



**Reimagining My Music Creation: A Polymodular Synthesis A portfolio of three compositions and exegesis**

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**Reimagining My Music Creation:**

**A Polymodular Synthesis**

**A portfolio of three compositions and exegesis**

**Exegesis**

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Doctor of Philosophy

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## **Abstract**

Synthesizers changed the way I hear and understand sound, revealing surprising synergies between the electronic oscillator, the world of music I had known up until that time, and the natural world which has always inspired my musical thinking and creation. In embracing the synthesizer, my music was altered in ways that go beyond the adjustments made in re-conceiving a work for different forces. By virtue of their intrinsic and unique nature, synthesizers challenged and then modulated my thinking about every aspect of my music creation from idea, thematic development, form and orchestration through to realisation.

This submission presents an opera recorded and explored during the research period and two multi-movement works composed and recorded during the research period. The exegesis outlines the journey undertaken from my work as a score-oriented composer of music for acoustic orchestral instrumentalists and vocalists, to my work as a synthesizer-oriented composer-performer of my music for electronic instruments.

The evolving story contained in the musical works composed as the primary dimension of my research is strongly autobiographical. Accordingly, an autoethnographical methodology complements the foundational methodology of research led by artistic practice.

The challenges involved in this journey were conceptual, technical, aesthetic, and methodological. This exegesis examines these various lines of development via the three works in the portfolio and, with reference to the scores, videos and recordings, the artistic responses and solutions resulting from my research. Excerpts of other works are offered as points of reference where relevant. Ultimately the work is examined for evidence of a polymodular synthesis between art, science and technology, forged in the creation of the music. Future creative potential for the candidate is considered, and to music composition more broadly in the electronic, digital age.

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## **Statement of Originality**

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Name: Peter John Rankine

Date: November 11, 2020

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And to the Sweet Peas, who inhabit our landscape and inspire our music – and, evidently, help get the fire going every morning.

## Abbreviations

This is a list of abbreviations used in this Exegesis

- AC Alternating current
- ADSR Attack, decay, sustain, release, the four most commonly used parts of an “envelope” used for shaping sounds. (Some recent synthesizers offer Delay, A, Hold, S, R.)
- ARiM Artistic Research in Music
- B!* My 1994 opera *Bunyip!*, with a libretto by Jenny Wagner based on *BoBC*
- BCE Before the Current Era
- BE* *Bunyip Endeavour*, an original work composed for the Endeavour Trio plus pre-recorded electroacoustic sounds, discussed in Chapter 3.
- BoBC* *The Bunyip of Berkeley's Creek*, a picture story book by Jenny Wagner with illustrations by Ron Brookes.
- BP* *Bunyip Polymodular*, an original five movement work for synthesizers, discussed in Chapter 5.
- CV Control voltage
- DAW Digital Audio Workstation, a system for recording and editing digital audio. In this exegesis it refers to my (now defunct) ProTools software and hardware rig.
- DC Direct current
- GUI Graphical user interface
- LFO Low-Frequency Oscillator, produces signals used to modulate other sounds, usually below 20Hz.
- M1 Moog One synthesizer
- MIDI Musical Instrumental Digital Interface
- NOW New Opera Workshop, Brisbane, 2019
- OASYS Korg OASYS workstation/synthesizer

- P6 Sequential Prophet 6 synthesizer
- QCM Queensland Conservatorium of Music
- QCGU Queensland Conservatorium Griffith University. QCM became an institution of Griffith University in 1991.
- QSO Queensland Symphony Orchestra
- QYO Queensland Youth Orchestra
- QYSO Queensland Youth Symphony Orchestra, the “flagship” orchestra of the QYO.
- VCA Voltage-Controlled Amplifier, which controls the amplitude of the synthesizer sounds.
- VCF Voltage-Controlled Filter, used to shape the harmonic spectrum of the sound.
- VCO Voltage-Controlled Oscillator, the source of the sound in (VCO) analogue synthesizers.
- VSL Vienna Symphonic Libraries, one of the top tier producers of sample libraries and sample host software.

## List of Media

The number labels of all media listed here are hyperlinked to online material (hosted at SoundCloud and Vimeo). By way of cross-referencing, these are also hyperlinked in-text. Using the same file numbering, a backup copy of these files is located in this [Dropbox folder](#).

All files are audio (mp3) files, unless specified as video (mp4) files.

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## Chapter 1: Introduction

### 1.0 Context and research question

The beating heart of this research is the audio-frequency voltage-controlled oscillator (VCO). These power-driven circuits which form the voice of the analogue music synthesizer have transformed my ideas about music and my approach to music composition. The research presented in this thesis and portfolio was already well underway when I began to interact with the Prophet 6<sup>1</sup> synthesizer (P6). However, the effect on my artistic research of both the sound and the idea of the VCO was profound. The VCO allowed me to hear music with new ears. It brought my earliest musical memories flooding back to me and integrated those sounds with the music I had created over many years of freelance life as a contemporary classical composer. The VCO opened a direct connection to natural phenomena and demanded that I reconsider how I approached music creation from that moment on.

The original focus of my research was to find alternate pathways to music production as a composer in the 21st century using technologies and musical instruments of the 21st century.<sup>2</sup> Having my ears opened to the synthesizer and synthesis, the creative challenge that forms the research question of this submission was to find a compelling fusion of my musical predilections and this unique, if disruptive<sup>3</sup> instrument, to produce new work. Being practice-led research, this question and my responses to it are woven through the scores and recordings of the music that constitutes the larger part of this PhD. This exegesis provides a contextual, ethnographical and analytical account of the processes and products of the research.

### 1.1 Structure and overview of this exegesis

In this introductory chapter, I will establish relevant biographical context to my research and describe my approach to the research question. The term *Artistic Research in Music* (ARiM; Borgdorff, 2012) well describes one thread of my approach in this

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<sup>1</sup> The Prophet 6 was released by Dave Smith in 2015, the first under his re-acquired company name Sequential (shortened from the original Sequential Circuits). The Prophet 6 hews closely to Smith's Prophet 5 from the late 1970s through to mid-1980s, an innovative instrument for its patch memory and polyphony, and treasured for its sound. With modern oscillators, the tuning on the Prophet 6 is far more stable.

<sup>2</sup> Whilst invented in the 20th century, the analogue synthesizer has been revived and thrives in various electronic music circles and continues being developed. My instruments benefit from 21st century technologies in their construction, such as in more stable tuning.

<sup>3</sup> Disruptive to my ideas and workflow, in the best possible way.

dissertation wherein I will explore the research based on artistic practice which resulted in the new artistic works that form the primary part of the doctoral submission. A second thread examines the research via the perspective of autoethnography, wherein the role of the self in shaping and influencing the course of research is recognized as both necessary and desirable. It was a natural fit to embrace an autoethnographical narrative as part of my PhD because of the strong linkages I perceive between peak life experiences and music insights made in the course of my research. The process of composition in this research particularly involved finding the resonant synthesis between various parameters of musical composition, life experiences and observations of the natural world. The connection between these worlds was provided by the VCO and an Australian Magpie called Sweet Pea. The understanding of how these discoveries shaped my research is provided by the autoethnographical and artistic context. Chapter 1 concludes with a review of literature in relation to these two research methods. Parts of the literature review are held over to subsequent chapters to enable placement of relevant references in context. Literature regarding historical and contemporary approaches to opera production are pertinent to the discussion of my opera *The Crushing* in Chapter 2, while some literature pertaining to synthesizers and synthesis is included in Chapter 4.

