*

Phyllotaxis (pp. 1 - 30 in Portfolio Volume One), composed for B flat clarinet, cello, and piano, is designed to represent the spiraling growth patterns of plant leaves in sonic form, mediated by a systematic pre-compositional design. The instrumentation was chosen to provide degrees of contrast between the three instruments, allowing three strands of music to be distinguished by individual timbre at the outset, with opportunities for combined timbres and blending as the piece progressed. The title describes this growth process.⁶⁸ In terms of texture and instrumental interactions, the piece is loosely inspired by Inuit vocal games, or competitive

⁶⁸ Henrik Jönsson and others, 'An auxin-driven polarized transport model for phyllotaxis', *PNAS*, 103/5 (2006), 1633 - 1638 (p. 1633).

1 music, usually known as *katajjaq*. In these competitions, usually two or occasionally four
2 participants (usually women)⁶⁹ face one another and produce patterns of motivic sounds
3 (derived, at least partly, from the morphemes of words) using the breath and throat; each
4 individual performs their own pattern, but the patterns interlock with complex hocketing and
5 imitation that creates a phasing effect.⁷⁰ The main motifs are repeated at specific time intervals
6 and identified by particular intonation patterns.⁷¹ The game continues as long as the players can
7 correctly perform the pattern in rhythm without becoming out of breath, laughing, or making
8 errors.⁷² One participant may also change patterns without warning, and the other competitor(s)
9 must adapt.⁷³ Of the resulting textural effect, Jean-Jacques Nattiez writes:

10
11 'In spite of the competitive nature of the game, the resulting sound must project the feeling that there is
12 perfect harmony between the singers and such uniformity of sound that the audience is not able to discern
13 exactly who does what.'⁷⁴
14

15 This effect takes advantage of the auditory streaming or melodic fission function of listening
16 and short-term memory, in which groups of sounds heard in close succession and containing
17 similar features (especially closeness of pitch height) are perceptually grouped into a single 'line'
18 of melody.⁷⁵ The main musical interest in the game involves manipulating this effect: each
19 participant must sustain their individual line, but the combined streaming effect makes it difficult
20 for the participants to maintain their line without errors, and confuses audience's perceptions in
21 terms of the source and independent nature of the different lines. While the game is in full swing,
22 composite melodic, rhythmic, and structural features form out of the individual components of
23 the stream. In addition to *katajjaq* and numerous other traditions worldwide, similar streaming
24 effects can be readily found in the music of Steve Reich and Kevin Volans, among others.

25 The sounds and morphemes used in *katajjaq* often reflect and encode aspects of
26 environment: names of ancestors or animals, toponyms, and the sounds of animals or other

⁶⁹ Nattiez, Jean-Jacques, 'Inuit Vocal Games', *The Canadian Encyclopedia* (2006)
<<http://www.thecanadianencyclopedia.ca/en/article/inuit-vocal-games-emc/>> [accessed 3 March 2013] (para. 6 of 14).

⁷⁰ *Ibid.*, para. 7 of 14.

⁷¹ *Ibid.*, para. 8 of 14.

⁷² *Ibid.*, para. 5 of 14.

⁷³ *Ibid.*, para. 8 of 14.

⁷⁴ *Ibid.*, para. 8 of 14.

⁷⁵ Snyder, p. 144.

1 natural sounds,⁷⁶ such as a burbling river or buzzing mosquitos.⁷⁷ *Katajjaq* could therefore be
2 seen as a means of storing and preserving environmental or natural memory data.

3 While I was interested in the aspect of ‘natural memory’ or sonification in the *katajjaq*
4 tradition, the human memory element was also equally interesting to me. The ‘throat games’ (for
5 they are not considered music or songs in the usual sense)⁷⁸ could be seen as a means of
6 preserving the environment of the original, unknown devisers of individual songs within the
7 collective memory of the practitioners and listeners. This is particularly intriguing as the specific
8 environments extant at the time of composition have vanished or changed. The ‘songs’
9 themselves are somewhat individualised through each new performance and undoubtedly
10 transform over the course of their oral transmission, but at the same time offer a means of
11 continuity and preservation. In composing *Phyllotaxis*, it was not my intention to imitate the
12 *katajjaq* in a literal sense (not least because it is a tradition outside my own heritage), but to
13 engage similarly with the concept of encoding aspects of one’s environment while retaining
14 some vestige of the ludic and competitive nature of the practice. There is an interesting
15 connection here between the *katajjaq* tradition and Jan and Aleida Assmann’s ‘Cultural
16 Memory’ framework-⁷⁹ specifically, it strikes me as an example of the so-called ‘floating gap’
17 between an incompletely-accessible, almost mythological, past and current living memory, a
18 means of cultural continuity and preservation of memories and traditions considered important to
19 those preserving them.

⁷⁶ Nattiez, para. 9 of 14.

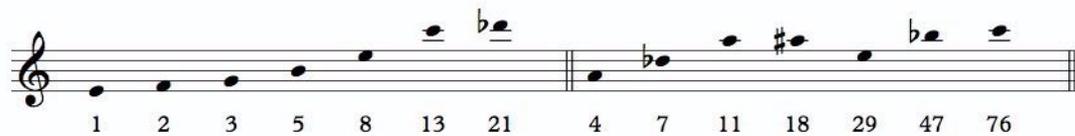
⁷⁷ For examples of *katajjaq* based on these particular two natural sound sources, see Tama Ball and Jennie Williams, *The River - Inuit Throat Singing*, online video recording, YouTube, 12 May 2016 <<https://youtu.be/zONMPEQWQNY>> [accessed 26 July 2016] and Karin Kettler and Jennie Williams, *The Mosquito*, online video recording, YouTube, 29 May 2011, <https://youtu.be/_mzm2ZVjOeA> [accessed 19 January 2013].

⁷⁸ Nattiez, para. 4 of 14.

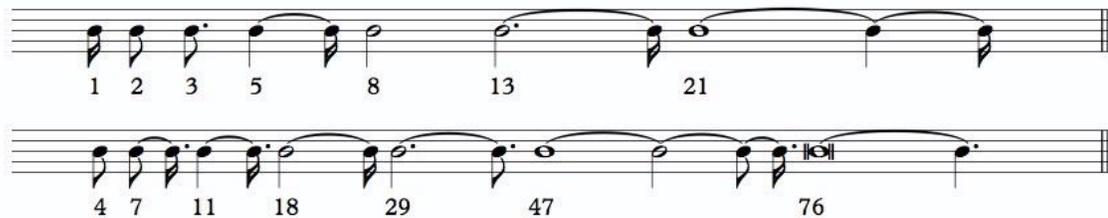
⁷⁹ The key concepts of A. and J. Assmann’s ‘Cultural Memory’ theory (das kulturelle Gedächtnis) mentioned here are outlined in Astrid Erll, *Memory In Culture*, trans. by Sara B. Young (Stuttgart: J.B. Metzlersche Verlagsbuchhandlung und Carl Ernst Poeschel Verlag GmbH, 2005; repr.: Basingstoke: Palgrave Macmillan, 2011), pp. 28 - 33.

1 Generative and systematic compositional processes in *Phyllotaxis*

2
3 The motivic materials for *Phyllotaxis* are derived from two sources: subsets of two well-
4 known (and, I should note, widely used within music) number sequences, the Fibonacci sequence
5 (the chosen numbers being 1, 2, 3, 5, 8, 13, 21) and the complementary Lucas series (the chosen
6 numbers being 4, 7, 11, 18, 29, 47, 76),⁸⁰ and one main motif representative of the plant growth
7 hormone auxin, which is responsible for governing the formation of leaf buds on plant stems in
8 patterns often corresponding to Fibonacci or Lucas sequences.⁸¹ These numbers dictate both
9 pitch and rhythmic content. Taking an arbitrary pitch centre of E with an assigned value of 1,
10 pitches are then organised according to the number of semitones above E; therefore 2 becomes F,
11 3 becomes G, 5 becomes B, etc. Similarly, taking a semiquaver as the smallest unit,
12 corresponding to the number 1, a set of durations is derived for each number set.
13



14
15 Fig. 1 - Pitch correspondences in *Phyllotaxis*



17
18 Fig. 2 - Rhythm correspondences in *Phyllotaxis*

19
20 Computer processes could easily have been used to generate these systems, as seen in many
21 generative musical works— for example, Brian Eno’s *Generative Music I*, the documentation of

⁸⁰ Andreas N. Philippou, ‘Lucas polynomials’, in *Encyclopedia of Mathematics*
<http://www.encyclopediaofmath.org/index.php?title=Lucas_polynomials&oldid=35972> [accessed 12 February 2013]

⁸¹ Jönsson and others, p. 1635.

1 which, concerning both design and programming, has proved useful to this study.⁸² At the time
2 of composing *Phyllotaxis*, I did not yet possess robust enough programming skills to accomplish
3 this, though it is an area of research I am keen to revisit now that my knowledge of programming
4 languages and software packages useful in such an endeavour has improved (specifically Python
5 and Max/MSP, though I have also been researching the multimedia possibilities of the interactive
6 fiction programming environment Inform 7). As the intention in composing *Phyllotaxis* was to
7 keep the level of rhythmic and pitch complexity relatively limited to increase practicality and
8 playability of the piece (and particularly as the standard piano cannot produce microtones), it
9 became apparent that it would be more straightforward in this instance to generate materials non-
10 technologically.

11 The main motif representing auxin, shown in Figure 3 below, is designed relatively
12 arbitrarily in comparison to the other materials— the rhythmic profile matches the stresses heard
13 when the molecular composition, NH-OH-o, is spoken aloud. The pitch contour also roughly
14 corresponds to these stresses, as well as containing a repeated pitch, B, to represent the repeated
15 H. Additionally, the uppercase and lowercase O's are represented by a D sharp and the D natural
16 one octave below respectively. The pitches provide several points of consonance and dissonance
17 in combination with the two number sequence pitch sets. For example, the opening sections of
18 the piece contain the three pitch sets overlapped in such a way that intervals consist almost
19 entirely of widely-spaced perfect fourths and fifths, while as the piece progresses the
20 accumulation of intervals and the shifts in alignment between cycles of the pitch sets produce
21 more dissonant clusters, such as in mm. 148 – 149 (p. 11 in Portfolio Volume One) where major
22 and minor seconds appear in closer spacing.

23



24

25

Fig. 3 - 'Auxin' motif

26

27 The structure of *Phyllotaxis* is procedurally generated using the above-described materials
28 with the guiding principle being the accumulation of new material 'pushed' into place over the

⁸² Pete Cole and Tim Cole, *Generative Music*, <<https://intermorphic.com/sseyo/koan/generativemusic1/>> [accessed 28 March 2014]

1 course of the piece by instances of the ‘auxin’ motif, resulting in ever more layers of complexity
2 and interaction between the different instruments, as in a *katajjaq* game. The ‘auxin’ motif
3 appears at the beginning of each repeated section in the clarinet part, followed by the first note
4 and first duration of each set in the other two instruments, then the first two pitches and
5 durations, then the first three, etc. Each instance of the ‘auxin’ motif appears with proportionally
6 increasing frequency until the repetitions become indistinguishable as distinct segments. This
7 first results in six instances of the motif followed by a few notes of shorter duration and
8 successively decreasing periods of silence.

9 The results of these procedures cause a macrostructure to form: a period of accumulation
10 shifting from a predominance of suspenseful silences to busier activity, until there reaches a
11 point where all pitches and durations are in play and a continuous stream of activity occupies all
12 three instruments by figure G, creating both separate layers of the systems at work as well as a
13 combined melodic and textural overall whole. From figure G, the individual strands, heretofore
14 restricted to their designated instrumental parts, begin to be divided more freely amongst the
15 instruments and varied further in timbre by shifts of playing techniques, dynamics, and range
16 displacement. Additionally, the ‘auxin’ motif, while still appearing according to its system and
17 remaining in the clarinet part, begins to disappear within the texture, eventually vanishing
18 entirely at figure R, to create an effect of absence and foiled expectation. In essence, the clarinet
19 loses the game of endurance, or alternatively the vanishing motif could be heard as
20 representative of vanished tradition, memory, or natural environment.

21 The rhythmic and pitch content of the piece required occasional intervention after strict
22 deployment of the elements according to the structural system. In several instances rhythmic
23 results were unnecessarily complex and could be simplified for ease of reading and performing
24 without audible difference, and pitches sometimes needed adjusting (usually by octave) for
25 instrumental range or to make a specific figuration more playable in the context of its
26 surrounding passage. Overall, further interventions were deliberately limited as an exercise in
27 becoming familiar with working in a more strictly systematic way than in my past compositional
28 practice. One further alteration, less germane a point in this discussion of systematic methods,
29 was to shift the pitch content one semitone higher at figure N through to figure P in order to
30 highlight the peak section of intensity after such a lengthy stretch of duration during which the
31 listener becomes thoroughly familiarised with expected patterns of pitch content. This decision

1 was the result of subjective consideration and does not reflect the systematic design of the
2 material.

3

4 **Analysis of results of sonification and systematic processes in *Phyllotaxis***

5

6 The methods employed in *Phyllotaxis* I found to be constricting and, in particular, an
7 obstacle to the level of desired control over the structural shaping of pieces. In subsequent works,
8 similar systems are often used in a localised way, and the principle retained of ensuring that the
9 piece's concept permeates the compositional techniques as far as is possible in a medium of
10 abstract representation. The construction of systematic parameters serves as a useful starting
11 point while composing; however, systematic procedures are not adhered to in other works as
12 rigorously as in *Phyllotaxis*, but rather these ways of working are treated more flexibly and in
13 combination with other techniques.

14 My initial interest in sonification of 'natural memory', while strongly related to the other
15 research concepts for the portfolio, I judged too broad a field of work to combine with human as
16 well as technological memory within the scope of one project. It has proved useful, at least in
17 terms of focusing the areas of research in this portfolio, to preserve the distinction Eric F. Clarke
18 posits between memory itself and environmental shaping or adaptation— memory being active
19 and recursive, adaptation being more passive and progressing in a relatively linear fashion
20 (though of course, in reality, the distinctions between these processes are less definite).⁸³
21 Furthermore, many works using sonification are slightly at odds with my own compositional
22 framework for the portfolio. Some pieces encountered in the course of research have offered a
23 very interesting premise accompanied by music that is relatively unstructured by comparison and
24 lacking autonomy from the respective conceptual context; while I do not claim there is lesser
25 value in such approaches, my personal aims differ, and the resulting listening experiences are
26 fairly different. Specifically, the aim is to create pieces in which the structures on various levels
27 are clear to the listener, rather than a perhaps more purely meditative, ambient-listening
28 experience. Large-scale, slowly-changing works effectively act to foil or sabotage normal
29 perceptual categorisation within music-related memory functions,⁸⁴ while with regards to

⁸³ Clarke, p. 30.

⁸⁴ Snyder, pp. 237 - 238.

1 *Phyllotaxis* and several other relatively smaller-scale works in the portfolio the intent is to work
2 in accordance with memory processes in order to draw attention to their usual functions and
3 phenomena.

4 One example of sonification which initially piqued my interest in relation to composing
5 *Phyllotaxis* is John Eacott's ongoing work *Floodtide*. In this work, data is read from electronic
6 sensors submerged in tidal waters, processed through software written by Eacott which produces
7 the results in notation, and performed live by a mixed and variable ensemble, reading the
8 notation while processing is ongoing.⁸⁵ The aim of the piece is for the musicians and the
9 audience to experience the tidal patterns in a direct and meditative way.⁸⁶ The idea of providing a
10 way to experience with immediacy a natural pattern that occurs otherwise in near-silence and
11 near-invisibility was highly intriguing in connection with *Phyllotaxis*, though my compositional
12 approaches diverged significantly over the course of writing and the resulting piece stands in
13 some contrast.

14 In accordance with my first research concept, systems structuring works at multiple levels, I
15 found that more direct control was needed over the structural shaping of my pieces, rather than
16 allowing data to dictate structure with little mediation by myself. Typical sonification methods
17 also proved an inharmonious fit with my second research concept, reflection on the experience
18 and remembrance of music. The goal of most works using sonification is to present the data,
19 pattern, or process for the listener's focus and reflection, whereas I wish to present the work
20 itself (in essence, my commentary on the data, pattern, or process) as an object of attention and
21 contemplation. Therefore, sonification techniques have been useful as an early phase of
22 composing for pieces within this portfolio, while the final resulting work represents a number of
23 steps of mediation and manipulation of the original set of data or elements— a process during
24 which I am reflecting upon the music myself before it reaches the performer(s) and listeners.
25 While of course any sonification process incurs some mediation and alteration of the original
26 data set, the aim is to make the process of fairly extensive mediation a central aspect of most
27 pieces. Finally, the pieces aim to encompass the possibility of coherence for a listener even if this
28 listener might be unaware of the extramusical concepts embodied in the piece. While this is
29 partly achievable by a work based on sonification as any listener will obviously form their own

⁸⁵ John Eacott, 'Flood Tide: sonification as musical performance—an audience perspective', *AI and Society*, 27/2 (2012), 189-195 (p. 189).

⁸⁶ Eacott, p. 191.