In Chapter 2 I will explore the challenge of achieving production for operatic works, viewed through the prism of my opera *The Crushing*. Major companies in Australia (and by and large, globally) are firmly wedded to 19th century opera, and there is scant opportunity for composers to contribute to the repertoire. The literature shows however that historically, many composers were prepared to adapt their works according to demand or circumstance and indeed, today some creatives are adapting to circumstances by developing and presenting their work in alternative ways. Originally commissioned as a work for conventional forces, *The Crushing* underwent several stages of development over several years, ultimately bringing me to the decision that I, also, needed to find other pathways to production.

The subject of Chapter 3 is *Bunyip Endeavour (BE)*, a new artistic work that proved a pivotal and transitive work in my PhD. This work enabled me to explore unfulfilled themes and ideas from an earlier work based on the illustrated children's book *The Bunyip of Berkeley's Creek (BoBC; Wagner, 1973)* and an associated opera *Bunyip! (B!)*. *BE* provided the opportunity to collaborate with the three musicians of Endeavour

Trio and a visual artist, and to include a synthesizer and studio-produced electro-acoustic sounds for the first time in concert in my music. In preparation for the concert, I identified one signature dimension of interaction between electronic and/or electroacoustic material for each of the three musicians, according to their personalities and predilections, to explore the interaction between acoustic and electroacoustic elements and to examine the results of these interactions. The dynamic, sum effect of the voice quality of the P6; the interaction between acoustic instruments, players, and recorded material; and the interaction between narrative, music and graphic ideas, resulted in the exploratory thread of an electronic instrument becoming the defining voice of the final, cumulative work in my portfolio, *Bunyip Polymodular (BP)*. Thanks in part to the visual artist's whimsical and playful yet insightful illustrations, the narrative story of Bunyip was liberated from its former moorings in the original story to develop new scope in *BE* and *BP*.

In Chapter 4 I will discuss the oscillator and the synthesizers that became the heart of this PhD, and how they inspired and guided my research. The analogue synthesizer gave me a deeper appreciation of the natural world, including an enriched understanding of the physical properties of birdsong that have threaded through my music since my earliest compositions. Being electromagnetic, the energy powering the VCO is of the same nature as the energy from the sun that powers the earth's biosphere, and this connection allowed me to embrace electronic sound sources as inherently *of* the natural world and not *apart from* the natural world. For the ears, this connection is satisfied by the rich harmonics of the VCO and co-constituent tone-shaping synthesizer modules. Together with other conceptual and practical discoveries along these lines, this changed my approach to music creation.

The subject of Chapter 5 is *BP*, the final work of this submission. As the result of my research, it is in technical and metaphorical senses of the term a work of polymodular synthesis. The core thematic ideas and broad formal compositional concepts have been *modulated* by a productive dialogue between synthesizers and my existing compositional processes and techniques. Furthermore, where *BP the music* is constituted in the development of musical ideas expressed through the media of electronic musical instruments and based on an inspirational story, there is, to use a term of music compositional craft, a second subject – *BP the research* is constituted in the development of my musical thinking. The identification of a *dynamic polymodular*

*interaction* between mind, musical ideas, and electronic instruments resulted in a new, multi-dimensional synthesis of art and technology.

Chapter 6 is the conclusion of this exegesis. It summarizes my modes of enquiry and the major themes that have emerged through this research, culminating in new artistic works and a comprehensive reorientation of my approach to creating music. The chapter summarizes how an autoethnographical lens helped me explore and describe the deep connections between life experiences and the developments in my creative work as composer, performer and producer of music. This process of reimagining music creation is, I suggest, an example of polymodular synthesis which will provide the basis of my future work.

## **1.2 Background – from beginnings to *The Crushing***

The sources of my inspiration are and always have been eclectic, however the process of composition in this research ultimately involved finding the resonant synthesis between various parameters of musical composition, life experiences and observations of the natural world. Aspects of my biography played a key role in shaping the creative work in this portfolio. Accordingly, a relatively substantial outline of the background to my musical development as a composer is warranted, with particular reference to experiences, sources of inspiration, themes and ideas that are pertinent to the works presented in this portfolio. This will include some sonic memories from early childhood; the impact of *piobaireachd* on my musical development; experiences with jazz and theatre; formal music studies and my development as a composer; and the loss and subsequent recovery of health.

### **1.2.1 Crickets, birds and LPs**

My first musical memories from early childhood are of insects and birdcalls, and these sounds have shaped my music from my first compositions to those in this PhD. My family's house in far north Queensland backed onto the rainforest from which came sounds that could be wonderfully melodic, subtle, or riotous depending on season, weather, and time of day. The deep night afforded a sky full of stars, and for more years than reason ought to have allowed I thought them the source of the sounds of polyrhythmic crickets and thrumming, phasing cicadas. Few places on earth would have been better served with wonderful birdsong, and this was consciously the thing I loved most, when I was a little older, about canoeing on nearby rivers.

Granted permission to select and play LPs in my family's home from about age eight, I most often reached for orchestral music. It took me somewhere else, as I sat on the floor close to the gramophone. The imprint of those recordings was clear when I heard and saw an orchestra live for the first time aged sixteen – I was metacognitively aware that I knew about the instruments from the records, and was able to experience the theatrical dimension of breathing, working players delivering their performance in four-dimensional<sup>4</sup> glory.

### 1.2.2 The pipes - harmony, rhythm and melody

The first instrument I studied, from the age of twelve years, was the highland bagpipe, and was awakened to its most interesting music, *piobaireachd*, in Scotland at the age of fifteen. A non-notated music learned by listening and singing, *piobaireachd* introduced me to the centrality of the voice, even in an instrumental music idiom. Were it notated, the notes at the end of phrases would be slightly elongated which, I discovered later, characterises much of Messiaen's melodic phraseology.

On leaving school I sought further tutoring in *piobaireachd* by Donald Bain in Wellington, New Zealand. His gift to me was rich, for when listening to him closely my ears came to perceive the delicate interplay and dance of harmonics. Drones were no longer single-pitched, but a halo of harmonics that, when the instrument was as well prepared as was Bain's, created subtle chords of harmonics drawn out in sympathetic resonance to the *piobaireachd* melody tones of the chanter. Discomfited however by my determination to be a full-time musician, *in loco parentis* his second gift to me was to urge me to swap my pipes for another instrument, such as the flute I had then recently acquired. *Piobaireachd* was an avocation for enthusiasts, and never would be a career choice, Bain insisted. I ceased to play the pipes at the age of twenty-one years<sup>5</sup>, however my regard for the unique and rich idiom that is *piobaireachd* is manifest in a number of my works<sup>6</sup>, including in this PhD. This background gave me a pathway into the music of Bartók (harmonic, rhythmic, melodic and idiomatic dimensions), and of Messiaen (melodic-rhythmic phraseology).

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<sup>4</sup> Time being the fourth dimension in the space-time continuum of physics.

<sup>5</sup> The tunes of *piobaireachd* remain with me and I was able to send off my father at his funeral twenty-five years later with *Lament for Mary McLeod*.

<sup>6</sup> My compositions *Celtic Cross* (1990), *Time and the Bell* (1990), *John Brown, Rose and the Midnight Cat* (1992), *Symphonia Dialectica* (1988), and *From Fire By Fire* (1989), all have some *piobaireachd* traces in their marrow.

To pipers, *piobaireachd* (art of piping) is *cèol mòr* (the big music) and all else is *cèol bheag* (the little music). Playing airs and piping for dancers was a pleasure, but of my qualified feelings about pipe bands, drumming was easily the most fascinating part. The *ad libitum* excursions of the better snare drummers was responsible, I realised later, for my first experiences of playing in a polyrhythmic ensemble.

### 1.2.3 Experiences with jazz and theatre

Embracing the flute, a period in Sydney allowed me a richer diet of music comprising concerts, jazz classes at the Conservatorium, private tuition, and my first exposure to contemporary classical music. Whilst I never pursued jazz studies much beyond that year, lessons from Don Burrows came back to me in this research<sup>7</sup> as I transitioned from working as a composer to working as a composer-performer and, most particularly, a composer-performer embracing a measured degree of improvisation (and chance) in presentation of the music. Compared to my accomplishments as a piper, however, I felt (correctly) my neophyte status as a flute player rendered me ill-prepared for life as a jazz musician, and I returned north for a stint of science study.

While being a selective student of science at James Cook University, the experience of creating music for theatre in Bryan Nason's production of *The Tempest* in Townsville in 1980 was deeply rewarding. The sense of a strong connection between the languages of drama and music has never left me – I perceive music always partly in theatrical terms and I hear drama always partly in musical terms. Two events compounded this impact on my life. In a stunning *tour-de-force* performance by *Silk* (a theatre troupe from Rotterdam) the *Oresteia* had me immediately locating and reading the three plays<sup>8</sup> to deepen the experience and get better acquainted with this wonderful literature. Just weeks later, a performance of Bartók by the Sydney String Quartet definitively ended my formal studies of science studies and set me on a course to the Queensland Conservatorium. I identified strongly with Bartók's *String Quartet No 5* owing to his deep regard for *his* folk music (a close relation of *my* folk music, it seemed to me) and a harmonic language that excited me in a way that purely triadic music did not. I

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<sup>7</sup> One was, "don't fill every corner of every bar – leave some space for the music to breathe". Another, referencing Charlie Parker, was that before one could "forget all that shit and just play", one really did have to *learn* "all that shit."

<sup>8</sup> The *Oresteia* is usually understood to be three plays by Aeschlyus, but this production combined works of three different playwrights – *Agamemnon* by Aeschlyus, *Orestes* by Sophocles and *Electra* by Euripides.

comprehended that I must learn also this *other* language he spoke – that of the classical tradition – that allowed him to compose this vibrant, muscular music.

#### **1.2.4 Finding composition**

Flute playing gave me entry to the Queensland Conservatorium of Music (QCM) and was the major study for my Bachelor of Music. Composition, however, grew effectively to be my principal study. This was stimulated and nourished by lessons with John Gilfedder and later Richard Mills that prepared me to undertake a Graduate Diploma of Music in composition. An array of influences shaped my work including some additional lessons with Vincent Plush and Michael Hannan that broadened my perspective. I recall a decisive moment when I showed Mills a sketch of what I thought might be an orchestral opening, which he affirmed and commanded me to finish. The result five months later was *Three Movements*, lasting 18 minutes. Movements I and II were performed by the QCM orchestra, and Movement III by the Queensland Youth Symphony Orchestra (QYSO), all conducted by John Curro. The following year they were performed by the Queensland Symphony Orchestra (QSO) conducted by Neil Flottman. The night of the first performance of Movements I and II and is seared into my mind because as I lay awake I realised that I had already heard the work, in terms of its orchestral colours, its form and its dramatic contours, before the first rehearsal.

#### **1.2.5 First commissions**

An excellent outcome of *Three Movements* was that, supported as I clearly was, I secured commissions to compose music for the (then) Queensland Theatre Orchestra and Expressions Dance Theatre, followed by a twelve-month composer residency with the Queensland Youth Orchestra (QYO). Of this residency *Symphonia Dialectica* was a pivotal work. A month-long intensive period studying with Oliver Knussen (in Melbourne) galvanised in me the feeling I had for more complex metres and polyrhythms which, to him and in his music, were brilliantly clear and essential. *Symphonia Dialectica* gave me a large canvas on which to develop ideas and techniques, with this excerpt [1.2.5](#) (0:51) demonstrating the beginning of the finale.<sup>9</sup>

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<sup>9</sup> At the time of this broadcast performance in November 1995, I was excited that the QSO performed the work as well as they did, though the performance is in some respects mediocre. Reflecting on this helped me accept that my own less than perfect performances of my music in this PhD actually stand up well beside the work that many professional performing musicians have offered on my behalf.

*From Fire By Fire* for the Queensland Wind Soloists in 1989 carried the unusual instruction from the group to “make it hard – especially for the horn players”. I obliged. If I had held anything in check for *Symphonia Dialectica*, I used this opportunity to “push the envelope” as far as my skills and the players’ skills were concerned. It is the only time I have been anxious about a piece “working”, because I was trying to capture ideas, shapes and sounds that were well outside of my former experience; some members of the ensemble also were not comfortable, especially in the earlier rehearsals. It was a wild ride for us all, but I had never had such a devoted, extensive rehearsal regime applied to my work, and the musicians did us all proud. That year, we won the Sounds Australian state awards for work and performance. Queensland Wind Soloists followed up with a CD recording – a first for them, a first for me, and first on the new 4MBS-FM label. After the recording, the group put the work aside for a year, then picked it up again to take on a tour of Canada and the USA. It was simply astonishing to hear it in concert after that fallow period – that which had been so hard won with sweat and probably tears, now sounded very natural, with the ever-changing rhythms playing a supple, wonderful dance. This was the first time for me that I understood how profoundly the *performance* of a work *changes* the work. I wished for all my works that they could have several performances as this one had. By contrast, it was confronting to reflect that most of my orchestral works to date, by comparison, had been sight-read in performance. I was particularly excited, therefore, that the next two commissions gave me an ally centre stage; a fine soloist whose command of the music would elevate the premiere performance.

#### **1.2.6 Creation and recreation**

A second residency with the QYO afforded me the chance to compose *Celtic Cross*, a concertino for violin and chamber orchestra with Graeme Jennings as soloist. Meanwhile, Paul Dean and *Musica Nova* commissioned *Time and the Bell*, a clarinet concerto for the 1990 festival. An exhibition of works by Henri Matisse at the Queensland Art Gallery reminded me that *Nasturtiums et la Danse* was one of at least two works that incorporated his earlier painting *La Danse* – now effectively a special prop in his studio, renewed by re-creation and re-contextualisation. Thus I explored the idea of creating two concertos with some shared “DNA” confident that, although there would be identifiable musical material that crossed from one concerto to the other, my writing for the two distinctive soloists and their very different instruments would ensure

the pieces would be siblings but not twins. The shared material was a synthesis of the formal, harmonic and melodic ideas of the ritornello, passacaglia, and chaconne. *Celtic Cross* and *Time and the Bell* share the result of this hybrid thinking in one episode in particular and yet many points of difference render them distinct. Collaborating with the soloists was a joy, and the experience of composing the two related works was instructive. The concept of modularity explored in the final two creative works of this PhD was seeded in this experience.

As I composed these two works, I was aware of my *piobaireachd*-playing younger self in some of the melodic and rhythmic figures, particularly in the soloists' parts. Additionally, the orchestration of *Celtic Cross* was influenced by sonorities of Celtic music with a wind section favouring the four double reeds augmented by just one clarinet (a bass); there were two horns but no other brass; one percussionist and a small string section. The opening violin solo, and indeed its development for the duration of the work is, very loosely, a *piobaireachd*. Similarly, the very opening of *Time and the Bell* is not literally but *of the essence of* and inspired by *piobaireachd* figures, though its development takes in a broader range of elements. The work is almost twice the length at 18 minutes and was always intended to have its own trajectory.

### 1.2.7 Music for theatre

*John Brown, Rose and the Midnight Cat* for the inaugural *Out of the Box* festival at Queensland Performing Arts Centre in 1992 introduced me to author Jenny Wagner and a creative team who all made for a wonderful experience in theatre creation.