1 thoughts and associations regarding any music they hear, this is more immediately achievable if
2 the music contains strongly-defined motivic organising principles. For example, in Eacott's
3 *Floodtide*, while aspects such as general harmonic language might be easily grasped by a
4 listener, other elements such as rhythmic patterning and overall structure would be difficult to
5 comprehend without knowing something about the source of the generating data, and due to the
6 variable instrumentation the timbral and textural features contain a higher degree of
7 randomisation than desired for this particular work.⁸⁷

8 *Phyllotaxis* has yet to receive any performance in its original trio form, though it was later
9 revised for flute, oboe, B flat clarinet, bassoon, horn, and piano, for performance by the Magnard
10 Ensemble during the 2016 MusicFest Aberystwyth composition course. The revised version
11 allows for much greater flexibility of timbre and more possibilities for blending of instrumental
12 parts, creating a more interesting surface texture and approaching more closely the principle of
13 auditory streaming present in *katajjaq*. Additionally, the structure has been adjusted slightly
14 (specifically tempi and length of pauses) to improve the proportions of structural sections and
15 give the piece a less rigidly mechanical, more playful feel to its unfolding. These changes were
16 the result of listening to and discussing the piece in workshops with the Magnard Ensemble. The
17 score for expanded instrumentation is included alongside the trio version in the portfolio (pp. 33
18 - 57 in Portfolio Volume One), and recorded excerpts of the sextet version are present as tracks
19 number 1 and 2.

20

21 **Use of systematic techniques in subsequent works**

22

23 While, as mentioned, the same level of rigorous generative procedures has not been used in
24 works other than *Phyllotaxis*, the general design principles of these systems has been fruitful as
25 regards the composition of other, subsequent pieces. This is particularly true of rhythmic
26 elements. Where pitch content has been derived from spectral analysis or other forms of analysis
27 (as discussed in Chapter Four) and timbral and structural elements have stemmed from pre-
28 existing sound or music sources (as discussed in Chapter Three), this has sometimes left

⁸⁷ I should note that Eacott himself questions these concepts and related issues as part of the ongoing work on the project, with an emphasis on audience and performer perception and reception as discussed in Eacott, pp. 189-195.

1 rhythmic elements without a basis in predecessor material and in need of a design principle with
2 the parameters of the specific piece in mind.

3

4 **Concepts and processes in *Mojennoù***

5

6 The piece which contains the greatest similarities to the methods used to compose
7 *Phyllotaxis* is *Mojennoù* (pp. 115 - 123 in Portfolio Volume One), written for two soprano and
8 one alto solo vocalists. It bears a conceptual resemblance to *Phyllotaxis*: the majority of the
9 material is based on another ludic singing tradition, this time *kan ha diskan* from Brittany.⁸⁸ The
10 choice of this source of influence relates to the text used in *Mojennoù*-- two poems, one in
11 Breton and one in French, by Breton writer, folklorist, and ethnographer Anatole Le Braz⁸⁹
12 (incidentally an ancestor of mine who worked with fellow ethnographers and authors François-
13 Marie Luzel and Théodore Botrel to document Breton music).⁹⁰ Excerpts from the two different
14 poems form the basis for two sets of musical materials. As with *Phyllotaxis*, I did not wish to
15 represent this vocal tradition in a strongly literal sense, though in this piece by nature of its use of
16 voices with minimal timbral differences is closer to its source of inspiration; rather, the intention
17 is to provide an interpretation of some features of *kan ha diskan* while also introducing further
18 degrees of interpretation and distancing- the varying, evolving nature of orally/aurally
19 transmitted tradition, the preservation efforts of Le Braz and his colleagues, Le Braz's own
20 expression of his Breton culture, contemporary environment, language, and personal and cultural
21 past through his poetry, and my own musical materials and ideas, newly-created but influenced
22 by the latter elements.

23 The first and longest section of the piece, running from the first bar to figure D, consists of
24 music based upon the *kan ha diskan* tradition⁹¹ in conjunction with the text in Breton. In *kan ha*
25 *diskan*, a partial call-and-response takes place between two or more singers: one singer (*kaner*)
26 begins a melody, joined partway through the phrase by the respondent (*diskaner*) or

⁸⁸ Yves Defrance, 'Le *kan ha diskan*: A propos d'une technique vocale en Basse-Bretagne,' *Cahiers De Musiques Traditionnelles*, 4 (1991) pp. 131 - 154.

⁸⁹ Anatole Le Braz, 'Du-hont', in Yann-Ber Piriou, *Au-delà de la légende... Anatole Le Braz: Essai biographique* (Rennes: Terre de Brume, Presses Universitaires de Rennes: 1999), pp. 359 - 360; Anatole Le Braz, 'Messe Noire', in *Poèmes votifs*, 9th edn (Paris: Calmann-Lévy, 1927), pp. 129 - 130.

⁹⁰ Bibliothèque National de France, 'Anatole Le Braz (1859 - 1926)', in *data.bnf.fr* <<http://data.bnf.fr/ark:/12148/cb11911531z>> [accessed 12 October 2014]

⁹¹ Defrance, p. 135.

1 respondents.⁹² The lead singer will then immediately begin the next phrase, often with some
2 overlap.⁹³ Both tempo and rhythm are maintained at a fairly relentless pace, while the melodic
3 lines are often varied, ornamented, and/or partially improvised.⁹⁴ The lead singer is judged based
4 on their skill at varying the melodies, the respondents on their ability to follow the lead singer
5 without errors, and the pair or group as a whole on their ability to keep the continuity of the
6 music throughout the session.⁹⁵ This bears a resemblance to the melodic streaming concepts
7 previously discussed, and also creates interesting opportunities for blended timbres and
8 spontaneous dissonances (similar to these same features arising from the near-unison voice and
9 guitar in the source music for *Night Studies*).⁹⁶

10 In this first section of *Mojennoù*, the pitch palette is limited to a set resembling the Dorian
11 mode centred on D, one of the typical pitch sets used in *kan ha diskan* (though pitch centres are
12 determined according to tessitura of the singers' voices).⁹⁷ The pitches appear in repeated but
13 slightly varying motivic cells, with a systematic widening of range accompanied by an increasing
14 pace of pitch-set change, shortening of phrases, and decrease in unison material between the
15 three voices. The pitch range reaches continually higher, first spanning from D4 to A4 (bars 1 to
16 17), then expanding up to D5 (bars 18 to 38), then to E5 (bars 39 to 40), F5 (bars 41 to 50), and
17 finally G5 (bars 51 to figure D). Meanwhile, the range also occasionally extends lower, to C4
18 beginning in bar 16, and then including A3 beginning at figure C. As the pitch set widens, the
19 motifs become progressively more distributed across the three parts, breaking up melodic lines
20 and increasing both fragmentation and auditory streaming; in conjunction, the text becomes
21 fragmented as well, progressing from lines of the poem to small groupings of words to single
22 words and finally syllables (bars 46 to figure D).⁹⁸

⁹² Ibid., p. 137.

⁹³ Yves Defrance, 'Le *kan ha diskan*: A propos d'une technique vocale en Basse-Bretagne,' *Cahiers De Musiques Traditionnelles*, 4 (1991), pp. 131 - 154 (p. 138).

⁹⁴ Ibid., p. 137.

⁹⁵ Ibid., p. 137.

⁹⁶ For highly typical examples of *kan ha diskan*, see Les soeurs goadec, *Konskried Sant Nikolaz*, online video recording, YouTube, 4 November 2009 <<https://youtu.be/ISWwHQXt0d8>> [accessed 13 October 2014] or Les frères Morvan, *Les frères Morvan*, online video recording, YouTube, 8 August 2009 <<https://youtu.be/H0CQTFZIDkU>> [accessed 13 October 2014].

⁹⁷ Defrance, p. 138.

⁹⁸ In this particular piece, the intelligibility of the text was secondary to its sound potential, and I have treated it as a motivic aspect alongside rhythm, pitch, and melody rather than as a strictly literary text. Therefore I will refrain from detailed analysis of the relationship between this text and the music, or my interpretive thoughts on the poems, for the moment, other than to note that I did endeavour to retain something of the contrasting moods of the two poems as I interpreted them—liveliness juxtaposed with melancholy.

1 The second major structural section of *Mojennoù*, lasting from figure D to bar 103,
 2 deliberately undermines and resists the systems employed in the rest of the piece to accompany
 3 the change in text (a new extract from a poem, also by Le Braz, in French). The material here
 4 focuses on harmony, with a succession of chords formed on the basis of shared pitches and
 5 avoiding any sense of functionality. This harmonic approach is quite similar to John Cage's
 6 *Quartet in Four Parts*, where sense of functionality has been deliberately avoided in order to
 7 promote a sense of stasis; it could also be considered as a more limited, less chromatically dense,
 8 and less rigorously methodical, yet nevertheless related, approach to Mauricio Kagel's 'serial
 9 tonality'.⁹⁹ Such harmonic approaches will be discussed further in Chapter Four.

10



11

12

Fig. 4 - Chords employed from figure D to figure F in *Mojennoù*

13

14 **Instances and influence of systematic techniques in other works**

15

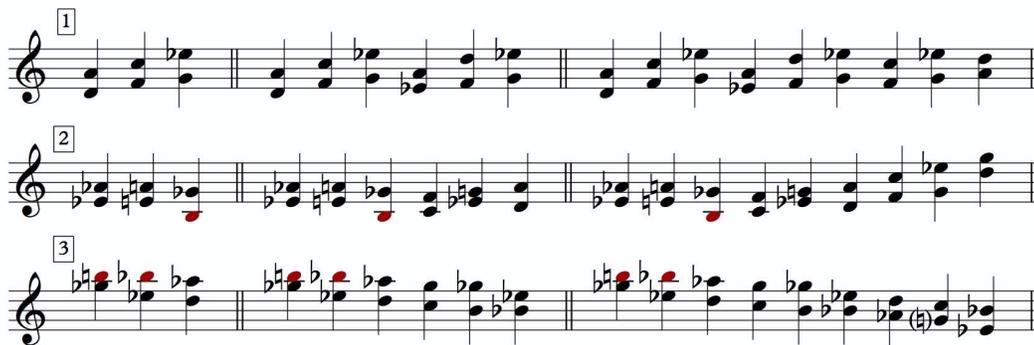
16 While *Mojennoù* contains perhaps the most straightforward usage of procedural systems,
 17 similar features appear in several other pieces. Most notably, similar motivic development that
 18 informs structure appears in the three *Lost Museum* pieces, which are discussed in detail in
 19 Chapter Seven. With other works, there is somewhat less focus on motivic aspects as primary
 20 sources of structure and design, and more upon systemisation of harmonic and/or timbral
 21 aspects; a work that would fall into this category is *Night Studies*, discussed in detail in Chapter
 22 Five. Most pieces represent a hybrid of these approaches, with systemisation forming one strand
 23 of an integrated process— for example, *Artefacts*, *Timestamp*, *Triskelion*, *Sur le borde de l'eau*,

⁹⁹ Björn Heile, 'Collage vs. Compositional Control: The Interdependency of Modernist and Postmodernist Approaches in the Work of Mauricio Kagel', in *Postmodern Music/Postmodern Thought*, ed. Judith Lochhead and Joseph Auner (New York and London: Routledge, 2002), pp. 287 - 299 (p. 292).

1 *Afterimage*, and *And am I born to die?* all contain some aspects of similar systematic design,
2 especially in terms of rhythmic motifs.

3 In particular, *Triskelion*, with its tripartite spiral-based motifs, represents succinctly a
4 systematic design employed with a degree of flexibility. A triskelion is a symbol constructed
5 from three connected spirals; hence, this piece consists almost entirely of rhythmic groupings of
6 threes (for example, bars 8 - 12). As the piece continues, the groupings of three are somewhat
7 obscured, leading to a point where clearly rhythmic material completely vanishes for a few
8 measures (bars 43 - 50) before reappearing in the descending, converging figurations that form
9 the ending of the piece (bars 51 - end). Thus the overall piece is a group of three segments,
10 though their borders are slightly elided. The pitch material similarly is constructed on a principle
11 of groupings of threes: three sets of dyads, internally grouped in sets of three, six, or nine. The
12 three pitch sets, illustrated below in Figure 5, are constructed to follow arbitrarily-composed
13 rising or falling contours that give the impression of flexible patterning (e.g. the rising third
14 and/or stepwise motion seen in the lower notes of set one in Figure 5).

15



16

17

Fig. 5 - Pitch sets in *Triskelion*

18

19 The pitches appear according to this design, mapped onto subtly shifting rhythms. The
20 resulting piece achieves a balance between generative design and expressive flexibility; the latter
21 aspect is one considered important in this particular piece; performed by a soloist, it therefore
22 benefits from some room for freedom and expressive colour. In addition to the desire for
23 flexibility, the design of this piece was kept very simple as the piece is quite brief, based upon
24 one relatively small idea (the symbol of the triskelion), and has a fairly spare, almost austere
25 character. In my estimation it would not readily bear a more rigorous or mathematical approach

1 such as in *Phyllotaxis* and the generative portions of *Mojennou*. This work therefore represents a
2 synthetic approach to systematic and intuitive composition.

3 One work in which compositional processes have in fact run counter to the type of
4 systemisation previously described is *Paper Imitation*, where overall disunity is a deliberate
5 feature of the piece; each section contains its own material following its own, local-level
6 parameters. Aspects of the latter will be discussed further in Chapter Three.

7

8

Chapter Three - 'Found' sounds and collage as conceptual and structural basis

Composing with borrowings vs. generative processes

The employment of pre-existing musical or sound sources (which have largely been treated as fluid and nearly interchangeable rather than distinct categories) has formed a major foundation for all of the works contained in this portfolio, whether as the starting point for the design of new musical materials as outlined in Chapter Two, or as elements that themselves form the structure and material of a piece while undergoing varying degrees of manipulation, transformation, or translation. These two approaches— creation of new materials and manipulation of extant materials— are, I argue, different expressions of the same process of encountering and interpreting sources from past and present environments, and not as diametrically opposed as they may seem. Rather it is a matter of adjusting where in the musical process the sources appear— during composition, performance, or listening— which in turn creates differing effects and experiences. This creates a dialogue between these stages or levels of processes and adds to interpretive and experiential richness. Berio writes that such explorations of referentiality create ‘a musical space inhabited by the significant presence of absences and by the echo of absent presences.’¹⁰⁰ In other words, the musical space occupied by the work comes into dialogue not only with its own immediate materials, but also its history, its points of connection to the past and other music or sound experiences, and the references brought to it by its audience as well.

In accordance with the concept of placing sources at different points of a spectrum of composition and experience, the focus is shifted in some pieces from pre-compositional use of extant materials (as seen in the works discussed in Chapter Two) to the incorporation of ‘found’ sounds, quotations, references, and ‘samples’ (whether literal digital samplings or non-electronic borrowings) directly within the resulting piece, with varying levels of transformation interposed. The approach differs from piece to piece in order to achieve the conceptual or perceptual effects specific to each work. Throughout, varying levels of unity versus disjunction and the effect juxtaposition of materials exerts upon the perception of these aspects is explored, as well as differing levels of potential recognisability or ‘presence’ of borrowed materials.

¹⁰⁰ Berio, p. 29.

1 I make a slight distinction between ‘found’ sounds and collage: ‘found’ sounds denote the
2 use of one or more pre-existing sounds and/or music materials as the basis for elements that have
3 been newly composed or constructed from transformed versions of such materials, while collage
4 refers to instances where pre-existing sounds and/or music (more or less transformed) appear
5 more directly within a piece. Of course, within most pieces both categories are employed in
6 tandem, and the boundary between them is fluid.

7 Numerous pieces in the portfolio feature forms of collage as a primary principle of structure;
8 I will first discuss *Artefacts* (Appendix 1, pp. 19 - 53 in Portfolio Volume Two), as this piece and
9 its research and composition have strongly informed all subsequent work.

11 ***Artefacts and influence on further works***

12
13 The first version of *Artefacts* for symphony orchestra was originally composed as part of a
14 master’s degree in 2012¹⁰¹ prior to beginning the PhD, after which revisions and reworkings
15 were carried out through the course of workshopping the first movement with the BBC National
16 Orchestra of Wales as part of the March 2014 Composition:Wales programme and then
17 preparing the complete piece with the Bruckner Orchester Linz for performance as part of the
18 September 2014 Ars Electronica Festival in Linz, Austria. This foundational piece and the
19 methods employed while composing and revising it represent a shift from my previous practice,
20 and have formed a basis for this portfolio and my subsequent work. As this piece has been
21 instrumental to the remainder of the works contained in the portfolio, and some of its
22 composition overlapped with the commencement of this PhD project, I include the most recently
23 reworked incarnation (from September 2014) in Portfolio Volume Two, and will discuss the
24 piece here for reference, as I have not previously described or analysed this piece other than in
25 programme notes.¹⁰²

26 The three movements of *Artefacts* describe a narrative arc progressing broadly through stages
27 of accumulation, transformation, and finally, decay. The first movement mimics learning and
28 memorisation habits which are common to children as well as other young animals, such as

¹⁰¹ Julia E. Howell, ‘Artefacts’ (music score, unpublished thesis, Cardiff University School of Music, 2012).