Subsequently I collaborated with Jenny again through her role as librettist for *Bunyip!* Whilst this 50-minute opera from 1995 has not been performed, its story and its musical kernels have remained with me and were ripe for major development in *BE* and *BP*. These are discussed in Chapters 3 and 5.

*Surya Namaskar, Chaand Namaskar* was a watershed work in my development of concepts of form, and of polymetric music. It was inspired in part by the *idea* of metric *feet* in poetry; and the use of patterns I heard in Rajisthani folk music (as heard in several performances by the *Rajisthani Desert Folk* musicians at the Brisbane Biennial, 1992) and played (as a student of the *tabla*) in Indian classical music. The kernel of the work is a simple, summative rhythm from playing three against five, and the entire 18-minute, five movement work relates to this polyrhythm. Variations in the

accompaniment of a melody are achieved in a polymetric setting by, for instance, allowing the patterns of five and the patterns of three to intermingle, with one or other taking prominence at different times. The same two fields are incorporated into the sinew of the melodic line itself, allowing it to be inflected one way, or the other, or both simultaneously. This concept of music existing in a polymetric field is, I think, analogous to Messiaen's music that exists simultaneously in several tonalities. These metric ideas are explored in *BP* and discussed in Chapter 5.

### **1.2.8 Loss and recovery of health**

In the worlds of film, or blues or rock or theatre or the fine arts, stories of addiction are never trivial but are not necessarily unusual. They seem to be less discussed in the classical music world. Unfortunately for me, alcoholism and addiction rudely interrupted a promising career. By the time I "got clean and sober" in late 1995 much destruction had been rendered to my health and my career, and several professional and personal relationships did not survive it. This is immensely regrettable but is a fact of my life.

Even less discussed in every domain is the quite possibly related matter of childhood trauma, such as sexual abuse – a connection plausibly made by Hari (2015). In any case, a brief mention of it here is in gratitude to the courageous people who have spoken up and, accordingly, have helped to save and heal my life. Since our governments, policy makers, society and institutions continue to allow outrageous leeway for trusted adults to hide behind their office and privileges, I determined I would name it (and obliquely, *them*) here. I was deeply scarred by childhood sexual abuse, as most survivors are. As has been revealed in recent documentaries, enquiries and publications, many people consequently die by desperate misadventure including by suicide. Fortunately, I have survived it and (can finally say) am glad to have done so. After my world collapsed in the early 1990s, the years I spent learning to negotiate my way in life on new terms correlates to years of lean production (in music composition terms) from the mid- to late-1990s. I did, however, finish my Master of Music and a Bachelor of Education at the University of Queensland; I remarried, learned to teach music from Years 1 to 12 and did so for some years before beginning to take on commissions again. Ultimately, I left teaching in 2010 for the joys and vicissitudes of freelance life – thanks in large measure to a supportive partner.

I had changed by then – and so had the music world. Public funding for commissions was a diminished pool contested by an augmented field of worthy applicants. The digital revolution was responsible for other changes. With encouragement from a friend and colleague, I purchased ProTools<sup>10</sup> and learnt to make recordings as a studio-based composer, to fulfil commissions by way of delivering a recording rather than a score. I have developed some skills around the use of the Digital Audio Workstation (DAW) for a dozen years now, up to and including this PhD. My DAW was a central player in the recording of *The Crushing* (discussed in Chapter 2) and played a role in *BE*.

### **1.3 Literature review**

This chapter concludes with a review of relevant literature on the methods that shaped my research. This includes a brief discussion of research based on artistic practice, and the rationale for including an autoethnographic component to my exegesis. I also discuss the role of collaboration as a research method; the importance of digital and electronic media in the course of my research; and the placement of this research in an academic environment.

#### **1.3.1 Artistic Research in Music (ARiM)**

The major part of this PhD is a folio of creative work that is a product of research based on artistic practice. This exegesis documents and discusses the ways I have experimented, analysed and refined my approaches to music composition. The two components are considered to be an integrated whole - the portfolio component is understood substantially as the realisation of the artistic research process as documented in the exegesis, and concomitantly the portfolio items may be considered as raw data produced by the research process; the exegesis analyses this data and discusses the results of the analysis. In seeking a terminology for research led by artistic practice, Borgdorff (2012) wrote, “The practice of the arts is central to artistic research” (p 145). The published literature over the last fifteen years has proposed a range of terms for this research methodology, as is well described by Emmerson (2018). The distinction between *Practice-led Research* and *Practice-based Research* (Candy, 2006) is still used

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<sup>10</sup> Avid’s (formerly Digidesign’s) ProTools is one of the most widely-used Digital Audio Workstations and, originally released in 1991, one of the first. In broad terms it began as a digital replacement for the analogue recording console, and its workflow and layout are most easily grasped with that fact in mind. By contrast, Steinberg’s DAW software Cubase developed an early facility with the language of MIDI and virtual instruments. Traits arising from these foundations are still clear on both platforms even after 40 years of development.

widely. Others that can pertain to music include *Performative Research* (Haseman, 2006), *Arts-based Research Practice* (Leavy, 2015), *Practice-led Research & Research-led Practice* (Smith and Dean, 2009), *Research through Practice in Performance* (Freeman, 2010), *Practice as Research* (PaR; Barrett & Bolt, 2007), *Performance as Research* (Nelson, 2013), and *Artistic Practice as Research* (APaR; Nelson, 2013 & Doğantan-Dack, 2015). “The terminologies that juxtapose *practice* with *research* suggest an essential difference to be reconciled and, partly to avoid that implication, the terminology of Artistic Research (promoted by Borgdorff, 2012) and more specifically Artistic Research in Music (ARiM) now seems to be gaining most widespread acceptance, certainly in Europe and now in Australia” (Emmerson, 2018, pp. 29-30). Such research based on and led by artistic practice describes my core approach in this dissertation.

The concept of an emergent methodology was coined by Nelson (2013), reflecting the fact that in practice-led research, the results of the research emerge through artistic practice, and this describes perfectly the way this research developed. My creative work required solutions to be found to overcome obstacles and problems. As my research developed through arts-led solutions to creative challenges, the nature of the materials I worked with also changed. The tangible products of the research are scores (for the earlier works), audio recordings (for all stages), and video recordings (for parts of the final work). This complementary exegesis discusses the processes, the research findings, the conceptual framework for the practice, the context and lineage of related ideas, through the lens of autoethnography.

### **1.3.2 Autoethnography**

Autoethnography is a research methodology that requires the researcher to draw on their experience to extend their understanding about an issue, acknowledging the “inextricable link between the personal and the cultural and to make room for nontraditional forms of inquiry and expression” (Wall, 2006, p. 9). Or as Lawrence (2011) suggests, everything a composer produces is, essentially, autobiographical.

In the context of social science research, Adams et.al. (2014) describe the value of recognizing that researchers’ lives and experiences are intertwined with their research projects and participants. Autoethnography recognizes the role of the self in shaping and influencing the course of research as necessary and desirable (Ellis et.al., 2011).

Bartleet (2013) extends this principle to the creative arts, arguing that autoethnography “has provided artists with a means to understand, contextualize and communicate the personal stories behind their artistic experiences” (p. 444). This can in turn enhance artistic research by expanding the artist’s awareness of their practice and enable them to communicate their journey with intellectual rigor and creative reflection, and as Ellis (1999) describes, illuminate cultural experience.