¹⁰² The unpublished thesis referenced above consists of the score (a different, earlier version than the one contained within Portfolio Volume Two of this present work) with a programme note, but no further accompanying text, per the regulations then in place for the degree.

1 songbirds and whales: the imitation and mental or physical rehearsal of snippets of sound in
2 order to learn specific songs.¹⁰³ Over the course of these processes, the original sound is often
3 transformed or distorted, through misremembering, reordering, or otherwise altering the structure
4 and content, for example through repetition. The second movement draws on street music
5 experienced during several years of living in New Orleans to reflect on the effect of music
6 moving through public space and how it engages with tradition and collective memory, in a
7 manner not dissimilar to some of the works of Charles Ives.¹⁰⁴ The final movement represents a
8 decay of memory, with a highly fragmented use of small musical units and the inclusion of
9 distorted echoes of material heard in the previous movements. The representation of these
10 concepts is primarily achieved through the use of collages constructed from specific source
11 materials.

12 All subsequent pieces of mine have been strongly influenced by work on *Artefacts* and its
13 process of workshops, rehearsals, and performance. Other works most closely allied with the
14 topic of collage, ‘found’ sound, and memory-influenced structures include *Timestamp* and *Night*
15 *Studies* (both of which I will discuss in more detail in Chapter Five); *La sirène engloutie*,
16 *Afterimage*, *Lunar Echoes*, and *Sur le borde de l’eau* (discussed further in Chapter Six); the three
17 *Lost Museum* pieces analysed in Chapter Seven; and *Paper Imitation* and *Carried on the Air*.

18

19 **Employment of borrowed material in *Artefacts* as basis for further explorations**

20

21 The first movement, ‘Largo sostenuto,’ treats as source material a recording I made during an
22 informal musical gathering in the living room of my aunt’s New Orleans home— specifically of
23 family friend Gina Forsyth, a Cajun fiddle player, performing her own song ‘Sparrows’ on violin
24 and voice.¹⁰⁵ The recording provides a rough snapshot of these sessions, which my aunt has been
25 hosting for several decades, primarily with the same core set of players who often performed
26 from setlists that were established over this time. The house was partially destroyed by flooding
27 during Hurricane Katrina in August 2005, and many of the usual musical guests displaced far

¹⁰³ Petr Janata and Daniel Margoliash, ‘Gradual Emergence of Song Selectivity in Sensorimotor Structures of the Male Zebra Finch Song System’, *The Journal of Neuroscience*, 19/12 (1999), pp. 5108 - 5118 (p. 5108).

¹⁰⁴ Specifically, I studied Ives’ *Three Places In New England* in relation to composing *Artefacts*. See also J. Peter Burkholder, *All Made of Tunes: Charles Ives and the Uses of Musical Borrowing* (New Haven and London: Yale University Press, 1995).

¹⁰⁵ Gina Forsyth, ‘Sparrows’, unpublished audio recording, rec. by Julia E. Howell (2 February 2004).

1 afield. This sudden and dramatic dispersal of a small musical community important to my family
2 life and my own childhood, which had been characterised by such strong continuity, caused me
3 to reflect on my personal formative musical memories and how music-related memories are
4 formed more broadly. Furthermore, the aim of the piece is to explore how memories of music
5 relate to the preservation and continuation of the music in question.

6 Listening to the aforementioned recording on several occasions, some small features were
7 identified as particularly intriguing or salient to this particular performance. One feature was the
8 blurring effect created by the voice and the fiddle sounding in unison, but having a slight
9 mismatch in timbre, pitch, and/or timing (a feature also explored in *Night Studies* and *Mojennoù*
10 explicitly, and occasionally appearing in other works as well, such as *And am I born to die?* and
11 *Lost Museum III: Llyn*). Another was the use of the open A string with a stopped A in unison,
12 common in Cajun fiddle technique, which creates a distinctive blended timbre. Additionally, I
13 wished to capture something of the experience of listening to the recording itself. The recording
14 only begins partway through the song, catching it mid-phrase, and the other participants can be
15 heard discussing that this is a new song that they would like to learn. This latter aspect, captured
16 somewhat accidentally in the recording, reflects the process of learning and memorising new
17 songs by listening, remembering, and rehearsing or replaying a musical memory mentally over
18 time.

19 These features of particular interest having been identified, small snippets of the recording
20 were then isolated, transcribed, and transformed into motivic ideas that develop and unfold over
21 the course of the first movement. This technique of sampling and digitally manipulating
22 recordings, then transcribing and translating them (with further transformations), later became an
23 important strand of compositional process in other works in the portfolio, and will be discussed
24 further in Chapter Five. In this first movement of *Artefacts*, only a limited collection of pitches
25 (A, E, F sharp, G sharp, C sharp) is heard at first, with no overt motivic definition— there is no
26 clear rhythmic or melodic profile. Gradually, motifs are implied by the use of spaced repetition,
27 with the sliding figure outlining a major or minor third becoming an identifiable, persistent
28 feature beginning at bar 11. The aforementioned bariolage figuration (stopped A, open string A)
29 begins to appear in bar 23.

30 Through an increase in rhythmic activity, progressively denser layering of instrumentation,
31 shortening of duration between repetitions of these motifs, and occasional punctuating solos

1 from individual string players, an effect of accumulation or acceleration becomes apparent by
2 figure D (and continuing beyond). In bar 57, a third motif begins to appear (first heard in the first
3 horn part): a descending third, G to E, which contrasts with the rising third figure (in particular
4 the instances where E moves to G sharp). This sets up the central point of tension in the piece:
5 the dissonance between G natural and G sharp, adding modal inflection of the 7th scale degree to
6 the pervading suggestion of A major tonality.

7 Meanwhile, longer melodic lines appear from figure D onwards in the woodwinds, building
8 upon previous phrases (reflecting the concept of memory rehearsal, and also strongly linking to
9 the systematic generative techniques, which represent a direct extension of techniques employed
10 in this movement, outlined in Chapter Two). The first appearance of an unaltered motif taken
11 from the recording appearing in its entirety is at bar 73 in the first violin; the motif's pitch
12 content, interval contour, and rhythmic profile have already been heard in diffused, rhythmically
13 augmented, and orchestrationally varied forms, so this appearance should simultaneously draw
14 attention and feel familiar. This method of 'rehearsing' disguised motifs that become fully
15 apparent over time appears in several other works in the portfolio as a direct result of the
16 satisfactory effects achieved in *Artefacts*, movement one, including *Timestamp*, *Sur le borde de*
17 *l'eau*, and *Lost Museum I: Lamentation*.

18 At the same time as this quasi-retrospective motif is revealed in its full form, the low brass
19 take over the extended form of the descending third motif and, once joined by cellos and double
20 basses, begin to bring it to more prominence, creating a point of dynamic and textural climax at
21 bar 78. Here all previous material already heard is in play at once— different elements of the
22 piece have been heard, repeated, and 'learned' or become familiarised. The dense tutti texture
23 now dwindles, with some last melodic snippets recalled in bars 82 and 83. At figure F, a much
24 thinned instrumentation repeats key motifs in slightly transfigured form: the G sharp/G natural
25 tension has been resolved, with G sharp having dropped out entirely, a new emphasis on G
26 natural as pitch centre, and some auxiliary pitches shifted down a semitone (C natural, F natural).
27 A last G sharp interjection in the double basses, however, gently undermines a total shift.

28 As evident from the compositional procedures outlined above, the first movement of
29 *Artefacts* represents something of a hybridisation between the type of generative, motive-based
30 techniques analysed in Chapter Two and the use of re-interpreted, borrowed elements. This
31 particular method of composing— listening to and analysing recordings, isolating certain

1 distinctive features, and interpreting and transforming them into new yet referential materials—
2 has become an important schema for the composition of many other pieces in the portfolio,
3 appearing within *Night Studies*, *Timestamp*, *Sur le borde de l'eau*, *Carried on the Air*, *Paper*
4 *Imitation*, *And am I born to die?*, and the *Lost Museum* triptych.

5 Showing some degree of contrast, the second movement, 'Allegro con brio', employs
6 relatively straightforward collage techniques. A collection of several related recordings formed
7 the sources: personal recordings of marching bands from Mardi Gras parades I attended during
8 February 2006 (the first festival held post-hurricane) and recollections of Haitian rara music
9 (processional music associated with public vodou ritual, heard during another street parade in
10 2007), as well as an older recording of the Balfa Brothers performing the traditional Cajun song
11 'La danse de Mardi Gras'¹⁰⁶. Aside from personal connection, these particular sources were
12 chosen because of their associations with cultural and collective memories and ritual; each of the
13 musical traditions represented exists to accompany specific, highly formalised collective
14 experiences that contribute to identity formation and transmission of past tradition (functions
15 described more broadly as ubiquitous phenomena of collective memory and social cohesion by
16 Maurice Halbwachs).¹⁰⁷

17 While these traditions seemingly provide a strong connection to a past shared history, they
18 also represent imperfect remembrances. The alteration of these specific sources was further
19 exacerbated by the particular environment at the time of recording (in the case of the live
20 recordings)—the immediate aftermath of the hurricane, when there was profound disruption and
21 dispersment of the usual social communities that produced this music. Additionally, the
22 recordings themselves capture only one version of particular portions of these traditions at a
23 specific time, again echoing Halbwachs—'each memory is a viewpoint on the collective
24 memory'.¹⁰⁸ Here, I equate recording to a form of memory in the sense of a heard and stored
25 experience, especially since I made three out of the four sets of recordings myself; in this case,
26 these music and sound sources were perceived both by a microphone and personally, and
27 retrieved both digitally and mentally. Following on from this movement of *Artefacts*, the

¹⁰⁶ The Balfa Brothers, 'La danse de Mardi Gras (feat. Dewey Balfa, Rodney Balfa & Will Balfa)', *The Balfa Brothers Play Cajun Traditional Music, Vol. 1 & 2* (Swallow, 6011, 1990).

¹⁰⁷ Halbwachs, *The Collective Memory*, cited in Erll, pp. 15 - 16.

¹⁰⁸ Halbwachs, *The Collective Memory*, cited in Erll, p. 16.

1 treatment of technology as a form of external memory or extension of memory is further
2 explored in *Timestamp*, *Night Studies*, *Sur le borde de l'eau*, and the *Lost Museum* pieces.

3 The second movement, in contrast to the first, uses layered blocks of material based upon the
4 sources described above, bringing it closer to the traditional sense of a collage. This movement
5 represents something of my listening experience at the time these sources were encountered:
6 namely, in a crowded festival environment, hearing different music approach and recede over the
7 course of the parades and my own movements around the space. The motion of sound sources in
8 this environment produced interesting distortions, shifts, and transfigurations of the music.
9 Therefore, the second movement is comprised of sections of differing (occasionally clashing)
10 music based (somewhat freely) upon the aforementioned sources, where certain elements of the
11 musical 'block' become audible before others and similarly fade in a patchwork fashion. This
12 listening phenomenon, where audibility and comprehensibility change according to motion,
13 subject position, and auditory filtering, is an idea which returns in several other pieces as a direct
14 result of the composition of *Artefacts* (specifically *Night Studies*, *Paper Imitation*, and
15 *Afterimage*).

16 In addition to the listening effects caused by literal, physical motion, the movement explores
17 the sometimes disorienting phenomenon of experiencing a sense of motion caused by listening to
18 music even when the listener is still. This effect seems to be imperfectly understood on a
19 cognitive basis, but nevertheless it is a common and documented experience to sense that
20 something or someone (perhaps oneself, though not always) is in motion while listening to
21 music¹⁰⁹ (usually in a forward direction).¹¹⁰ The layers of different rhythmic activity in *Artefacts*'
22 second movement, occurring at differing rates and in unrelated patterns, aim to create a sense of
23 constant and irregular motion. The uncondensed section (at figure K) brings these layers,
24 cohesive within themselves but disjunct in combination, into a swirl of chaos, where tempi and
25 rates of speed become further destabilised.

26 In constructing these somewhat nonlinear collages of competing and combining musical
27 'blocks' that nevertheless retain a sense of teleology or continuity of concept, this composition
28 was also influenced by Berio's *Sinfonia* and *Rendering*, Kagel's *1898*, Philippe Manoury's
29 *Sound and Fury*, Ravel's *La Valse*, Lutosławski's *Concerto for Orchestra*, and John Cage's

¹⁰⁹ Clarke, pp. 91 — 125.

¹¹⁰ Clarke, pp. 91 — 125.

1 *Imaginary Landscape* series, in addition to the aforementioned research into spatial aspects of
2 Ives' use of collage and borrowing.¹¹¹ These pieces all share features with mine beyond the mere
3 presence of some use of collage, in that they use multilayering of different materials, often
4 proceeding at different or variable tempi, to create a combined effect of unpredictable motion,
5 disorientation, sense of space, or an amalgamation of these features. Continued study of each of
6 these works mentioned and the different effects achieved has also proven influential in relation to
7 composing other works in the portfolio (for example, further study of *1898* impacted the
8 composition of *Paper Imitation*).

9 The third movement of *Artefacts* deals with decay and absence, displaying a sparser type of
10 collage containing incomplete references that purposely do not develop. The main sources for
11 this movement are two recordings of family members, now deceased: firstly, the 'strumming'
12 figure in the strings is based upon a tape of my young cousin imitating a blues song with
13 accuracy of figurations and style despite not yet knowing how to form chords on his guitar;
14 secondly, the snatches of melody are derived from recordings of my grandmother singing songs
15 remembered from her youth despite advanced dementia. The spare passages composed from
16 these sources are then interspersed with unconduted sections similar to the passage seen at
17 figure K in the second movement, but containing a greater quantity of layered materials. The
18 effect of these passages is a kind of sudden telescoping of previously-heard music— a flattening
19 of time and space. The concept represented by the third movement is a contemplation of how
20 remnants of the past are left behind almost at random, in the form of some memories or audible
21 artefacts that survive over time (though altered) as others are lost. This exploration of fragments
22 and absences progressed in the wake of this movement's composition, and can also be seen in
23 *Night Studies*, *Sur le borde de l'eau*, *And am I born to die?*, *Afterimage*, and the *Lost Museum*
24 set. The difficulties of suggesting absence while also using quotation and reference, and
25 maintaining some sense of motive, are examined further in the latter pieces, as *Artefacts* does not
26 completely address this issue. In the pieces mentioned above, there is some experimentation with
27 differing levels of presence and disappearance of quoted material, effectively shifting references
28 to the foreground or background of the musical space and making referential aspects more or less
29 potentially recognisable to the listener.

¹¹¹ Regarding spatial aspects of Ives' music in particular: Jennifer Iverson, 'Creating Space: Perception and Structure in Charles Ives's Collages', *Music Theory Online: The Online Journal of the Society for Music Theory*, 17/2 (2011) <<http://www.mtosmt.org/issues/mto.11.17.2/mto.11.17.2.iverson.php>> [accessed 6 April 2013].

1 Collage in Night Studies

2
3 The string quartet *Night Studies* (pp. 59 - 91 in Portfolio Volume One), begun in 2013, is
4 directly influenced by methods and techniques devised in *Artefacts*. *Night Studies* is an
5 exploration of the process of sampling, transformation, and translation of recorded sources most
6 prevalent in the first movement of *Artefacts*, applied on a more focused, smaller, yet more
7 detailed scale. These methods, as employed in *Night Studies*, will be addressed further in Chapter
8 Five, though it is worth noting some aspects of collage and structure here. Instead of presenting a
9 collage in the usual sense of multilayering of heterogeneous materials (such as in movement two
10 of *Artefacts*), *Night Studies* unfolds as a collage over the course of the five movements. Each
11 movement focuses on a different facet of one source recording (blues musician Blind Willie
12 Johnson's *Dark Was the Night, Cold Was the Ground*). In effect, it presents a collection of
13 different, indirect, mediated viewpoints onto the same object. Rather than a collage that is mainly
14 constructed in space (e.g., a broad field of layered materials occurring more or less
15 simultaneously), it is a collage primarily constructed over time, the different sections of material
16 effectively assembling a collage within the recent memory of the listener as they hear each
17 movement in succession. This process of cumulative collage indirectly mimics the listening
18 experience the piece is intended to capture: through repeated listenings, 'new' sound features
19 actually become more apparent as the listener's brain becomes more familiar with sound
20 elements that vary and those that remain constant.¹¹² *Night Studies* presents a collection of such
21 variable, more transient features heard (by myself) in the recording, unfolding over time for re-
22 interpretation by the listener and re-contextualised by the juxtaposition of the different materials
23 in each movement within a variegated but cohesive whole.

¹¹² Clarke, pp. 32 - 34.

1 *Paper Imitation: montage and disunity*

2
3 Unlike other works in the portfolio where unity and cohesion at multiple levels is a structural
4 premise, *Paper Imitation* aims to use collage for a much more fragmentary effect, with a
5 different structural result. *Paper Imitation* (pp. 153 - 197 in Portfolio Volume One) is a piece for
6 Pierrot ensemble (with bass clarinet replacing B flat clarinet) commissioned by the Lontano
7 Ensemble. In contrast to other works in the portfolio where unity was an important feature,
8 *Paper Imitation* is characterised by strong contrasts and sudden juxtapositions of very different
9 materials. The piece is based on Bruno Schulz's short story *The Street of Crocodiles*,¹¹³ and
10 loosely aesthetically influenced by two works responding to Schulz's story: the film of the same
11 title by the Brothers Quay with music by Leszek Jankowski,¹¹⁴ and Kamil Turowski's
12 photographs referencing Schulz's work.¹¹⁵ Additionally, some of the sounds incorporated allude
13 to the nocturnal ambiance of urban neighbourhoods in which I have lived. In *The Street of*
14 *Crocodiles*, the reader is escorted by an anonymous narrator through a series of vignettes of a
15 fictional city, a collage of scenarios presented as both dangerous and delightful, shoddy and
16 intriguing. Time is handled fluidly in the story, blending memories and imagined scenes with
17 action occurring in the present. The title of my piece is derived from the final paragraph of the
18 story:

19
20 'The Street of Crocodiles was a concession of our city to modernity and metropolitan corruption.
21 Obviously, we were unable to afford anything better than a paper imitation, a montage of illustrations cut
22 out from last year's mouldering newspapers.'¹¹⁶
23

24 Originally, *Paper Imitation* was sketched as a multi-layered, flexible, at times open-scored
25 piece, more akin to a typical surrealist collage in the visual arts, such as those of Schulz's
26 contemporary Hannah Höch. Related works studied in connection with this type of structure
27 include Berio's *Circles*, Boulez's Third Piano Sonata, Stockhausen's pieces which employ
28 moment form, Kagel's *1898*, and Chin's *Akrostichon-Wortspiel*. A flexibly- or open-scored
29 format was difficult to achieve in *Paper Imitation* due to the size of the ensemble and difficulty

¹¹³ Bruno Schulz, 'The Street of Crocodiles', in *The Street of Crocodiles*, trans. by Celina Wieniewska (London: Penguin Books, 1992), pp. 99 - 110.

¹¹⁴ *Street of Crocodiles*, dir. Stephen and Timothy Quay, music by Leszek Jankowski (Atelier Koninck, 1986).

¹¹⁵ Katarzyna Marciniak and Kamil Turowski, *Streets of Crocodiles: Photography, Media, and Postsocialist Landscapes in Poland* (Bristol, UK and Chicago: Intellect, 2010).

¹¹⁶ Schulz, p. 110.

1 of coordinating and rehearsing the different instrumental parts, and a more fixed form proved
2 necessary for practical reasons. This also fits more closely with the structure of the story,
3 creating a cinematic montage that unfolds over time, as opposed to several layers of material
4 competing in the same temporal space.

5 The piece is built from three categories of materials: a ‘fog’ or ‘static’ texture, comprising
6 microtonal pitches chosen from spectral analysis of a foghorn¹¹⁷ and indistinct, wavering motifs
7 that appear and disappear, reminiscent of the sounds of an electrical substation in my Cardiff
8 neighbourhood; a scherzo collage, including snippets of motifs drawn from (but transformed and
9 fragmented so they are only obliquely referential) ragtime, the Squirrel Nut Zippers’ ‘Ghost of
10 Stephen Foster’,¹¹⁸ Brahms’ ‘Rondo alla zingarese’ from the Piano Quartet No. 1 in G minor,
11 Op. 25, the ‘foxtrot’ from Shostakovich’s *Jazz Suite No. 1*, and recordings by the New Leviathan
12 Oriental Fox-Trot Orchestra; and ‘mechanical’ thematic material, using percussive and
13 interlocking figurations to create a combined texture resembling machinery sounds. The
14 fog/static can be seen from the beginning of the piece to figure C, the scherzo material from
15 figure C to figure I, and the machinery elements from I to L; a coda from L to the end briefly re-
16 establishes the static texture of the opening, with some fragmentary motifs appearing to
17 contribute to a sense of incompleteness. Within these four larger sections, the materials ebb and
18 flow, transforming or fragmenting; for example, from figure A to B the music seems to build in
19 activity by increase in rhythmic activity and timbral changes only to subside again at figure B,
20 while from figure G to figure I the instruments drop out or slow their activity in an irregular
21 manner, creating an effect of deterioration. The overall principles of the piece are contrast,
22 disjunction, and incompleteness. In this portrayal of decay and absences, there are stylistic
23 similarities to the *Lost Museum* pieces, or the final movement of *Artefacts*.

25 ***Carried on the Air*: referentiality without quotation**

26
27 *Carried on the Air* (pp. 1 - 14 in Portfolio Volume Two) differs slightly from other works in
28 the portfolio in its usage of pre-existing music. The intention was to compose in such a manner

¹¹⁷ Julia Innes, ‘Brume_criquets_Sillery_septembre.A1_01’
<<https://freesound.org/people/innesjul/sounds/199961/>> [accessed 15 Aug 2014] [public domain].

¹¹⁸ Squirrel Nut Zippers, ‘Ghost of Stephen Foster’, *Perennial Favorites* (Mammoth, 1998).

1 that the result would closely resemble a quotation, though in reality there are no direct
2 quotations, only the referential contents of my own memory. This piece was commissioned for a
3 European String Teachers' Association workshop day held at Cardiff University School of Music
4 on the seventh of February, 2016. The given parameters were *concerto grosso* string ensemble
5 instrumentation, two minutes' duration, a specific harmonic figuration (for pedagogical
6 purposes), and accommodation of an ability range from young beginners to professional players.

7 In connection to the first requirement, *concerto grosso* instrumentation, the piece was
8 devised as a response to the *concerti grossi* for strings by Corelli, the innovator of the genre.¹¹⁹
9 After listening to the Opus 6 set of *concerti grossi* (familiar to me from past experience as a
10 violist) several times, some distinctive, memorable, and reasonably common figurations were
11 sketched out from memory (inevitably and intentionally not quite accurately). These include the
12 descending scale patterns, oscillating octave leap figures, portato bowing, and pizzicato
13 punctuation, seen, for example, from figure A to figure B, as well as the long, imitative melodic
14 lines seen in the three soloists' parts. These figures are overlapped and offset to create a sense of
15 blurring or indistinctness through the divided ensemble (violin, viola, and cello sections each
16 being divided into two parts). As at least some of the parts were required to be playable with
17 little rehearsal by a group that included young learners, the rhythms and harmonic content are
18 kept very simple, and the tempo slow; this also contributes to the blurring effect by causing the
19 motifs to be heard in a less detailed or complex form, as if at a distance or slightly degraded from
20 their original appearance, and at a slightly slower tempo than usual, similar to a record playing at
21 the incorrect speed, a tape deck winding down, or digital timestretching. The overall effect of the
22 piece is of distance and distortion.

23 The version of the score included in the portfolio represents a more advanced and complex
24 update of the piece created for an opportunity to have the piece read by more experienced players
25 than the first incarnation (the Orion Orchestra, at MusicFest Aberystwyth in July 2016,
26 conducted by festival participant Kelvin Lee). This version contains slightly more variety in the
27 pitch content and harmony, more offsetting of figurations to enhance the blurred effect, and the
28 insertion of some new material (as seen from the beginning to figure A, for example) that adds
29 contrasting rhythmic activity and timbral roughness due to the more varied bowstrokes required.

¹¹⁹ Michael Talbot, 'Corelli, Arcangelo', in *Grove Music Online* in *Oxford Music Online*, (Oxford University Press) <<http://www.oxfordmusiconline.com/subscriber/article/grove/music/06478>> [accessed 5 January 2016].

1 This enhances the level of distortion in the piece, reminiscent of a much-simplified version of the
2 representation of radio static in Salvatore Sciarrino's *Efebo con radio*. The new version, while
3 still quite brief in duration, better conveys the concept— that of snatches of music that sound
4 familiar but can't quite be recognised, heard from a distance via radio or other mediating
5 transmission medium.

6

Part Three - Harmony and Pitch

Chapter Four - Harmony and use of spectral or other harmonic analysis

Harmonic approaches

In accordance with the first research principle of the portfolio, systemisation on multiple levels to form cohesion, harmony and pitch content has been approached within much the same frameworks as other aspects such as rhythm, duration, and structure, and therefore has not been treated as an independent feature of primary importance. This has resulted in a selection of related but differing approaches, varying with each work to fit the piece's individual parameters, as overall unity of concept and design is important to the compositions as a group (as discussed in Chapter One, section one, p. 6). In effect, each piece contains a relatively individualised harmonic language. As harmony is subservient to other governing principles and pitch has been discussed in relation to the principles operating within specific pieces at other points within the commentary, I will not focus in great depth on harmonic analysis of individual works in this chapter; nevertheless there are some distinctive common features of the harmonic schemes present in the portfolio, which I will briefly categorise.

Generated pitch sets

As seen in Chapter Two, in some cases pitch sets for use within a piece have been generated in a systematic way reflecting the conceptual basis for each, and designed in tandem with other aspects, specifically rhythm and structure. This can be seen most overtly in *Phyllotaxis*, where pitches have been derived from the same mathematical basis as rhythm; in passages in *Mojennou* where modal harmony undergoes a procedural unfolding; and in *Triskelion*, in the three sets of symmetrical progressions of dyads. These instances are cases where pitch material is not derived from pre-existing music or practice, but rather newly designed in connection with the concepts

1 represented in each piece. The majority of the works in the portfolio, in contrast, borrow, or
2 inherit, pitch and harmonic aspects from extant sounds or other music relevant to the individual
3 piece. This is not to say that there are no connections between the treatment of pitch in
4 generative and borrowed instances; in fact, the two approaches often interact. For example, in
5 *Lost Museum I: Lamentation*, the pitch palette was derived from a recording, but employed
6 within the composition in a motivic, generative manner (described in Chapter Seven). Further
7 overt instances can be observed in *La sirène engloutie* and *Sur le borde de l'eau*, while less
8 direct interactions are present in other works.

10 **Spectral analysis**

12 For a number of works, portions of relevant pre-existing recordings were sampled and
13 imported into the spectral analysis software SPEAR¹²⁰ for analysis and manipulation of pitch.
14 SPEAR provides tools for analysing the frequencies and partials present within the sample, but
15 also allows the editing and transformation of the pitch content. Where SPEAR has been
16 employed, the general approach has been to selectively limit the pitch set to a small collection,
17 which is then usually employed as a mode, verticalised into a set of pitch fields, or, commonly, a
18 combination of the two. Examples of this approach are present in *Night Studies* and *Timestamp*
19 (discussed in Chapter Five), *Lunar Echoes* (discussed in Chapter Six), and *Paper Imitation*
20 (analysed in Chapter Three).

21 In this approach, I have been influenced by the work of spectralist composers; in particular,
22 Tristan Murail, Gérard Grisey, Jonathan Harvey, and Georg Friedrich Haas. Some common
23 features shared by my work and that of these composers include a focus on timbre as affected by
24 the frequencies and partials present; referentiality in employing pre-existing sounds and music,
25 albeit in a heavily transformed manner and used as a source for newly composed materials,
26 rather than being a more direct quotation; and a conceptual kinship in terms of the topics of
27 hearing and listening, the ephemeral and less easily perceptible details of sound, and
28 affordances.¹²¹ The works have not usually approached a level of microtonal complexity often

¹²⁰ Michael Kateley Klingbeil, *SPEAR* (version 0.7.4, 2009).

¹²¹ Affordances being the multiple potential types of interaction a listener might have with sound or music, or, in effect, the multiple functions sound or music might serve in relation to its environment. Clarke, p. 36 – 37.

1 encountered in the work of the composers mentioned, with some small exceptions. This is due to
2 the mainly subtractive, deliberately delimited approach to deriving the pitch sets desired for most
3 of the pieces (which will be further elucidated below), as well as considerations of practicality
4 for the performers of the works and the requisite instrumentation.
5

6 **Inheritance of harmonic content**

7

8 In some works, pitch content has been inherited wholesale from the pre-existing music which
9 serves as their basis. Most commonly this represents a process of straightforward analysis and
10 transcription, as opposed to the transformative techniques outlined above. Examples of this
11 approach can be seen in portions of *Night Studies*, the main motif of *Timestamp*, *And am I born*
12 *to die?*, *Sur le borde de l'eau*, and some passages of both *Paper Imitation* and *Artefacts*. In these
13 cases, the use of relatively unaltered pitch content has always been employed in order to
14 maintain a strong connection to the source material with lesser degrees of transformation. This
15 most commonly appears where relatively direct quotation or collage effects are present, as
16 discussed in Chapter Three.
17

18 **Subtractive derivations of pitch sets**

19

20 Overall, the feature common to all the outlined approaches to pitch content is that of
21 subtraction, fragmentation, limitation, and filtering of material. This is a deliberate framework
22 based upon the concepts elaborated in Chapter One— the distancing effect of time and
23 geography, ephemerality and fragility of memory and sound events, the creative but also filtered
24 aspect of working memory, and concepts of listening and hearing. The overarching principle
25 here stands in some contrast to other composers working from a similar conceptual standpoint,
26 such as Berio and Kagel. Whereas these two composers in particular often deliberately create a
27 pitch field operating on an expansive yet systematic principle of chromatic saturation,¹²² both
28 approaches are representative of the concept of the ‘flattening’ of space and time and increased
29 accessibility of past and present music due to methods of preserving and transmitting past

¹²² Losada, p. 96.

1 music,¹²³ juxtaposed with distancing, mediation through transmission, decay and entropy,
2 subjectivity of individual and collective viewpoint, and the ultimate inaccessibility of the past.
3 However, my works strongly emphasise the latter aspects; therefore, instead of an additive,
4 polymodal, or extensively chromatic approach that might emphasise saturation and
5 expansiveness in more than one dimension, the portfolio generally presents a subtractive,
6 selective, limited approach, employing the harmonic ‘survivors’ of an evolutionary or entropic
7 procedure much as the use of other types of remnants of the past is explored.

8 This methodological basis also represents a means of marrying generative and selective
9 procedures: by reducing pitch space to a specifically defined, transformed set, generative motivic
10 processes can then operate upon these collections, creating further stages of mediation,
11 distancing, and creative progression. Most often, this has resulted in the treatment of pitch
12 collections in an analogously modal fashion, with an established pitch centre and distinctive
13 intervallic relationships; occasionally this also aligns with modality inherited from the source
14 music, creating another point of connection.

15

¹²³ Berio, p. 9.

1 **Part Four - Electronics approach and integration with acoustic**
2 **techniques**
3

4 **Chapter Five - Use of electronic techniques as compositional tools**
5

6 **Electronic techniques as analytical and compositional tool**
7

8 In order to explore the interaction between audio technology and memory and the integration
9 of electronic and acoustic techniques, a prominent aspect of the composition of the portfolio is
10 the use of digital technologies as compositional tools, often resulting in works that are purely
11 acoustic in their performance version, but contain traces of a technological and electronic
12 history. The rationale and conceptual basis behind these approaches has been discussed in
13 Chapter One, but will briefly be reiterated below before discussing individual pieces.
14

15 **Translation of electronic to acoustic**
16

17 As a rule direct quotations of recorded materials have been largely avoided, and in particular,
18 completely unaltered recordings¹²⁴ do not appear within a final piece. This is partly to avoid
19 some questions of ethics and aesthetics of borrowing which fall outside the purview of this
20 particular portfolio, but also to more strongly engage with concepts of listening and remembering
21 as opposed to hearing. Hearing is defined in this context as environmental perception and
22 immediate, unconscious or semi-conscious auditory cognition, while listening implies focused,
23 conscious attention, filtering, categorisation, and interpretation of perceived sounds, and
24 interacting with short- and long-term memory in order to contextualise the present acoustic
25 environment.¹²⁵ Wishing to furnish an externalised representation of these latter functions in my
26 work in order to turn focused listening and thought towards a recursive reflection upon

¹²⁴ I refer here to third-party recordings rather than samples of my own materials recorded by myself.

¹²⁵ Here I follow summations of psychoacoustic and cognitive theories outlined in Clarke, pp. 41 - 46, and Snyder, pp. 3 - 18.

1 themselves, degrees of mediation, filtering, transformation, recontextualisation, and
2 interpretation have been incorporated in my use of pre-existing materials.

3 If works of mine were to be based primarily on functions more associated with hearing and
4 ecological perception, recorded and electronic materials with lesser degrees of post-production
5 alteration, or perhaps none, would then be included. I appeal here again to McLuhan's
6 environment versus anti-environment framework.¹²⁶ Of course, some pieces do refer more or less
7 overtly to hearing as opposed to focused listening, and/or specific environments, but usually as a
8 secondary feature, or at least at some remove as it appears through the lens of transformational
9 techniques. For example, *Lost Museum III: Llyn* (discussed in detail in Chapter Seven) involves
10 site-specific hearing, but in an allusive, transfigured way focusing on one particular sound detail.
11 One piece where this is more prominent than in other works is *Paper Imitation*, where I wished
12 to convey a slightly more direct acoustic image of an ambient environmental space than in the
13 majority of my works.