It was a natural fit to embrace the dimension of an autoethnographical narrative as part of my PhD because of the strong linkages between music insights made during my research and peak life experiences. What drives me more than anything else in my studio is the excitement of making connections between different dimensions of my life, across various disciplines, embracing personal values, artistic values and observations of the natural world. These connections shed light on the work I am now doing and are the epicentre of my research and artistic practice. For example, birdsong introduced me to music and continues to be a powerful source of inspiration and pleasure. As my research progressed I came to identify the magpie as a black-and-white-coloured pair of oscillators and filters<sup>11</sup>, controlled by a superb musical mind. This observation is corroborated by scientific investigation into the mind, songs and habits of this endlessly fascinating bird (Kaplan, 2019; Schmidt and Wild, 2014). The role of the magpie as collaborator from the natural world is discussed variously in Chapters 3, 4 and 5. As a voice in my music, it features prominently in *BP*.

My ideas, aesthetic values and sensibilities, and the musical culture in which I became a professional musician all influence my research including what and who I study, and how I interpret and value what I experience. This is consistent with the heartfelt ethnography described by Ellis (1999). My research does not present a broad analysis of the world of synthesis but an exploration of pathways that would lead to a resolution of my research question. Autoethnography assists me to make conscious the personal and cultural variables that accompanied me during this research process. Autoethnography expanded my awareness of the factors that influenced the pathway that I took. The validity of this work as research, as described by Ellis (1999), is that it seeks verisimilitude; that the journey and the outcomes will be found coherent and credible.

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<sup>11</sup> The syrinx of oscines (songbirds) comprises two independent sound producing and sound shaping apparatus.

When I wrote my Masters dissertation in the early-mid 1990s<sup>12</sup> personal opinion and the acknowledgement of emotion in research were *verboten*. One strived for objectivity. How one felt about something was considered to be unacademic and therefore irrelevant. It did strike me at the time as ironic because Plato, whose greatest gift to Western philosophy, I have heard said, *is Western philosophy*<sup>13</sup>, was not afraid to discuss, grapple with and seek to understand the effect of various kinds of music on the soul<sup>14</sup>. I figured at the time that Plato probably was not wrong to be examining these questions, but there was (again ironically) a sea yet to navigate between one of the progenitors and towering figures of Western philosophy in the late 5th to mid-4th century BCE and we mere music scholars twenty-three centuries later. It was for us, for now, just too hard, too complex to reconcile the definitions *du jour* of scholarly scope and style, with a richer mix embracing dimensions of the human psyche. Accordingly, when during my PhD candidature I was introduced to published autoethnographical research, it was self-evident that I should embrace this dimension in my research narrative.

### 1.3.3 Collaboration

The benefits of collaboration in artistic research are emphasised by Nelson (2013) and Borgdorff (2012) who argue that inspiration is more likely found in a rich environment, working in unfamiliar ways. “Collaborative research” connotes specific approaches, ideas and methods beyond the scope of this exegesis, but opportunities for collaboration did occur, and they enriched the research. Opera is of its nature a collaborative, multilayered process, and the extensive collaboration at all stages of *The Crushing* are summarized in Chapter 2.

*Bunyip Endeavour* provided opportunities to collaborate with the three members of *Endeavour Trio*, as well as visual artist Sally Molloy. This was a pivotal, watershed work within the portfolio, and the changes of approach to my composition after that event were shaped by the collaboration with these four artists. For example, Sally

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<sup>12</sup> *Time and the Timeless – conceptual resonance between T S Eliot’s Four Quartets and Olivier Messiaen’s Quatuor pour la Fin du Temps*.

<sup>13</sup> With my friend and one-time theosophist Michael Dixon, I performed music on several evenings at Brisbane Theosophical Society meetings in the early-mid 1990s, usually preceding a guest speaker. One speaker was Polish philosopher Henryk Skolimowsky (1930-2018), who was the first (but not last) I heard to accord this particular accolade to Plato.

<sup>14</sup> For example, Plato *Republik* Book III. Pelosi (2010) explores this in detail and argues that “*in Platonic reflection the authentic interlocutor of music is the soul*” (p6).

responded to the photo I sent her of the P6, and she saw in the (potentiometer) dials the likeness of a beetle. We riffed in conversation on the beetle, recalling “Searching for Small” in *Winnie-the-Pooh* (Milne, 1978); this beetle became an animated character in Sally’s graphics, while for me it became “an oscillator that goes brzzzzht”. Sally gave this beetle wonderful colours and flight (see Figure 3.4c), which was a perfect metaphor for what happened subsequently to the path of the oscillator in my music composition.

Feeding into this process, I sought a response in synthesis to the sound of Cellist Trish O’Brien’s cello harmonics (as is discussed in Chapter 3). This was not an emulation but a synthesizer voice *in response to* the cello voice for my new sonic palette, and the results were decisive in choosing purely electronic media for the final composition of my portfolio. This process is discussed and illustrated in Chapters 4 and 5.

### **1.3.4 Digital connections**

Collaboration included participation in video and online discussions, in real-time or otherwise. This is fitting, given my research embraces digital and electronic media in my music practice (and quite necessary in the COVID-19 world of 2020). Examples of synthesis were to be found in texts, journal articles, and recordings, but a growing reference resource is online where exemplars demonstrate how they work with their instruments, what their instruments can do, and the performance of their music. It is by these means that I was able to familiarize myself with and learn from the work of a number of synthesists discussed in the following chapters. This is also the reason I chose to document my final creative work partly on video recordings – it had been useful to me, so I hope it is also useful to others who may care to see, as well as to hear, what I have done, and how I have done it.

### **1.4 Academic lens**

The placement of this research in an academic environment is ultimately another form of collaboration. The opportunity is to find a creative contribution that embraces art and academia (Nelson, 2013), where the creative projects contribute to “what we know and understand” (p. 6), while academia “opens its mind to forms of knowledge and understanding entwined with arts practice” (p. 3). In this environment, a critically reflective, practical “doing-thinking” at best coexists with “abstract conceptual thinking” (p. 29).

Initial impetus for this research was an exploration of alternate pathways to music production for a composer in the 21st century. Before moving forward, the next chapter describes how this question arose during a long campaign seeking pathways to production of an opera *The Crushing*.

## Chapter Two: Pathways to Production

“What *I* heard was a mistake; what *Miles* heard was an event. What he played next,

*made it – my ‘mistake’ – right.*”<sup>15</sup>

“It’s just a flesh wound.”<sup>16</sup>

### 2.0 Context and chapter overview

My primary research for this PhD began by backing away from one situation, before moving forward to another. The focus of this chapter is an opera *The Crushing*, which brought me to the limits of my abilities to work with deference to a paradigm I mistook as a necessity. This led me to consider alternative pathways to production. In spite of prevailing traditions in the past hundred years, the literature illustrates that opera never has been a monolithic, established form or set of parameters. While Australians’ tax revenue for musical and theatrical arts largely supports mainstream companies that are deeply wedded to music predominantly more than a century old, with their massive infrastructure of theatres, stages, sets and costumes, there is a growing number of creative people thinking laterally and using new spaces – real and virtual – to present their work to audiences. As part of my research into alternate pathways to production, the chapter concludes with some examples of experimentation with electroacoustic and digital media.

An account of the composition and partial realisation of the opera *The Crushing* is included to give context to the choices I subsequently made. The score of the opera is found at Appendix B (scene descriptions p. 123, with the full score following immediately after p. 126 of this exegesis):

[2.0a](#) Scene 1, 8:48 (score pp. 1-23); [2.0b](#) Scene 2, 6:24 (pp. 24-38); [2.0c](#) Scene 3, 9:44 (pp. 39-62); [2.0d](#) Scene 4, 8:10 (pp. 63-79); [2.0e](#) Scene 5, 9:37 (pp. 80-95); [2.0f](#) Scene 6, 9:00 (pp. 95-114); [2.0g](#) Scene 7, 12:08 (pp. 114-140); [2.0h](#) Scene 8, 10:32 (pp. 141-173); [2.0i](#) Scene 9, 3:08 (pp. 174-176).

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<sup>15</sup> Safajah (March 8, 2014). <https://www.youtube.com/watch?v=FL4LxN-iyw> This is a comment made by Herbie Hancock, reflecting on the ability of Miles to integrate a “mistake” – in this case a chord that Hancock certainly had no intention of playing and regarded as a rogue event – into the fabric of the work.

<sup>16</sup> The Black Knight to King Arthur, in the face of mortal wounds. Python (Monty) Pictures (1975). *Monty Python and The Holy Grail*.

Selected extracts of these scenes are included in the discussion below.

## 2.1 Commission

A sugar cane field. The harvest is about to begin. Aiden Caine has spent the last forty years revisiting this spot on his farm, at this time of year, waiting for the westerly wind to blow in. Waiting for the earth to be turned, stirring memories that are best forgotten – history that is best left buried.<sup>17</sup>

*The Crushing* began in 2010 as a commission for an operatic work for “conventional forces” of lead singers, chorus and orchestra, with a view to staging it and possibly touring it, using professional and amateur musicians and singers. Librettist Rod Ainsworth and I (then) were based in Bundaberg, Queensland, a region with a long history of sugar cane farming.

## 2.2 Development

Public workshops and developmental performances with artists and stakeholders informed early development of the work, and responses were promising from all who participated. The work was shortlisted at the Queensland Premier’s Drama Award in 2010 and a finalist in the APRA/AMC Art Music Awards for Excellence in a Regional Area in 2012. In Bundaberg in July 2010 the Bundaberg Youth Choir, accompanied by the chamber orchestra of the QYO performed four draft episodes of work comprising in total 17 minutes of music directed by the author. The penultimate episode *Floating*, [2.2a](#) (1:34), in which the music seeks to capture a quality of stillness in time after the drama reaches its fiery climax, was recorded in the public reading, July 2010. This same episode was recorded in December 2015 for the demo CD, [2.2b](#) (2:16). Four singers (SATB) were recorded twice (in slightly altered physical positions, SATB and ASBT to create a sonically more complex multitrack mix). I added live flute and the remainder of the instruments as VSL samples. This passage correlates to the scene 8N, commencing p. 170 of the score.

In September 2012 we presented a concert performance of the 38-minute Act I at the Moncrieff Theatre Bundaberg. The QYSO, conducted by John Curro, participated as a

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<sup>17</sup> This précis is taken from promotional material for the concert performance of the first Act of *The Crushing*, Moncrieff Theatre Bundaberg, 18 September 2011.

part of their regional touring program. The singers included four principals<sup>18</sup> and a chorus drawn from local choirs who had rehearsed over several weekends under my direction.

Limited rehearsal time on the morning of the performance was further constrained as the orchestra chose to spend the lion's share of the time rehearsing Beethoven's 4th Symphony. The chorus, excited by a unique opportunity to perform with an orchestra, was left to face the audience without even a complete run through the work.

Fortunately, they had rehearsed well previously and had mastered cross-rhythms. At the performance, the orchestra manager refused to reconfigure the stage between items. His sparkling new risers, designed for a full wind section, occupied one half of the stage and were quite empty with the small wind section required for Beethoven. Absurdly, it resulted in a compromised performance of *The Crushing* with orchestra centre stage, wind section on risers, and chorus partially in the wings. Despite these limitations, we gained a great deal of enthusiastic response from community participants, visiting musicians and audience (and perhaps a little cynicism about the regional funding that flowed to a Brisbane-based orchestra for their appearance in a regional community).

Over the following year I completed the commission, with a ninety-minute work.

### **2.3 Beginnings of a New Thing**

In 2014 Rod Ainsworth and I successfully obtained limited funds to develop a demonstration recording of the work to garner the interest of production partners. The ensuing CD recording of *The Crushing* that I directed and mixed comprised live singers post-mixed using orchestral sample libraries. The experience impressed on me that I needed to develop further my use of such digital technologies. As Hugill (2012) noted, "new technologies have transformed the way music is heard, composed and performed, produced and distributed" (p.3); Rutherford-Johnson (2017), Ross (2018) and Raines (2015) clearly expose that an array of approaches and devices is the new normal for a contemporary composer, with a score now but one of several discretionary media. In

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<sup>18</sup> The four principal singers were Soprano Suellen Cusack (Loretta), an ex-Bundaberg singer based in Brisbane; professional opera bass Mark Penman (Old Aiden); Julie Morrison (Selena), a Hervey Bay-based professional singer/singing teacher and director of community choir *All Sorts*; and one of her vocal students Nicolas White (Zane). The chorus predominantly comprised members of *All Sorts* who had travelled between Hervey Bay and Bundaberg for rehearsals and the performance.

this sense, my CD recording was a small step but significant step because it was the first step in a new direction.

The most wonderful days of the entire project for me were five days in the company of five Brisbane-based professional singers in December 2014.<sup>19</sup> Many times in my career as a composer I have wanted more direct interaction with other musicians, and in those five days, I had a feast. We rehearsed for three days and recorded for two, with David Spearritt professionally (in both senses of the term) handling the engineering.

Subsequent to those sessions, David sent me the audio files of the singers, and I arranged these all on a timeline in ProTools with the digital orchestra. The idea that the listener might forgive the crudeness of the emulated music was challenged when heard with the excellent voices, and I took the expensive step of investing in a much better, deeper, more nuanced sample library. Vienna Symphonic Libraries (VSL) offers much greater semblance of a live orchestra than is represented in this CD – and to be frank, it is with mixed feelings that I hear it now – but at that time, I had already spent some weeks preparing the “mock up” version we used in the recording sessions, and there was pressure of time to produce the CD.<sup>20</sup>

A further promotional video produced in May 2015 features Katie Stenzel and classical accordionist James Crabb performing the aria *Fire Tango*. The following recordings are of this aria in two forms, the second from on two media. The VSL version is an excerpt of the CD (the opening of Scene 7), while the video was created as additional promotional material.

[2.3a](#) Fire Tango Katie Stenzel (soprano) with VSL, 2:24

[2.3b](#) *Fire Tango* Katie Stenzel (soprano), James Crabb (classical accordion), 2:13

[2.3c](#) Video *Fire Tango* Katie Stenzel (soprano), James Crabb (classical accordion) 2:13

Following some promising discussions about a chamber version of the opera with James Crabb plus a small ensemble, I created a complete score for classical accordion, cello and percussion with vocal quintet (the soloists would also be the chorus, as was the case in the CD recording). James is an enthusiastic and seasoned hand in theatre work, and

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<sup>19</sup> These singers were Katie Stenzel, Sharon Moore, Mattias Lower, Daniel Smerdon and Sam Hartley.

<sup>20</sup> There was also some appropriate encouragement from my supportive partner to “move on” to other projects.

I'd have especially loved for this promising arrangement to be realised. Had I spoken sooner to David Malouf, however, I might have held off making this arrangement – scoring for the classical accordion demanded more study than for any other instrument I had written for and, but for one aria, it is unperformed. At the inaugural New Opera Workshop in Brisbane in 2019 (NOW), Malouf told me that he does not pick up his pen until he has a performance guarantee in his contract (Diary note, 2019, 7 April). Even a figure of his literary stature has been caught out with work for theatre or film not reaching production.