14

15 **Electronic methods in compositional process in the portfolio**

16

17 Pieces in which transcription, software-based analysis, and/or electronic manipulation have
18 been used as compositional tools include *Am I born to die?*, *Paper Imitation*, *Artefacts*,
19 *Timestamp*, *Lunar Echoes*, *Night Studies*, *Sur le borde de l'eau* (which I will discuss in more
20 detail in Chapter Six), and the trio of *Lost Museum* pieces (discussed in depth in Chapter Seven).
21 There are several methods employed: simply listening to a recording multiple times, noting down
22 striking features, and creating motivic materials based on this listening; using Logic X to cut and
23 select samples for further compositional development; using Sonic Visualizer,¹²⁷ Capo,¹²⁸ and
24 SPEAR¹²⁹ to identify and select pitch sets and interval relationships present in the recordings for
25 use within my own composition; and manipulation of recordings (namely adjusting duration,
26 reordering samples through cut and paste, and layering of different samples), again using Logic
27 X, and subsequently transcribing these resulting elements for use as compositional materials.
28 These techniques are employed in varying ways and with varying degrees of prevalence

¹²⁶ McLuhan, p. 68.

¹²⁷ Centre for Digital Music, *Sonic Visualizer*, (version 2.0, Queen Mary, University of London, 2012).

¹²⁸ Super Mega Ultra Groovy, *Capo* (v. 3, 2013), Mac OS 10.11 and later.

¹²⁹ Klingbeil, *SPEAR* (version 0.7.4, 2009).

1 throughout the portfolio, yet are all guided by the overall principle of using audio technology as
2 means of gathering information about specific recordings and gleaned details for further
3 interpretation. This process involves actively reflecting on factors of mediation, distance,
4 distortion, and destruction that act upon the relevant recording and its past history as well as
5 upon my own listening, remembering, associating, and reinterpreting of these sources, in
6 accordance with the concepts outlined in connection with the third research concept in Chapter
7 One.

8

9 **Electronic tools and processes in *Timestamp***

10

11 The piece *Timestamp* (pp. 93 - 99), commissioned for a workshop day held by Cardiff
12 University School of Music's Contemporary Music Group on the 15th of November, 2014,
13 represents an exercise in progressing the technologically-informed methods seen in *Artefacts*,
14 movement one. In the latter work, as described in Chapter Three, a small sample of a recording
15 was isolated, timestretched, and transcribed in order to derive the motivic materials for the
16 movement. In *Timestamp*, this technique proved useful in connection to the brief for this work:
17 to recontextualise the soprano saxophone motif from Harrison Birtwistle's *The Triumph of Time*
18 within a newly composed piece.

19



20

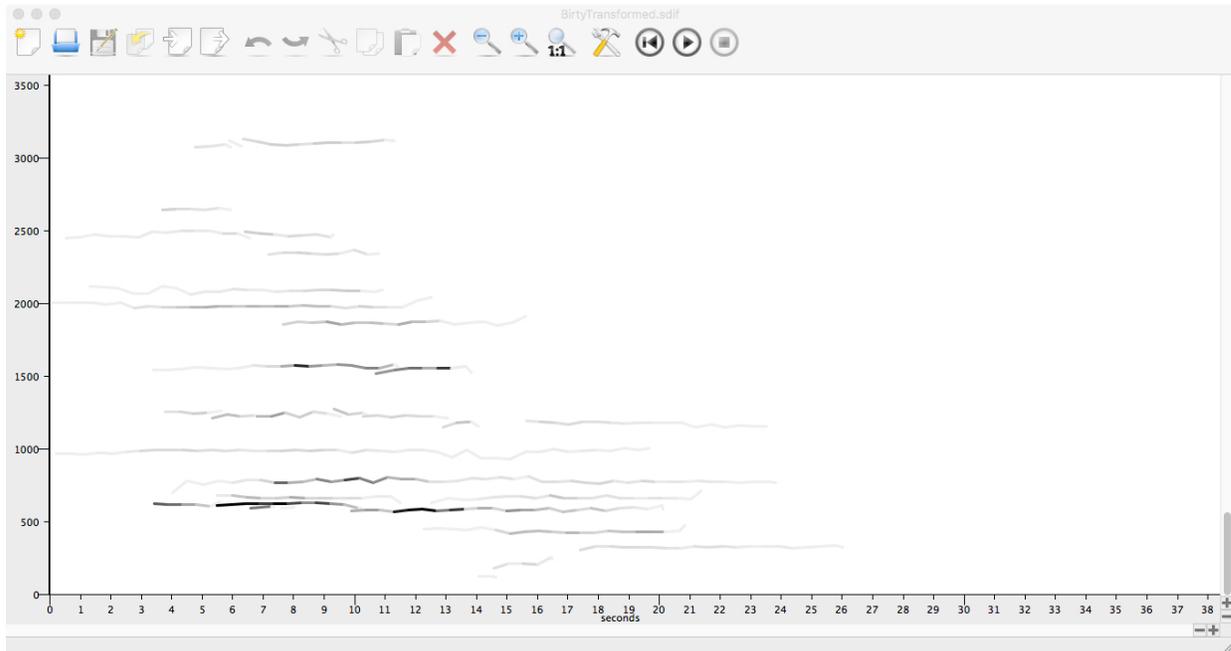
21 Fig. 6 - Motif from Birtwistle's *The Triumph of Time*

22

23 After an instance of this motif in a recording of Birtwistle's piece was isolated, it was then
24 also timestretched as in the aforementioned movement of *Artefacts*. To take this process a step
25 further, however, this altered microsample was then imported into SPEAR in order to analyse its
26 component frequencies. Within SPEAR, I then selected particular partials to narrow the palette
27 of pitch content for use within my work, discarding some duplicate pitches and frequencies
28 outside the useful range of the ensemble instrumentation given in the brief. The resultant

1 collection of partials creates a kind of reduced echo or impression of the original sample, in
2 keeping with the exploration of the life of remnants and ‘poor’ copies outlined in Chapter One.

3



4

5 Fig. 7 - Resultant collection of partials in SPEAR

6

7 This collection of pitches appears in the final piece, redistributed amongst the ensemble to
8 create entirely new timbral colours. This adds yet a further layer of mediation: the sample
9 processed in SPEAR contained not only the soprano saxophone’s motif, but also the orchestral
10 accompaniment; hence, traces of the saxophone motif’s original context are carried forward into
11 Timestamp, though only the faintest hints remain. Aside from the new orchestration, the sample
12 processed in SPEAR is simply transcribed to construct the piece with no further transformations.
13 This heavily ‘degraded’, reduced version of one small sample is conceptually linked to Hideo
14 Iwasaki and Oron Catts’ art installation *Biogenic Timestamp*,¹³⁰ in which microchips are
15 consumed by genetically engineered cyanobacteria, illustrating that no form of data storage is
16 exempt from the ravages of outside forces over time— in turn, linked to the concept of entropy
17 inherent in Birtwistle’s piece. While *The Triumph of Time* represents the experience of observing

¹³⁰ Hideo Iwasaki and Oron Catts, *Biogenic Timestamp*, 2010, Ars Electronica Museum
<<https://www.aec.at/center/en/biogenic-timestamp/>> [accessed 23 September 2014].

1 a passing funeral cortège as a reminder of death and decay as inescapable aspects of existence,¹³¹
2 *Biogenic Timestamp* similarly illustrates that even technology designed to outlast the mortality of
3 human memory cannot escape the ravages of time.

5 **Electronic tools and processes in *Night Studies***

6
7 *Night Studies* (pp. 59 - 91 in Portfolio Volume One) is a string quartet in which focuses on
8 details of listening experience and outmoded audio technology, specifically in relation to
9 experiences listening to ‘Dark Was the Night, Cold Was the Ground’ by Mississippi Delta blues
10 musician Blind Willie Johnson.¹³² *Night Studies* presents a larger-scale employment of
11 electronics as compositional tools with a purely acoustic piece as the end result, as well as an
12 exploration of the effect of repeated listenings of a particular recording. Each movement of the
13 piece is self-contained and contrasted from its surrounding movements, creating the effect of a
14 collage in its totality, as noted in Chapter Three. This connects to the phenomena of habituation
15 and perceptual invariants: over the course of repeated listening of a recording, the listener’s brain
16 becomes habituated to the most prominent, constant features perceived in the audio and the
17 processing of these sound features shifts from fully conscious perception to more unconscious
18 functions of remembering and perceptual organisation.¹³³ This filtering of invariants allows the
19 listener to perceive details in the sound previously unnoticed, usually transient features or those
20 which contrast from the more constant features.¹³⁴

21 In the case of *Night Studies*, the piece as a whole reflects on such perceptual filtering, and
22 each movement focuses on specific features heard within the original recording that are not
23 explicitly part of the recorded music— e.g. artefacts of the performance, environment, and
24 technology retained and transmitted in the recording. This recording is very familiar to me, as I
25 have heard it on LP and CD on numerous occasions. It contains some striking characteristics,
26 similar to aspects explored in other recordings (particularly in *Artefacts*, *Mojennou*, and *Sur le*

¹³¹ Hall, Michael, ‘Work Introduction to *The Triumph of Time*’, *Universal Edition*,
<<https://www.universaledition.com/composers-and-works/sir-harrison-birtwistle-64/works/the-triumph-of-time-5330>> [accessed 2 November 2017] (para. 2 of 4).

¹³² ‘Blind’ Willie Johnson, ‘Dark Was the Night, Cold Was the Ground’, *Slide Guitar Classics* (Los Angeles, Rhino, 1993). N.B.: This track within a compilation is in the public domain.

¹³³ Snyder, pp. 23 - 24.

¹³⁴ Clarke, pp. 32 - 33.

1 *borde de l'eau*): the near-unison between voice and guitar, causing moments of microtonal
2 divergence and a distinct combined timbre; various sounds caused by the action of playing the
3 guitar; distortion of timbre and pitch caused by the recording and playback technology; and noise
4 artefacts caused by the same technology and the increasing imperfection of duplicated and stored
5 copies of the recording over time.

6 The pitch content of the first three movements is derived via the same techniques used in
7 *Timestamp*: isolation of a small sample followed by processing in SPEAR, selecting specific
8 partials in a relatively subjective manner (though also with a view to reducing duplicate pitches
9 and those outside the practical range of the quartet), and then composing using this limited
10 palette of pitches as an invented mode. The fourth and fifth movements inherit pitch directly
11 from transcriptions of manipulated samples of the original recording, focusing more centrally on
12 rhythmic, motivic, and structural transformation as opposed to alteration of pitch and timbre.

13 The first movement is based upon the wavering shifts in timbre caused by technological
14 distortion in the original recording, and also linked to the sound of cicadas, often a subject of the
15 auditory filtering described above. To convey this effect, figures that slowly oscillate between
16 two pitches are employed in combination with transient distortion of timbre through changing
17 bow pressure and the use of harmonics, sul ponticello, tremolo, and pizzicato, with a small two-
18 note slide motif transcribed directly from the guitar part of the original recording. These figures
19 are repeated throughout the movement in a regular fashion, allowing the listener to develop
20 familiarity, though with subtle shifts of rhythm, register, timbre, and timing between parts; the
21 limitation and repetition of material causes some elements to fade into the background of one's
22 hearing, while the small changes re-focus the ear or allow individual features to be actively
23 perceived as fresh or new.

24 The second movement combines the harmonic approach of the first movement (using
25 SPEAR to generate a limited palette of pitches) with the sampling approach of later movements.
26 A small melodic motif was sampled and transcribed, then employed as a repeated motivic cell.

27



28

29

Fig. 8 - Melodic sample in *Night Studies* movement two, 'Cold Was the Ground'

1 This motif is embedded within the described harmonic context: a limited set of pitches,
2 verticalised as pitch fields and distributed across the instruments to create a slight sense of
3 spatialisation. The chords are designed specifically to achieve a sense of stasis and avoid any
4 impression of forward development through modal or tonal functions other than a repeated return
5 to the pitch centre of F; this technique of effectively halting discernible progression over time is
6 directly inspired by John Cage's similar employment of deliberately semi-disjointed block
7 chords in *String Quartet in Four Parts*.

8 The third movement combines three features: the effect of rapidly skipping through the
9 recording (seen in the alternating chord figurations in the opening of the movement, bars 80 -
10 96), the microtonal pitch space created by technological distortion as well as the variable
11 intonation of the performance (seen in bars 97 - 113), and the remainder of the frequencies
12 present when the frequency bands of the music itself are removed using SPEAR (appearing in
13 this movement in a durationally augmented form as the glissandi figurations commencing in bar
14 114). In total, this movement focuses on the pitch elements that make up an integral part of the
15 recording despite being unintentional inclusions, whether derived from ambient sounds,
16 technological artefacts, or 'unmusical noise' created by the actions of performing the music;
17 these elements could be considered extraneous to the music itself, but form part of the fabric of
18 the recording and its history as a sound object.

19 The fourth movement focuses on the percussive and rhythmic nature of some of the noise
20 artefacts present in the recording, sourced both from recording or transmitting technology and
21 sounds caused by the guitar slide, plectrum, or fingers. These sounds were captured in small
22 samples in Logic X, amplified, and then transcribed for use as motivic material. The motifs are
23 further manipulated through shifts in rhythm and duration, metric modulation, alteration of the
24 alignment between layers of the motifs in the different instruments, and tempo changes.

25 The fifth and final movement represents extensive use of sampling, manipulation, and
26 transcription. Several slices of the original recording, transformed via timestretching, cropping,
27 and multilayering, were rearranged and reconstructed to create a new version of the track. This
28 resulting remix or collage was then transcribed and mapped onto the four instruments, with the
29 only further transformation being the addition of playing techniques that alter the timbre of
30 motifs at certain points (the timbre already being altered by virtue of transcription for string
31 quartet as opposed to voice and guitar or the electronic medium).

1 These methods, employing electronic manipulation during composition but resulting in an
2 acoustic work, also appear in *Sur le borde de l'eau*, *Paper Imitation*, the *Lost Museum* pieces,
3 *Artefacts*, and *And am I born to die?*. However, *Night Studies* represents the most extensive and
4 involved application of these techniques within the portfolio. This arose partly through the piece
5 serving as a testing ground for different ways of executing this approach and building software
6 skills. More importantly, the prevalence and detail of these techniques are due to the central
7 focus on repetitive focused listening and auditory filtering, a theme touched upon in other works,
8 but explored in depth in *Night Studies*.
9

Chapter Six - Use of live and fixed electronic elements within pieces

Overview of approaches

My approach to the inclusion of electronics in pieces has been guided by practical performance considerations, acquisition of new skills and knowledge in terms of tools, software, hardware, and procedures, and a particular focus on live, embodied auditory sources. Regarding practical considerations, limited rehearsal time has usually necessitated that I, as the electronics performer, follow and react to the instrumental performer(s) rather than vice versa. Regarding the focus on live sources, within most pieces the primary focus has been kept on live instrumental performance (e.g. embodied sources), using electronics as a means of enhancing or expanding the capabilities of the acoustic instruments, providing disembodied sources in dialogue with or responding to the live performer(s), or some combination of these approaches. Where pieces are based upon pre-existing recordings, I have attempted to explore the question of how listening experiences change when a sound object previously stored in a disembodied, acousmatic¹³⁵ format is re-translated to embodied, acoustic formats, ‘re-animating’ it on some level; my aim here is to highlight the element of human listening and interpretation inherent in music-related memory processes, rather than provide alternate recorded or acousmatic versions of the original source materials, as previously discussed in Chapter One. This has resulted in an emphasis on using electronics as analytical and compositional rather than performance tools (as discussed in Chapter Five) and/or allowing live, acoustic performance to predominate within pieces. The electronics directly present in my compositions are both an instrument of the ensemble in themselves and an extension of the other instrument(s) present, resulting in a synthetic combination of sound sources. The electronics effectively form a bridge to the ‘past’ of the music while allowing a new context and sound environment to appear.

¹³⁵ To recall Schaeffer and Chion’s definition, ‘acousmatic’ refers to music or sound that does not have a directly visible source, such as an instrument. Chion, *Guide des objets sonores*, p. 18.

1 **Use of fixed electronics**

2
3 The use of fixed electronics within the portfolio is restricted to playback of samples
4 responding to, or interacting with, a part for live performer(s), as opposed to fixed tracks to
5 which the players must align their parts. This is partly for practical reasons: the amount of
6 preparation needed to coordinate a live part to a track is greater than that necessary to rehearse a
7 piece in which the performer(s) and electronics operator are able to maintain some flexibility.
8 More importantly, however, the latter approach allows the exploration of certain avenues within
9 the research topics. It more clearly defines the electronics operator as a performer within the
10 ensemble, adding to the collaborative nature and reinforcing the focus on embodied, live sources
11 as discussed in Chapter One; it allows the fixed elements a small but useful degree of spontaneity
12 and flexibility in their dialogue with the live materials; and finally it allows for greater
13 interaction between the first research topic, systemisation and generative compositional
14 approaches, and the third, integration of electronic and acoustic techniques.