#### **2.4 Drivers for alternative pathways to production**

Between 2012 and 2017 when my hope for a performance of *The Crushing*<sup>21</sup> was gradually fading, there were many letters, many meetings (involving travel to Brisbane on several occasions and to Sydney twice), many discussions and several multi-day workshops exploring pathways to production through engagement of opera companies, theatre companies or festivals. I wondered if I had spent more hours composing the music for the opera, or in trying to secure a performance. Third parties included community adult and youth choirs, community orchestras, festival directors, professional singers and players, music directors, theatre directors and a dramaturg. The final event I attended was a two-day planning session with a creative team<sup>22</sup> developing a proposal for a season in Brisbane followed by a season in Bundaberg where the “touring” version of the production would be activated.

For pragmatic reasons I was overcoming personal resistance to changing *my* paradigm and moving to electroacoustic and digital media. In the classical music realm there remains, however, significant cultural and institutional resistance to the use of electronic, electroacoustic and digital media.

#### **2.5 Institutional and cultural resistance**

After some twenty-five years of research and development, harnessing the power of personal computers and the benefits of digital processing, sound libraries provide a particular *musique concrète* solution allowing today's composer, orchestrator, and performer to realise “orchestral” music using sampled (recorded) sounds. Insofar as

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<sup>21</sup> As of October 2020 Rod Ainsworth is attempting to garner interest in a performance (again), and the outcome of a new funding submission is pending.

<sup>22</sup> The team included Rod Ainsworth, Dominie Hooper (Designer), Glenn Hughes (Lighting Director), Mic Gruchy (Digital Set Designer), and me as composer/music director.

success is achieved, it requires musical and technological training - craft and art. These technologies are widely used across the musical spectrum, but the uptake of sample libraries in classical music settings meets fierce resistance, such as was met by would-be Wagner's *Ring* producer Charles Goldstein.<sup>23,24</sup> One objector regards this as "shamefully and fraudulently devaluing Wagner" (Judd, 2014), but unwittingly raises paradoxes of value in the juxtaposition of this statement with his second article on the same web page, about the opening minutes of *Das Rheingold*, first opera in *The Ring*. He writes:

One of opera's most dramatic preludes, this is music which forces us to confront the power of color and pure sound, with all of the rich overtones which can only be created by an orchestra. Here is a Bayreuth performance conducted by Pierre Boulez: (Judd, 2014).

The ensuing video clip is in MP4 format, sample rate 320 kbs. It does seem problematic to his case to argue against the sound from twenty-four high-fidelity speakers playing the 'orchestra' from the pit, in 44.1KHz/24-bit depth audio, with live singers on stage who worked with Goldstein on such details as nuanced adjustments of tempo, and then to wax lyrical about the power and the colour of the opening of the opera, listened to on whatever device one is sitting at whilst reading his blog, most likely a computer or a smartphone with variable playback specifications, and certainly playing a file already reduced and converted to a "lossy"<sup>25</sup> mp3. Arguably, live singers with VSL would achieve a performance somewhere between the audiophile's experience of a CD at home and a fully live performance. But depending on *which* fully live performance, *which* VSL realization, and perhaps *which* CD or DVD recording or listening device, the order of excellence may be different – acoustically and artistically. The silver lining in the cloud of such examples as this, is in the creative responses being made in various ways by content creators.

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<sup>23</sup> The American Federation of Musicians very publicly confronted Goldstein, who had planned to stage the work with live singers on stage and a VSL 'orchestra' in the pit. "Small companies just can't really afford to hire 80, 90, 100 musicians ... many small companies either use a piano, or a couple of pianos....I had the idea that ... [I] could use some sort of digital sound to put on small productions," (Cooper, 2014; Nielsen, 2014).

<sup>24</sup> A second example is the response to a plan to 'replace musicians with a machine' in an 'electronic Les Miserables' in the West End, London (Reynolds, 2004).

<sup>25</sup> "Lossy" is a term used by audio engineers to describe audio files that are incomplete – data is lost, and the response in playback is compromised. See Katz (2002, 2013).

## 2.6 On orchestras

The possibilities of digital orchestras have been explored for well over a decade. In New York Paul Henry Smith is having greater success in achieving outcomes for composers by recording their works using sample libraries, via the cutely named Fauxharmonic Orchestra.<sup>26</sup> The Boston Globe reported:

With symphonic music at risk as a living art, Smith sees digital orchestras ... as a lifeline. "The orchestra is 400 years old and slow to change. But it is changing. ... [it is] a new instrument that eventually will split off and do its own thing, like the piano after the harpsichord or the guitar when electric players like Jimi Hendrix opened up new worlds. The Fauxharmonic Orchestra can't replace connecting with other human beings to create music. But this is just Digital Orchestra 1.0. It has no rules yet to restrict imaginations. When versions 3, 4, and 5 come along, we'll see that this was just the beginning" (Lozaw, 2009).

Embracing these new technologies is clearly not revolutionary. Yet while the logistics of opera production in present day Australia remain prohibitive for all but a select few, digital technologies remain a resource with great untapped potential.

## 2.7 Australian opera companies and new operas

Composers in Australia have limited chance of contributing their visions of opera to the discourse within academic and artistic communities. At NOW, David Malouf observed that less than one in twenty film scripts ever get produced, and for opera, it is much worse (Diary note, 2019, 7 April). These observations, sadly, align squarely with reviews of the industry. One review (Commonwealth of Australia, 2015) found that the four major Australian opera companies<sup>27</sup> identified that Australia has "a long and proud history of commitment to opera," (p. 2) however, there are significant pressures on finances, access and artistic vitality. The review identified that these four companies have a strong track record of developing new productions of existing and established

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<sup>26</sup> Paul Henry Smith's first interest in electroacoustic music in the 1980s faded owing to the 'unresponsiveness' to nuance required for authenticity – the technology could only go so far, and it wasn't far enough. In 2003, coinciding with the maturing of the likes of the VSL project, along with wifi devices for modifying the sound in real time as a conductor might, his interest rekindled and he now produces recordings for composers and performers. He tests the quality of his results by conducting 'live' performances of well-known classical repertoire (for example, by Beethoven and Ravel).

<sup>27</sup> The four major Australian opera companies are Opera Australia, Opera Queensland, State Opera of South Australia, and West Australian Opera.

works, especially those of the 19th century and early 20th century as “these have become the more popular works within the operatic canon” (p. 51).<sup>28</sup> Between 1991 and 2014 the four companies had developed eleven new Australian works, with a single new Australian mainstage work (*Bliss*) being staged during the period 2009 to 2014. Each of the four Australian opera companies receiving the most funding from the Federal Arts budget developed, on average, *one new opera every eight years*. With Artistic Director Lyndon Terracini at the helm, the position of Opera Australia is that “audiences aren’t interested” in new operas (Taylor, 2015), a position that, although countered by the production of two works mentioned below, sadly is only too apparent in their prevailing programming decisions.

*The Rabbits* (music by Kate Miller-Heidke and libretto by Lally Katz, based on the book by John Marsden and illustrated by Shaun Tan) was commissioned by Opera Australia, who produced the first performance at the Perth International Arts Festival in 2015. It has subsequently played seasons in Melbourne, Sydney and Brisbane. In 2019 Elena Kats-Chenin was composer-in-residence in collaboration with Opera Australia to compose a new opera *Whiteley*.<sup>29</sup> These uncommon but welcome opportunities are available to very few composers.