15 Fixed electronics, in the form of sample playback, has been employed in *La sirène engloutie*,
16 *Afterimage*, *Lunar Echoes*, *Sur le borde de l'eau*, *Lost Museum II: Photo Booth*, and *Lost*
17 *Museum III: Llyn*, with different degrees of prevalence. In some cases, as in *Sur le borde de*
18 *l'eau*, the samples provide the link to the pre-existing materials upon which the piece is based; in
19 others, they invoke a specific temporal or geographical environment, or idea, as in *La sirène*
20 *engloutie*, *Afterimage*, and *Lunar Echoes*. In each instance, the fixed elements are always
21 connected to other materials present, in order to enhance the dialogue between acoustic and
22 electronic, live and recorded sound sources. *La sirène engloutie*, *Afterimage*, *Lunar Echoes*, and
23 *Sur le borde de l'eau* will be discussed in more depth in this chapter, while the use of electronics
24 in the two *Lost Museum* pieces is described in Chapter Seven.

26 **Use of live electronics**

27
28 In Chapter One and this chapter, I note that electronics have been employed as an
29 orchestrational tool— an added ensemble member and/or a means of extending live instrumental
30 capabilities. This aligns the focus of the portfolio with the third research concept, integration of
31 electronic and acoustic techniques, without deviating to explore electronics on their own. The

1 techniques employed include delay lines, reverb units, transposers, and live looping, allowing
2 alteration of several aspects: timbre, rhythm, and pitch; blending between acoustic, live
3 processed, and purely electronic sources; and manipulation of the sense of space (by adding echo
4 and reverb effects that change the listener's perception of the musical space) and time (through
5 repetition, blurring or timestretching, and echo effects) in performance. These transformations
6 create degrees of distancing and mediation in accordance with the concepts of the passage of
7 time, collective and individual memory, ephemerality, and mutation of copies described in
8 Chapter One. Additionally, this use of live electronics as orchestrational tool and spatial
9 manipulator has been influenced by the electroacoustic works of Kaija Saariaho (a relevant
10 example being *Fall* for harp and live processing). Live processing, accomplished in all but one
11 instance through Max/MSP patches I have built for each requisite piece, appears in *La sirène*
12 *engloutie*, *Afterimage*, *Lunar Echoes*, *Lost Museum III*, and *Sur le borde de l'eau*.

13

14 **Live electronics in *La sirène engloutie*, *Afterimage*, and *Lunar Echoes***

15

16 These three pieces represent a progression of skills and techniques from the first to the third,
17 subsequently extending to later works in the portfolio. They contain similar instrumentation, with
18 flute and electronics in each, and related approaches and techniques.

19 *La sirène engloutie* represents a first foray into combining electronics with live performance,
20 as well as a means of learning the basics of constructing Max/MSP patches. The piece contains
21 three categories of materials: recorded samples of a song, processed through granular synthesis; a
22 part for Kingma system microtonal bass flute; and recorded samples of piano 'noise' (scraped
23 and plucked strings, pedal noise, reverberation within the piano body, etc.) and a sequence of
24 piano chords from the climactic passage of Debussy's *La cathédrale engloutie*. The song and the
25 Debussy piece both relate to Celtic myths of the drowned city of Ys and siren-like entities, but
26 are otherwise unrelated, especially in terms of their musical features. The flute part contains
27 motifs based upon the interval and rhythm contour of the passage from *La cathédrale engloutie*,
28 with distortions of pitch (using quarter tones) and rhythm. The motifs follow a process of gradual
29 accumulation, lengthening, and expansion of pitch range similar to the process seen in
30 *Phyllotaxis* and accumulative motivic passages in other works, though in a more flexible and
31 basic manner resulting in a lower level of complexity.

1 The live electronics are used expressly to enhance this additive process: the live recording
2 and playback of loops adds layers of activity and increases complexity of texture as the piece
3 progresses, and from figure D to F create a dense harmonic chordal progression which directly
4 responds to those drawn from Debussy and heard simultaneously in the sample playback. The
5 effect of the live electronics is to mirror in reverse the progression of granular vocal samples
6 heard in the first section of the piece (beginning to figure D). These samples begin as short
7 snippets of vocal melody recognisable as such, but are transformed into ever shorter and more
8 distorted grains until the voice itself is completely lost and no melodic features are discernible,
9 with only granular noise in its place. Meanwhile, the flute's material begins from the most basic
10 form of its motif (seen in bar 2), its own 'grain', and is transformed as described above into
11 lengthier 'samples'.

12 The live looping was designed to employ a Boss RC30 Loop Station foot pedal unit;
13 however, during workshopping of this work with Carla Rees and Michael Oliva of rarescale, it
14 became apparent that this hardware unit is unsuitable for the type of looping desired in this work.
15 Its loop lengths, synchronisation, and mechanical triggering are not capable of the flexibility of
16 loop durations and points of occurrence present in the electronics part as notated. I have therefore
17 incorporated desired looping capabilities into Max/MSP patches in order to achieve flexibility
18 and possibilities of detailed customisation. A further issue in the workshop arose: the samples
19 used were deemed by performers, listeners, and myself alike to be perceptually perhaps overly
20 dissimilar from one another and the live part (in terms of timbral aspects in particular). Such
21 heterogeneity would not be problematic were it not for the explicit attempt to connect the live
22 flute part with the piano chord samples; this creates the expectation that unity should be a
23 prominent feature in the piece, rather than a more disjointed collage of different materials. With
24 regard to the integration of electronic and acoustic techniques, then, this piece has not quite
25 succeeded.

26 In order to approach the last issue from a different angle, *Afterimage* employs similar
27 techniques, but is designed in a somewhat inverted manner compared to *La sirène engloutie*. The
28 samples heard were recorded and processed first, with the flute part written to respond more
29 closely and directly to the resulting sounds than in *La sirène engloutie*. Additionally, the samples
30 contain a higher level of processing and transformation from their original recorded sources than
31 the vocal and piano recordings used in *La sirène engloutie*, allowing for a greater blend of sound

1 sources and less identifiably distinct blocks of material. Finally, recordings of flute sounds (from
2 which some motifs heard in the live part were then derived) are also incorporated into the sample
3 set to create more timbral affinity between acoustic and electronic parts. The one instance of live
4 processing in the piece (bar 63, the final bar) further cements the interaction between electronic
5 and acoustic parts by using delay lines and reverb to imitate the flute sounds heard earlier in the
6 piece solely in the electronic part.

7 *Lunar Echoes* takes a slightly different approach to the two pieces previously discussed,
8 while employing similar methods. It was commissioned for a concert responding to the *fragile?*
9 exhibition of contemporary ceramic arts at National Museum Wales, Cardiff, 2015. *Lunar*
10 *Echoes* responds to a specific work in the exhibition: Adam Buick's *Massive Intertidal Jar*, a
11 modern interpretation of the Korean moon jar tradition. Made with the inclusion of materials
12 sourced near Abereddy Beach in Pembrokeshire, Buick considers his work as a kind of
13 distillation of, or container for, a specific landscape, inviting reflection on the particular qualities
14 and transient or changing nature of the environment invoked.¹³⁶ To preserve this concept in
15 *Lunar Echoes*, the electronic samples used employ processed versions of recordings of waves on
16 Abereddy Beach¹³⁷ (a location I had visited myself prior to composing the piece) as well as the
17 sound of seawater trickling through stones and sand¹³⁸ (in reference to the materials used in
18 creating *Massive Intertidal Jar*).

19 Similarly to the flute part in *La sirène engloutie*, the flute and harp music is referential to the
20 samples (using some pitches heard in the spectral freeze-processed samples, and having timbral
21 similarities at certain points), but not as strongly integrated as the materials in *Afterimage*. This
22 partial separation between electronics and live parts is intentional, the electronics being
23 indirectly representative of the specific natural environment connected to *Massive Intertidal Jar*,
24 while the live instruments, with their 'circling' motifs focusing on symmetrical contours,
25 repetition, three-note figures (similar to those seen in *Triskelion*), and inclusion of details derived
26 from the samples, are representative of the spherical jar itself, with its inclusions of fragments of
27 natural matter. The live processing present in the final section of the piece (bar 65 to the end),

¹³⁶ Adam Buick, 'About', <<http://www.adambuick.com/about/>> [accessed 18 February 2015]

¹³⁷ Dana Varahi, '01.Abereddy-Beach' <<https://freesound.org/people/LolitaPerdurabo/sounds/164925/>>
[accessed 28 February 2015] Licensed under Creative Commons Attribution 3.0 Unported,
<<https://creativecommons.org/licenses/by/3.0/legalcode/>>.

¹³⁸ Ephemeral_Rift, 'Stream' <<https://freesound.org/s/76390/>> [accessed 28 February 2015] Licensed under
Creative Commons Attribution 3.0 Unported, <<https://creativecommons.org/licenses/by/3.0/legalcode/>>.

1 including delay lines, reverb units, and transposers, acts to greatly distort the timbre and pitch of
2 the live instruments, recontextualising transformed motifs recurring from the opening section of
3 the piece (beginning to bar 42) with inclusions from the middle, active section wherein the
4 sounds of water rushing through stones appears in the samples and is imitated by the flute and
5 harp (bar 43 to 64). This distortion of motifs and incorporation of elements ‘picked up’ along the
6 journey of the motifs from first to last segment creates both a sense of circularity and distancing
7 or metamorphosis, as *Massive Intertidal Jar* represents a mediation and reinterpretation of its
8 original environment.

9

10 ***Sur le borde de l’eau: exploring liveness***

11

12 *Sur le borde de l’eau*,¹³⁹ a piece for solo viola with electronics (pp. 141 - 150 in Portfolio
13 Volume One), represents the greatest level of fusion and equality of focus between acoustic, live
14 processing, and fixed electronic elements amongst the works in the portfolio, in order to explore
15 questions of liveness of sound sources in accordance with the third research topic of the
16 portfolio. This piece is based upon Alcide ‘Blind Uncle’ Gaspard’s recording of ‘Sur le borde de
17 l’eau’,¹⁴⁰ a traditional Cajun ballad. This recording features several striking elements: distortion
18 and a particular timbral character created by the 78 rpm recording and playback; an idiosyncratic
19 style of guitar playing combined with a distinctive vocal tone; lyrics relating a story with
20 archetypal or mythical aspects;¹⁴¹ and some distinctive features of pitch and unexpected harmony
21 (specifically, the major/minor modal mixture, and the modal inflections in some of the guitar
22 chords).

23 These various distinctive components of the recording were analysed using the analysis and
24 song-tuition software *Capo*¹⁴², and the live viola materials composed based upon this analysis.

¹³⁹ This title matches that given on the original recording label and is correct in Cajun French, although it diverges from academic French (where it would be given as *Sur le bord de l’eau*).

¹⁴⁰ Blind Uncle Gaspard, *Natchitoches/Sur le borde de l’eau* (Vocalion, 5333, 1929); an mp3 transfer of this public domain 78 rpm record can be found at Neal Pomea, *npmusic.org* <http://npmusic.org/Blind_Uncle_Gaspard_Sur_la_Borde_d_l_Eau.mp3> [accessed 29 July 2015].

¹⁴¹ The lyrics are similar to the Canadian folk song of French origin titled ‘Isabeau s’y promène’, telling of a young woman walking by the water where she meets and falls in love with a sailor and later comes to grief. While the comparison of lyrics is my own, information on ‘Isabeau s’y promène’ is sourced from H el ene Plouffe, ‘Isabeau s’y prom ene’, in *The Canadian Encyclopedia* (2006) <<http://www.thecanadianencyclopedia.ca/en/article/isabeau-sy-promene-emc/>> [accessed 30 July 2015].

¹⁴² Super Mega Ultra Groovy, *Capo* (v. 3, 2013), Mac OS 10.11 and later.

1 These materials are newly composed rather than simply transcribed from the analysis, using
2 intervals, pitches, timbres, melodic contours, and rhythms derived from the recording but then
3 transformed; nevertheless, they retain allusions to the source. For example, the pizzicato
4 passages echo plucked guitar; repetitive sliding descending figures, such as the one seen in bar
5 22 or in a different form in bar 39, imitate the sliding vocal style; the use of compound time
6 signatures interrupted by variations in metre reflects the unsteady tempi in the recording; the use
7 of double-stops, open strings, and drone figures reflects common characteristics of Cajun folk
8 playing style and the relationship between vocal melody and guitar in the recording; and use of
9 harmonics, sul ponticello, and changes in bow pressure add occasional relative timbral roughness
10 similar to the changing level of timbre distortions in the recording.

11 The live processing is achieved through a Max/MSP patch I created for this work (save for
12 the inclusion of the karma~ external object for looping).¹⁴³ The patch combines the recording
13 and playback of live loops, playback of pre-recorded viola samples (some including processing,
14 some without), processing of live input using delay line and reverb unit ramps, and playback of
15 processed samples from the original recording. The piece begins with solo live viola, recorded
16 for looping, then playback of the loop with the live viola accompanying. The music then begins a
17 process of expansion of layers and complexity: live materials are frequently recorded and looped,
18 then accompany the loops, while pre-recorded viola samples add a third layer of activity. The
19 palette of motifs remains similar throughout, creating imitative, echoing effects; the timbres,
20 however, shift over time, especially from figure D where a slow ramp of delay lines and reverb
21 begins. From figure F, a processed sample of Gaspard's original recording slowly begins to be
22 audible. The samples of the original recording have been processed using Logic X and
23 Soundmagic Spectral plugins, focusing on spectral freezing, comb filtering, and selective EQ to
24 create blurred drones far removed from the original. As the sample playback becomes more
25 audible, the frequencies within the drones begin to connect audibly with the pitch content of the
26 viola elements previously heard.

27 By figure I, the viola elements (by this point, consisting of no further live elements and
28 playback of a short loop) are subsumed completely by the sample playback—the original audio
29 overwhelms its derivatives, though in a transmuted and heavily disguised form. The sample
30 playback continues unaccompanied for a flexible amount of time, shifting between different

¹⁴³ Rodrigo Costanzo, *karma~* (2015), Max/MSP.

1 samples that have been processed in similar ways to allow for subtle and barely noticeable
2 durational changes. The processing causes an effect of flattened or slowed time, as details of the
3 recording (especially rhythmic figures) become smoothed or disappear, even as pitch space
4 expands. The samples present a sort of aura of the original, containing traces and remnants— an
5 amplification (quite literally) and expansion of the echoing effects heard earlier in the interaction
6 of the live and electronic parts.

7 The live viola part rejoins the texture with the melody of the ballad, played *ad libitum*. This
8 is one of a few instances in the portfolio of works where a pre-existing musical element is heard
9 mostly unaltered; as this piece was composed for a specific performance where the audience
10 would almost certainly be unfamiliar with the original recording, it seemed a suitable opportunity
11 to experiment with allowing a less disguised version of the original music to appear in the final
12 work, an approach mostly avoided in other compositions and therefore worth testing (for
13 example, compare *Night Studies*, where only very small samples of the original music can be
14 heard, or *Timestamp*, where the motif is treated as a whole unit but manipulated in time and
15 orchestrational space to prevent direct recognition). A brief coda returns *Sur le borde de l'eau* to
16 the solo viola material after the sample playback and ballad melody have faded,
17 recontextualising the opening passages that have now ‘passed through’ the sound space of the
18 original audio (in the altered form presented by the processed samples).

19 While, from a compositional standpoint, *Sur le borde de l'eau* shows a successful attempt at
20 seamless blending of acoustic and electronic sources, it presents some difficulties from a
21 performance perspective. As regards production it is difficult to blend the sound of the amplified
22 viola with the pre-recorded viola samples to a sufficiently indistinguishable degree; the desired
23 effect of slight disorientation regarding sound sources did not come across fully in the piece’s
24 premiere performance, as noted by some listeners. The recording presented on the supplementary
25 Disc 1 (track 13) is a studio recording of the piece, allowing a greater level of control over the
26 mixing of the different parts. A comparison of studio techniques versus performance and
27 questions of performer and listener control in reference to the specific topics described in this
28 commentary are outside the realm of the current portfolio as the focus is limited to works for live
29 performance, but should be addressed further in future when live electronics are employed in a
30 similar manner.

31

1 **Part Five - *Lost Museum*: a synthesis**

2
3 **Chapter Seven - *Lost Museum***

4
5 *Lost Museum* is a series of three interrelated compositions reflecting on themes of systemic
6 and institutional violence, destruction caused by the passage of time, preservation, and the
7 interactions between artwork and museum. Each piece contains some treatment of ‘found object’
8 source sounds; representation of memory concepts; motif-based systematic structures; and use of
9 electronics either in the compositional process or as a part of the resulting piece. As a result, this
10 set of works forms a useful case study for the synthesis and integration of the different concepts
11 and methods outlined in the previous chapters of this commentary.
12

13 **‘Das Verschwundene Museum’ exhibition, Bode Museum, Berlin, 19/3/15 to 27/9/15**

14
15 The exhibition ‘Das Verschwundene Museum’ (‘The Lost Museum’) was shown in the Bode
16 Museum, Berlin, in the summer of 2015 to commemorate the 70th anniversary of the end of
17 World War II.¹⁴⁴ The exhibit described and explored the mysterious destruction by fire of much
18 of the collection of the museum, primarily comprising medieval and Renaissance painting and
19 sculpture, which was stored in the Friedrichshain flak tower for safekeeping at the time of the
20 Soviet occupation of Berlin.¹⁴⁵ The exhibition included damaged works of art left in their semi-
21 destroyed state as well as restored pieces, replicas of damaged or lost pieces, and photographs of
22 missing works alongside displays and text discussion regarding restoration and replication
23 techniques.¹⁴⁶ The exhibition was described in its introductory wall text as ‘a polyphonic

¹⁴⁴ Staatliche Museen zu Berlin, ‘The Lost Museum: The Berlin Sculpture and Paintings Collections 70 Years After World War II’ <<http://www.smb.museum/en/exhibitions/detail/das-verschwundene-museum.html>> [accessed 4 September 2015] (para. 1 of 5).

¹⁴⁵ Tom L. Freudenheim, ‘The Lost Museum: The Berlin Sculpture and Paintings Collections 70 Years After World War II: Review’, *The Wall Street Journal*, 1 July 2015 <<http://www.wsj.com/articles/the-lost-museum-the-berlin-sculpture-and-paintings-collections-70-years-after-world-war-ii-review-1435789134>> [accessed 2 July 2015] (para. 3 of 7).

¹⁴⁶ Staatliche Museen zu Berlin, ‘The Lost Museum’, para. 3 of 7.

1 reflection: curators, conservators, archivists, historians, moulders, and artists... offer a variety of
2 perspectives and even contradictions'.¹⁴⁷

3 Somewhat ironically, a plaster replica factory set up prior to the outbreak of the war to
4 provide inexpensive tourist souvenirs to museum visitors has provided the main avenue for
5 restoration of damaged and lost pieces, as many molds have survived; this raises interesting
6 questions of high versus low art, rarity versus mass production, and the value of originals versus
7 copies.¹⁴⁸ Beyond questions of the treatment of individual works, the exhibition also overtly
8 posited questions regarding the role and responsibilities of a museum as a reflection of its
9 particular social, political, and temporal context¹⁴⁹ as opposed to an idealized, transhistorical
10 institution in which the (lowbrow?) public may view ostensibly canonical (highbrow?) works in
11 an abstracted setting in a manner bordering on devotional.

12 Having visited this exhibition in July 2015, I became interested in exploring some of these
13 concepts in my work as there were numerous affinities apparent. The considerations of how best
14 to commemorate and preserve or recreate artifacts (of any variety) from the past, the value of
15 copies versus originals, and the use of technology to attempt to reverse or prevent decay and
16 destruction are closely linked to my research questions and are of ongoing interest after having
17 completed work in a very similar conceptual and technical vein during the 2014 Ars Electronica
18 Festival in Linz (specifically, work on *Artefacts* leading up to the festival, then *Timestamp* which
19 immediately succeeded the festival). The first piece in what would become a set of three, entitled
20 *Lost Museum I: Lamentation* (pp. 205 - 208 in Portfolio Volume One), was composed in
21 November and December of 2015 for solo double bass, using a recording of Giovanni Pierluigi
22 da Palestrina's 'Jod: Manum suam misit hostis' from the third book of his *Lamentations*,¹⁵⁰
23 composed for the Maundy Thursday liturgy during Holy Week in the calendar of the Catholic
24 church.¹⁵¹ The reasons for this instrumentation and source material are outlined in the next
25 section.

26

¹⁴⁷ Freudenheim, para. 2 of 7.

¹⁴⁸ Ibid., para. 6 of 7.

¹⁴⁹ Ibid., para. 2 of 7.

¹⁵⁰ Lewis Lockwood, Noel O'Regan and Jessie Ann Owens, 'Palestrina, Giovanni Pierluigi da', in *Grove Music Online in Oxford Music Online* (Oxford University Press)

<<http://www.oxfordmusiconline.com/subscriber/article/grove/music/20749>> [accessed 30 November 2015].

¹⁵¹ Herbert Thurston, 'Tenebrae', in *The Catholic Encyclopedia*, Vol. 14 (New York: Robert Appleton Company, 1912) <<http://www.newadvent.org/cathen/14506a.htm>> [accessed 9 October 2016].

1 **Conceptual overview of Lost Museum I: Lamentation**

2
3 Beyond considerations of practicality and the specific performance opportunity on offer, solo
4 double bass was chosen due to its percussive and timbral capabilities, its ability to produce
5 pitches rich in overtones (given the use of spectral manipulation of the recording, noted below),
6 its physical similarities to some of the sculpture collection in terms of materials and construction
7 techniques, and its link to contemporaneous instruments, being a member of the viol family, a
8 kind of transformed throwback to past lutherie and woodcarving practice. Prior to composing the
9 piece, I revisited an earlier study of Stefano Scodanibbio's four-movement work *Voyage That*
10 *Never Ends* (composed 1979 - 1997).¹⁵² In addition to being of influence in its idiomatic writing
11 for the bass and systematic use of a distinct palette of timbral effects, the piece clearly highlights
12 the bass itself as a somewhat archaeological link to the past (specifically in its use of
13 scordatura).¹⁵³ Furthermore, the work contains extramusical links to a past which is implied to be
14 unfinished, ongoing or recursive, and in a state of fragmentary decay (suggested by the titles of
15 the work as a whole and its individual movements, which reference an unfinished anthology by
16 Malcolm Lowry and a travelogue by 19th-century explorer John Lloyd Stephens respectively).¹⁵⁴

17 Palestrina's *Lamentations* as a whole appealed as a subject and source for this piece by virtue
18 of its contemporaneity, geographical concordance, and similarity of theological topics with the
19 majority of the artworks in the scope of the exhibition. Additionally, its polyphonic style is
20 felicitous for spectral manipulations. The movement in question, 'Manum suam,' furthermore
21 sets text which is germane to the topic of the destruction of war and of objects considered sacred:

22
23 The enemy has stretched out his hands over all her precious things; yea, she has seen the nations invade her
24 sanctuary, those whom thou didst forbid to enter thy congregation.¹⁵⁵

¹⁵² Stefano Scodanibbio, 'Compositions List', <<http://www.stefanoscodanibbio.com/compositions.htm>> [accessed 10 October 2015].

¹⁵³ Stefano Scodanibbio, programme notes for *Ex Novo Musica 2010 - VII edizione: Stefano Scodanibbio, compositore e interprete*, [music concert] (Venezia Teatro La Fenice, Sale Apollinee, Venice: 12 October 2010) <<http://www.culturaspettacolo venezia.it/node/12657>> [accessed 9 October 2016].

¹⁵⁴ Scodanibbio, 'Ex Novo Musica 2010: Stefano Scodanibbio'.

¹⁵⁵ *Lamentations* 1.10 (RSV).

1 The concept expressed here of a ‘sanctuary’ for ‘precious things’ is reminiscent of the
2 idea of the museum as a kind of ideal shrine to particular masterworks, called into question in the
3 exhibition.

4 The majority of the Bode Museum’s collection consists of pieces created for churches or for
5 domestic devotion. As religious artefacts (even if the artworks were perfectly unchanged since
6 their creation and undamaged), their display in the museum divorces them from their original
7 setting, context, and purpose. Similarly, the recording of ‘Manum suam’ is removed from its
8 original environment; in fact, it is distanced by three degrees. Firstly, by its performance outside
9 of a Catholic church and for a purpose other than the specific liturgy for which it was composed;
10 secondly, by performance outside of its time period; and thirdly, by its existence as a specific
11 recording of the live performance (what could be considered a copy of one version of a
12 performance). These aspects of the piece’s polyvalence coincide with the exhibition’s aim of
13 presenting multiple possible perspectives: ‘this legacy [of missing art] has meant something
14 different for each generation. Every approach reflects the prevailing political zeitgeist and thus
15 the decision to favour one version of the past over another.’¹⁵⁶

17 **Compositional process and analysis of *Lost Museum I: Lamentation***

18
19 The composition of 'Lamentation' began with isolating a small sample of the recording of
20 Palestrina’s ‘Jod, Manum suam misit hostis’ from the third book of his *Lamentationem*.¹⁵⁷ The
21 small sample was chosen somewhat arbitrarily for the distinctive quality of a particular motif
22 within it: the E, D, F figuration seen, for example, in bars 41 – 42. This sample was then
23 processed in Logic Pro X using Michael Norris’ suite of spectral plugins and Apple reverb
24 plugins to create altered, layered drones and to limit the partials to a smaller range. Limiting the
25 range yields a pitch set consisting of the notes of the Locrian mode with E as the final. This pitch
26 set was then used as the basis for constructing motives within the piece.

¹⁵⁶ Exhibition wall text quoted in Freudenheim, para. 2 of 7.

¹⁵⁷ Giovanni Pierluigi da Palestrina, *Lamentations, Book 3*, I Cantori di Lorenzo, cond. by Filippo Maria Bressan (Tactus, TC521603, 2009).



Fig. 9 - Motif derived from Palestrina sample

To create the sense of a fragment glimpsed or revealed, the directly-quoted motif is reserved for the final section of the piece. Consequently, the piece begins with an inversion and expansion of the pitches contained within the quoted motif: the A, G, A figure seen in bars 1 - 3 (with the exception of the tremolo interruption, to be discussed momentarily). This is immediately followed by a combination of this motif with the quoted motif: the E, G, F figure of bars 4 - 6. Both of these motifs contain an interjection in the form of a two-note tremolo (bars 2 and 4), and the phrase concludes with the reappearance of the A which is ‘missing’ from the second motif, but in the form of a natural harmonic.

Spacious
♩ = c. 60

Double Bass

pizz. arco sul tasto light pressure pizz. arco sul tasto light pressure (tr) arco ord.

p *pp* < *p* > *mp* < *mf* *pp* < *p* > *p* *mf* *p*

Fig. 10 - Bars 1 — 6, *Lost Museum I: Lamentation*

The piece continues the established pattern of similar pizzicato motifs broken by the interpolation of interjectory figures and punctuated by harmonics at phrase ends, with each iteration of each type of motif often becoming slightly more complex through the alteration of rhythm (for example, in bar 16) or a change of timbre (for example, harmonic glissandi as in bar 14 - 15 or snap pizzicato in bar 19). This pattern is not adhered to in a rigidly systematic way in order to create a sense of flexibility and forward motion through the use of lengthening phrases and uncertainty. The first major section of the piece concludes with bars 23 - 26, in which two new motifs- the tremolo of bars 23 and 25 and the glissandi of bars 24 and 26- are introduced as

1 a point of both punctuation (by the new, previously unheard figurations) and transition (in the
2 context of the related materials which follow this passage).

3 The second major section of the piece begins with the introduction of the original form of
4 the quoted motif. The E and F are heard isolated between interruptions of the tremolo and
5 harmonic figures (e.g. bars 27 - 31). The quoted motif is heard in its entirety for the first time in
6 bars 38 -39, before being disrupted once more by the tremolo figure and the B flat harmonic
7 which punctuated the phrase endings of the first section of the piece. To finish, the quoted motif
8 is heard once more, then fragmented into the glissandi figures seen in bars 44 - 45 and 47 - 48,
9 which preserve the minor third present in the motif. One final version of the three-note motif
10 from the first section reappears in bar 46. Finally, a much slowed, pizzicato variation of the
11 tremolo motif concludes the ultimate bar.

12 Further plans for revising this work include lengthening it, extending the additive process
13 in order to include a more direct quotation of the melodic fragment from the Palestrina work
14 and/or including the manipulated sample as a fixed electronic part alongside the solo bass. These
15 questions are a consequence of the inclusion of so small a quotation and hardly an immediately
16 recognizable one, while signposting the quotation with the title and program note- issues raised
17 during the rehearsal and first performance and, afterwards, in discussion when presented at the
18 School of Music's weekly composition seminar. Some listeners felt that the piece itself did not
19 deliver enough of the source material to warrant the strong emphasis placed upon it by the title,
20 programme note, and my verbal communications. This emphasis was intentional, as a sense of
21 fragmentation and absence should be the primary characteristics of the piece; however, in its
22 current state, this potentially creates a confusion as regards listener expectations. The title has
23 now been updated to *Lost Museum I: Lamentation*, which perhaps better reflects its character
24 while slightly de-emphasizing the quotation as a feature of overarching importance without
25 completely obscuring it.

27 **Overview of *Lost Museum II: Photo Booth* and *Lost Museum III: Llyn***

28
29 The next two pieces were composed concurrently from December 2015 to March 2016.
30 Each deals with a particular artwork in two separate, slightly later, museum exhibitions which, in
31 some respects, happened to deal with the same general questions- the exhibition 'Constellations'

1 at the Tate Liverpool, and the recent retrospective of Welsh artist Ivor Davies at the National
2 Museum of Wales Cardiff.¹⁵⁸

3 ‘Constellations’ is an ongoing, rotating exhibit featuring works from Tate Liverpool’s
4 permanent collection arranged thematically or conceptually rather than in a linear or
5 chronological fashion.¹⁵⁹ The curatorial approach is summarized thus:

6
7 ‘At the heart of each constellation is a ‘trigger’ artwork, chosen for its profound and revolutionary effect on
8 modern and contemporary art. Surrounding the trigger works are artworks that relate to it and to each other,
9 across time and location.’¹⁶⁰

10
11 This deliberate centring of interrelationships within the museum’s collection and its
12 method of presentation carries obvious echoes of concepts explored by the Bode Museum.

13

14 **Concepts and composition of *Lost Museum II: Photo Booth***

15

16 My piece subtitled ‘Photo Booth’ (pp. 211 - 228 in Portfolio Volume One) focuses on
17 one of the so-called ‘trigger artworks’ within the ‘Constellations’ exhibit- an installation of the
18 same title by Lorna Simpson.¹⁶¹ Tate’s catalogue describes this piece as

19

20 ‘a multi-part installation comprising fifty found photo booth portraits predominantly depicting black
21 men and fifty ink drawings on paper of the same dimensions as the photographs. The elements are each
22 individually framed and they are hung on the wall in a deliberately loose and irregular cloud-like shape.

23 The photographs are all small-scale black and white photo booth portraits taken in the 1940s. The
24 historical specificity of the images was important to Simpson. She has said, “The ’40s, in American culture,
25 were a tough time in terms of life, work, Jim Crow laws, segregation and lynchings. And so the nostalgia of

¹⁵⁸ *Silent Explosion: Ivor Davies and Destruction in Art* [exhibition], Judit Butor and Nicholas Thornton, curators (National Museum Wales, Cardiff: 14 November 2015 - 20 March 2016) <<https://museum.wales/cardiff/whatson/8579/Silent-Explosion-Ivor-Davies-and-Destruction-in-Art/>> [accessed 23 January 2016].

¹⁵⁹ *Constellations: Highlights from the Nation’s Collection of Modern Art* [exhibition] (Tate Liverpool, Liverpool: 3 May 2013 - ongoing) <<http://www.tate.org.uk/visit/tate-liverpool/display/constellations>> [accessed 30 Jan 2016].

¹⁶⁰ *Constellations*, <<http://www.tate.org.uk/visit/tate-liverpool/display/constellations>> [accessed 30 Jan 2016].

¹⁶¹ Rachel Taylor, ‘Lorna Simpson: Photo Booth, 2008’, in *Tate Art & Artists* (2008) <<http://www.tate.org.uk/art/artworks/simpson-photo-booth-t12949>> [accessed 30 Jan 2016]. N.B.: As the *Constellations* exhibition is rotating, ‘Photo Booth’ is now on display at Tate Modern instead; see above reference, which has been updated with new display details.

1 how beautiful these portraits are is one thing, but the context of the era is important with respect to what
2 was endured at the time.”¹⁶²

3
4 Around the same time as I was viewing this exhibition, I was exploring the recently-
5 digitized collection of wax cylinders in the library of the University of California Santa
6 Barbara.¹⁶³ I was immediately struck by some parallels between the outmoded cylinder recording
7 technology and the discarded photo booth portraits. Both collections came into being with the
8 intention of identifying and capturing a specific individual person or individual moment in time;
9 however, they have now become opaque and practically esoteric through the passage of time and
10 the excision from their original contexts and purposes. As with the aforementioned Palestrina
11 recordings, several degrees of distance between the original object and the current viewer or
12 listener have been introduced.

13 Taking this concept as a starting point, I chose several wax cylinder recordings¹⁶⁴ as an
14 analog to the snapshots in Simpson’s work. I chose the cylinders in a relatively arbitrary fashion
15 by browsing and selecting recordings that contained strong rotation/mechanical sounds and/or
16 snippets of music, more or less audible or distorted. The interplay between these elements over
17 the course of a recording was the primary area of interest. These were edited and processed
18 electronically using very similar methods to the source recordings for ‘Lamentation’. However,

¹⁶² Taylor, <<http://www.tate.org.uk/art/artworks/simpson-photo-booth-t12949>> [accessed 30 Jan 2016].

¹⁶³ University of California Santa Barbara, *UCSB Cylinder Audio Archive* <<http://cylinders.library.ucsb.edu>> [accessed 31 January 2016].

¹⁶⁴ ‘Bird sounds and piano’ (UCSB Library Performing Arts Special Collections, Cylinder 10634) <<http://www.library.ucsb.edu/OBJID/Cylinder10634>> [accessed 31 January 2016]; ‘Advice by unknown speaker on how to make the best use of one’s days’ (UCSB Library Performing Arts Special Collections, Cylinder 7736) <<http://www.library.ucsb.edu/OBJID/Cylinder7736>> [accessed 31 January 2016]; “‘Bring back my kitty to me” sung to the tune of “My bonnie lives over the ocean” by acapella children’s chorus’ (UCSB Library Performing Arts Special Collections, Cylinder 7934) <<http://www.library.ucsb.edu/OBJID/Cylinder7934>> [accessed 31 January 2016]; ‘Baby song’ (UCSB Library Performing Arts Special Collections, Cylinder 5211) <<http://www.library.ucsb.edu/OBJID/Cylinder5211>> [accessed 31 January 2016]; ‘Black wax home recording of banjo solo’ (UCSB Library Performing Arts Special Collections, Cylinder 13237) <<http://www.library.ucsb.edu/OBJID/Cylinder13237>> [accessed 31 January 2016]; ‘Black wax home recording of brass solo with dog howling and man whistling and calling Muggsy’ (UCSB Library Performing Arts Special Collections, Cylinder 13222) <<http://www.library.ucsb.edu/OBJID/Cylinder13222>> [accessed 31 January 2016]; ‘Black wax home recording of man and woman singing Mother’s prayers have followed me and Sweeter as the years go by with organ’ (UCSB Library Performing Arts Special Collections, Cylinder 12866) <<http://www.library.ucsb.edu/OBJID/Cylinder12866>> [accessed 31 January 2016]; ‘Black wax home recording of a group of men singing drinking songs, August 15, 1915’ (UCSB Library Performing Arts Special Collections, Cylinder 13167) <<http://www.library.ucsb.edu/OBJID/Cylinder13167>> [accessed 31 January 2016]; ‘Black wax home recording of boys attending Nazareth Hall boarding school, Nazareth, Pennsylvania, April 1, 1914’ (UCSB Library Performing Arts Special Collections, Cylinder 13164) <<http://www.library.ucsb.edu/OBJID/Cylinder13164>> [accessed 31 January 2016].

1 in this piece, I chose to incorporate the resulting electronic part within the final, acoustic, piece
 2 alongside the trio of piano, bass flute, and bass clarinet in order to clearly centre the technology
 3 which transmits yet mediates and distorts the fragmentary voices and snippets of music which
 4 can be heard. The notated materials in the piece are analogous to Lorna Simpson's ink drawings,
 5 interspersed amongst the electronic part as well as acoustic elements which directly echo sounds
 6 heard in the electronics. For example, the piano part contains a repetitive 'scissor' motif which
 7 forms a kind of auditory 'scribble,' which sometimes also appears transformed into an
 8 oscillating, 'rotating' figure resembling the percussive sound of the wax cylinders rotating,
 9 prominently heard in the electronics.



11 Fig. 11 - 'Scissor' motif



12 Fig. 12 - 'Cylinder rotating' motif

13
14
15

16 Meanwhile, the bass clarinet and bass flute pass hocket and/or layered motifs between their
 17 respective parts to create a fragmentary *Klangfarbenmelodie* texture which advances and recedes
 18 in prominence at different points throughout the piece. These elements combine into a large-
 19 scale mirror form, where the motifs are 'passed through' a central static passage formed of
 20 vertical layering of previously-heard harmonies (bars 65 – 81) and reappear, transformed, in
 21 loosely inverted retrograde thereafter (bars 82 – 112).

22 Thus, while the music has progressed over time, it is ultimately circular, perhaps
 23 representative of the rotation of a wax cylinder or recurrent patterns of historical events- or both.

24 This piece also served as something of an experiment in how connections between fixed
 25 electronics and acoustic parts might be perceived as connected or disjointed based on their

1 timing and levels of related features. After workshopping the piece,¹⁶⁵ I felt that, while the
2 acoustic instrumental parts were sufficiently suggestive of the electronic sounds, the electronics
3 could be improved by incorporating pre-recorded samples of the instrumental materials and/or
4 were timed more closely with the live performers. These adjustments might change the
5 presentation of the electronic sounds as the primary source from which the live sounds follow;
6 however, ambiguity or questioning of which source is more primary would be intriguing.

8 **Concepts and composition of *Lost Museum III: Llyn***

10 Finally, the third composition in this group, subtitled ‘Llyn’ (pp. 231 - 238 in Portfolio
11 Volume One), the Welsh word for ‘lake’, was written in response to the collages of Welsh artist
12 Ivor Davies. While Davies works in many media, his body of work primarily deals in
13 destruction, decay, and political and institutional violence.¹⁶⁶ In particular, his recent collages
14 focus on what he perceives as the cultural suppression practised upon the Welsh language,
15 communities, and people.¹⁶⁷ One such collage, titled *Epynt*,¹⁶⁸ references the 1965 deliberate
16 flooding of the village of Capel Celyn in order to create a reservoir to supply the city of
17 Liverpool.¹⁶⁹ This event has been widely perceived as an act of political violence perpetrated by
18 the English government against a community supposedly deemed expendable by nature of its
19 rural Welshness.¹⁷⁰

20 The collage presents a nearly flat surface, with granular fragments of dust and detritus.¹⁷¹
21 I wished to reflect this grainy yet limited material, as well as evoke the calm surface of the lake
22 that hides decaying remnants of the razed village- a literal, visual image of the site of the
23 drowned village as well as a figurative representation of decay, fragmentation, and scattering of

¹⁶⁵ The piece was workshopped at Cardiff University School of Music on 17 February 2016 by Carla Rees, Heather Roche, and Xenia Pestova, with electronics operated by myself and conducting assistance by Dr. Robert Fokkens.

¹⁶⁶ Ivor Davies, ‘Artist’s Foreword’, in *Silent Explosion: Ivor Davies and Destruction in Art*, ed. by Heike Roms (London: Occasional Papers, 2015), pp. 8 - 10 (p. 9).

¹⁶⁷ Andrew Wilson, ‘Engaging Thought and Action: Notes on the Work of Ivor Davies’, in *Silent Explosion: Ivor Davies and Destruction in Art*, ed. by Heike Roms (London: Occasional Papers, 2015), pp. 16 - 35 (p. 29).

¹⁶⁸ Wilson, p. 32.

¹⁶⁹ ‘City apology “40 years too late”’, *BBC News* (19 October 2005) <http://news.bbc.co.uk/go/pr/fr/-/1/hi/wales/north_west/4357438.stm> [accessed 13 February 2016].

¹⁷⁰ Delyth Lloyd, ‘Tryweryn: Personal stories 50 years after drowning’, *BBC News* (21 October 2015) <<http://www.bbc.co.uk/news/uk-wales-34528336>> [accessed 13 February 2016].

¹⁷¹ Wilson, p. 32.

1 site-specific identity (the latter aspect being present in a literal sense in Davies' collage by its use
2 of dirt from the site). To this end, I constructed the piece from a palette of eight limited motifs
3 using interrelated rhythms and derived from a hexachord which hints at the Phrygian mode.
4



5
6 Fig. 13 - Hexachord employed in *Lost Museum III: Llyn*
7

8 The piece is scored for flute, viola, and electronics,¹⁷² and consists of four sections. In the
9 opening section of the piece, from the start to rehearsal figure D, each cell recurs eight times
10 before moving to the next motivic cell, with the overlapping of the two parts manipulated by a
11 non-linear overall decrease in the time between each instance of a cell. For instance, the viola
12 begins the pattern with a new cell heard every eight crotchet beats, then seven, then six, followed
13 by five and a half, then six. Meanwhile, the flute enters after the third instance of the first cell in
14 the viola part, with spaces of seven crotchet beats, seven again, seven and a half, six, five and a
15 half, and five and a half again until the new cell appears at the end of bar 15. This establishes a
16 sense of flexible patterning, with 'echoes' which vary slightly between the two instruments,
17 reminiscent of ripple patterns on the surface of water. The close range and nearly-identical
18 dynamic swells used enhance the effect of slightly-distorted echoes.

19 This treatment of the motivic materials continues to rehearsal figure D, with slight
20 expansion of the timbral palette from figure B through the use of flutter-tongue in the flute and
21 tremolo in the viola, gradual introduction of vibrato in both instruments, and the interpolation of
22 dyads in the viola part from figure C. Thus the 'ripples' or 'echoes' are subtly distorted or
23 transformed as they 'expand' or travel outward in the imagined space of the music. The viola's
24 dyads add emphasis to the B flat heard against the A natural of the flute part, while also briefly
25 introducing a new pitch, G flat, in bar 39. This destabilises the established hexachord and
26 foreshadows the harmonic shift at figure D. This section is punctuated at its close by a new
27 timbre- the artificial harmonics in the viola at bar 49.

¹⁷² I omit here an analysis of this instrumentation as it was determined purely by the available performance opportunity at the time of its composition.

1 At this point, at figure D, the accompanying Max/MSP patch is activated, and delay lines and
2 reverb units begin to slowly ramp up on each part. This has the effect of intensifying the echo
3 effect that has already been present in the imitation between flute and viola, increasing the level
4 of distortion, and also introducing an element of uncertainty to sourcing the sounds (especially as
5 the patch's effects begin very subtly, so the new sounds are not quite noticeable at first).

6 After the delay lines and reverb units have reached their peak values, at figure F the texture
7 changes and sample playback begins in the Max/MSP patch. The sample is a combination of
8 processed and unprocessed wave sounds as well as underwater samples (from Llyn Gwynant in
9 North Wales and Lake Winnepesaukee near my family's home in New Hampshire),¹⁷³ with
10 added layers of spectral drones created from the same recordings by processing using Michael
11 Norris' suite of spectral plugins in Logic X.¹⁷⁴ In effect, the slow progression of materials to this
12 point leads to a slightly more direct experience of the sound of the referenced environment, with
13 a shift from the abstracted instrumental materials to more literal, recorded sounds; however,
14 there is also a shift from more live, present, acoustic sources to acousmatic, disembodied
15 sources, raising the question of which is the more direct or 'present' source and manipulating
16 degrees of distancing.

17 From bar 102 to the ending, electronic elements vanish, leaving only the instrumental parts
18 with faint, transformed versions of the motifs trailing off.

20 **Representation of Memory Function in *Lost Museum III: Llyn***

21
22 The granular nature of the employment of limited motifs in this section is not only
23 conspicuously analogous to the materials present in Davies' collage, but also relates deliberately
24 to the functioning of echoic memory. Echoic memory, or early processing, forms the first step in
25 the process of understanding and storing sounds in memory.¹⁷⁵ A steady stream of sound
26 information is received through the anatomical structures of the ear into the auditory nerves and
27 thence into neural pathways for processing; the earliest and most instantaneous processing

¹⁷³ Benboncan, 'Lake Waves 2' <<https://www.freesound.org/people/Benboncan/sounds/67884/>> [accessed 19 January 2015]; Andrew Richards, 'Frozen Lake Ice and Water Sounds', <<https://www.freesound.org/s/146423/>> [accessed 19 January 2015]. Both samples licensed under Creative Commons Attribution 3.0 Unported, <<https://creativecommons.org/licenses/by/3.0/legalcode/>>.

¹⁷⁴ Michael Norris, *Soundmagic Spectral* (beta v. 2, 2010), Logic X, Mac OSX.

¹⁷⁵ Snyder, p. 8.

1 (echoic memory) involves the extraction and categorisation of auditory features (e.g. pitch,
2 timbre, loudness) for perceptual understanding by the brain and the activation of short-term and
3 long-term memory functions.¹⁷⁶ Auditory events at this sensory level are grouped together by
4 virtue of their timing, similar perceptual features, and the neural pathways of the listener
5 (familiar sounds traveling through already-established pathways).¹⁷⁷ The listener is primed by
6 repetition of current sound events as well as their past experiences (previously-reinforced neural
7 pathways) to then subconsciously group the sounds into larger patterns and form an
8 understanding of their basic relationships over time, forming an integrated perceptual experience
9 of ‘sound-images’ of the acoustic environment that interact with extant memories.¹⁷⁸

10 It was precisely this granular, unconscious level of perception I wished to reflect in *Lost*
11 *Museum III: Llyn*. Echoic memory processes occur on a scale of milliseconds,¹⁷⁹ which would be
12 impossible to accurately portray compositionally for obvious practical reasons; therefore, the
13 motivic materials in the piece occur more closely in relation to the understood scale of short-term
14 memory processing, around 3 to 7 seconds per event.¹⁸⁰ Despite this necessary expansion of
15 scale, the operation of the motifs does form a near analogue to echoic processing: encapsulated
16 events defined by pitch, timbre, and loudness, transformed by subtle adjustments to these
17 aspects, and grouped in a patterned and integrated fashion by means of their timing and
18 repetition. As the particles of dust used in Davies’ artwork formed by their grouping a kind of
19 ‘place-memory’, so the motivic ‘grains’ in my piece should form a specific ‘sound-memory’
20 reminiscent of the immediate perceptual experience of a sound source (in this case, of the lake).
21 Similarly, the electronics also play upon the concept of grouping versus disjunction of sound
22 events and orientation versus disorientation in the perception of sound sources.

¹⁷⁶ Ibid., p. 20.

¹⁷⁷ Ibid., p. 20.

¹⁷⁸ Snyder, p. 23. See also Clarke, p. 31.

¹⁷⁹ Snyder, p. 19.

¹⁸⁰ Ibid., p. 47.

1 **Conclusion**

2
3 Taken as a whole, this portfolio demonstrates a process of exploration along the boundaries
4 of and within the interactions between the three research concepts discussed in detail in Chapter
5 One— systemisation and generative compositional methods, reflection or commentary on the
6 experience of music itself, and integration of acoustic and electronic techniques— while
7 discovering methods of working that effectively combine these concepts in ways that
8 successfully achieve the individual aims of the pieces.

9 Regarding the first theme, Chapter Two’s analysis of *Phyllotaxis* and subsequent works
10 containing derivative techniques describes an investigation of a strict application of procedural
11 generation as a method of achieving unity of design while maintaining local-level contrasts, and
12 the consequent adaptation of these techniques to more flexible deployment to accommodate the
13 inclusion of other concepts and methods in later works.

14 Chapter Three describes a process of exploration of the effects of different collage
15 techniques, settling upon a hybrid approach combining collage elements with the aforementioned
16 generative techniques and electronics-informed methodologies in order to better represent
17 concepts of listening and remembering as a creative, generative act as well as a selective process
18 of preservation, entropy, and *bricolage*.

19 Chapter Four illustrates the development of pitch approaches that satisfactorily serve the
20 other concepts and design principles in order to adhere to multi-level structural unity.

21 Chapters Five and Six show solutions discovered regarding how to convey most effectively
22 the pieces’ individual histories of transmission and traces of their technological past, as further
23 mediated and interpreted by my own listening and remembering.

24 Finally, Chapter Seven’s in-depth case study of the Lost Museum set of works illustrates the
25 refined synthesis of approaches and techniques building upon the findings in earlier pieces in the
26 portfolio, showing a way of working that efficiently combines the research concepts in service of
27 the desired goals of the individual compositions and displays a distinctive compositional voice.
28 These compositional methods, refined over the course of the composition of the portfolio and
29 representing significant shifts and progression in my practice, add up to a specific blend of
30 techniques that, taken together, define the original features of the works presented: the balance of

1 generative and borrowing procedures combined with the focus on mnemonic concepts; the
2 technologically-informed transformational methods; and a deliberately delimited yet inclusive
3 post-tonal approach to pitch with a modal trend.

4 As the research in connection with the portfolio has been wide-ranging and interdisciplinary,
5 there have been points in the composition of the portfolio where it has been necessary to truncate
6 or disregard possible branches of work in order to maintain specific focus on only the three
7 defined research topics and their integration. In particular, some topics deliberately left
8 unexamined in this portfolio include: the implications of purely electronic or acousmatic sources
9 versus acoustic sources in terms of the memory concepts relevant to the portfolio, focusing
10 specifically on a blend between electronic and acoustic sources; possibilities of procedural
11 generation using computer and electronic tools; questions of soundscape versus collage as
12 compositional frameworks; questions of listener control and interactivity; detailed investigation
13 into implications of site-specific performance on spatial and perceptual aspects of the works in
14 the portfolio; more nuanced and complex employment of microtonality, spectral techniques, and
15 live electronic processing; and undoubtedly, several other pathways. In particular, the latter three
16 listed aspects—site-specific performance, expanded pitch space, and more extensive and
17 complex use of live processing—are avenues for future development of the foundational
18 practices explored by the portfolio works that will form next steps for me to build upon my
19 previous work.

20 The music composed for this portfolio is representational, in the sense that each piece
21 communicates specific sonic ‘images’, moments, and environments; yet it is also mediated by
22 personal memory, compositional processes, and technology. This allows it to present a holistic
23 auditory experience tying together numerous divergent threads with both cohesion and
24 heterogeneity. By focusing on the active, ongoing nature of listening, memory, preservation, and
25 destruction, the pieces can act as a conduit for connections and collaborative listening and
26 remembering—a kind of lightning rod for musical memory.

27

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