Some of the smaller companies with leaner budgets have a more consistent record of supporting new works. Chamber Made Opera<sup>30</sup> is committed exclusively to production of original chamber operas. Douglas Horton was Artistic Director of Chamber Made Opera for twenty-one years and was involved in thirty world or Australian premieres, and yet is “gloomy and pessimistic” about the state of opera in Australia. “We are still talking today about the things we were talking about when we started out” (Cathcart, 2015). Sydney Chamber Opera<sup>31</sup> undertakes a mix of commissioned works by Australian composers, Australian premieres of contemporary international works and ‘canonical’ repertoire from the 20th century. In May 2015 it presented the premiere season of *Fly Away Peter*, composed by Elliott Gyger with libretto by Pierce Wilcox, based on the novella by David Malouf. Happily, this duo was commissioned to follow

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<sup>28</sup> Record producers used to flood radio stations with requests to play new releases, because tracks would often become popular *because of* familiarity. Our companies, it could be argued, are not giving new works much of a chance by sticking with what audiences already know.

<sup>29</sup> Opera Australia. Retrieved from <https://opera.org.au/artists/elena-kats-chenin>

<sup>30</sup> Chamber Made Opera Retrieved from <http://www.chambermadeopera.com/about/>

<sup>31</sup> Sydney Chamber Opera. Retrieved from [http://www.sydneychamberopera.com/?page\\_id=14](http://www.sydneychamberopera.com/?page_id=14)

on with the 2019 *Oscar and Lucinda*, based on Peter Carey's novel (Jefferson, 2019). In its first decade of existence Victorian Opera<sup>32</sup> produced thirteen new Australian works; although the new work in 2015 had a season of just three days, presumably reflecting box-office to cost ratios. *Pecan Summer*, an opera by singer/composer Deborah Cheetham was premiered in 2010 and enjoyed its fourth season at the Adelaide Festival in 2014. It must rate as a standout success in terms of number of productions and performances. Notably, on the promise the work showed in 2009, Cheetham formed her own company to produce it, "Short Black Opera".<sup>33</sup> Composer Mary Finsterer's *Biographica* (librettist Tom Wright) was premiered at the Sydney Festival in January 2017 in a co-production with the SCO and Ensemble Offspring.<sup>34</sup> Like *L'Histoire du Soldat* and *The Turn of the Screw* it illustrates how much can be achieved by a small ensemble of vocal and instrumental forces. *Dry River Run* was commissioned by The Queensland Conservatorium Opera School (composer Paul Dean, librettist Rodney Hall) and premiered in 2018 in a performance by the students at QCGU.

The challenge of creating new opera was the primary subject of enquiry of NOW in 2019, sponsored by Opera Queensland and QCGU. In addition to my conversation with Malouf cited above, several speakers encouraged me to step outside my comfort zone and explore new means to realise my music. Tim Hopkins<sup>35</sup> addressed opera in the digital realm, including exploration of opera making in virtual reality, and of seeking out partnerships with people and bodies not normally associated with opera (such as local transport companies, as he has done, identifying a common interest). Patrick Eakin Young<sup>36</sup> explored the use of live and mediated vocals with diverse technologies in story-telling and of collective content development through group improvisation. Composer-performer-academic Laura Bowler, founder and artistic director of Size Zero Opera which exists to commission and produce new innovative chamber opera<sup>37</sup>, tackles raw and challenging content in her work, nowhere more so than the presentation of workshopped material of herself processing the effects on her life of being raped as a teenager by her singing teacher. Her work more broadly explores pressing social and

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<sup>32</sup> Victorian Opera Retrieved from <http://victorianopera.com.au/about/our-story/>

<sup>33</sup> Deborah Cheetham. Retrieved from [http://www.deborahcheetham.com/short\\_black\\_opera\\_company](http://www.deborahcheetham.com/short_black_opera_company)

<sup>34</sup> [http://sydneychamberopera.com/?page\\_id=2984](http://sydneychamberopera.com/?page_id=2984)

<sup>35</sup> See Tim Hopkins website <https://timhopkinsworks.com/>

<sup>36</sup> See Patrick Eakin Young's website <https://www.patrickeakinyoung.com/>

<sup>37</sup> See the Size Zero Opera website <https://twitter.com/sizezeropera>

environmental issues. Her use of ambient soundscapes and footage of the southern oceans to produce *Antarctica*, a work designed to provoke the audience to consider the impacts of climate change,<sup>38</sup> is another example of an artist working *around* the obstacles presented by traditional opera companies. Or put differently, she is an artist finding compatible, sympathetic collaborators with shared values. Such examples underlined to me the challenges that have to be faced and overcome by contemporary operatic composers and made me start to consider more deeply new ways of conceiving and presenting work beyond traditional models.

## **2.8 Historical examples of the adaptability of opera media**

The literature concerning composers historically adapting their scores to meet demands provides useful context and precedent. Polzonetti's (2009) research is enlightening for its revelation of how readily composers of the eighteenth century reworked their scores; adapted existing works in order to keep up with audience demand (in the case of Vivaldi); re-crafted work for specific singers resulting in multiple versions of the work (e.g. Mozart); and adapted works for other venues, cities, producers, and sponsors (pp. 3-23).

For at least a couple of centuries the notion of a "fixed" document was foreign to the creators of opera (Polzonetti, p. 22). The score was even, at times, "descriptive", a transcription of what was presented, rather than "prescriptive", denoting what the composer wished the performer to present. This suggests a level of discretionary leeway for performers unfamiliar to the opera world today (p. 8). There was in the 18th century and for much of the 19th century, no unified approach to opera-making; the 'score' was a relatively fluid, negotiable document. From this research it can be observed that opera never was a fixed artifact, contrary to its status in an "Imaginary Museum of Musical Works," (Goehr, 1992, from Title<sup>39</sup>), situated in one of the labyrinthine constructs of selective musical memory and imagination. The score was malleable, negotiable and subject to adaptation.

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<sup>38</sup> See the Manchester Camerata website <https://manchestercamerata.co.uk/manchester-camerata-and-maverick-composer-laura-bowler-combine-to-tackle-the-issue-of-climate-change/>

<sup>39</sup> It is outrageous, perhaps, to cite Lydia Goehr merely for her title, excellent though it is and perfectly suited to this context. Goehr's philosophical work identifies and deeply explores preconceptions and assumptions that music historians, scholars and critics bring to their understanding of music, in ways that is outside the scope of this PhD. Her work did help the writer to recognize that approaches to opera-making are entirely constructed and discretionary, if also cultural and subconscious.

Even though eighteenth-century reformers tried to change the process of making opera, what they never dreamed of changing was the nature of opera as process. Understanding music of Bach's and Vivaldi's time (and opera in particular), requires us to make a special effort to ... start imagining the process of production and reproduction of opera as a continuous and still ongoing phenomenon (Polzonetti, 2009, p. 10).

Interdisciplinary, multilayered and comprised of many elements, opera is a complex creation. The influence of various roles such as singer, composer, director, librettist, producer, designer and impresario has been greater or lesser at different times in history and in different places. Writing just over thirty years ago, Pleasants (1989) defined the (then) present period as the *period of the producer* and was highly critical of some of the excess liberties taken in many productions – criticisms that I would suggest are still valid today. In fact Malouf (2015) wrote that some listeners came to prefer audio recordings so they could enjoy the singing and musical dimension of the opera without the distractions (p. 9). Ridout (2012) cites several reviews and complaints focussed on the visual aspects of production, which many came to regard as excessive. He writes “the idea that you should keep your eyes closed in the opera house has become common currency among the opera-going public” (p. 170). Film, television and video productions have added to and changed the way opera is experienced. Morris (2012) writes “although they record or document an event in the theatre, they are very much their own medium ... the visual conventions of video is loaded with conventions of its own” (p. 111). In any case, it is pertinent to remember that in opera, music is one part of it – the major part, arguably, and certainly is so to me as a composer – but nevertheless one dimension of a multifaceted, multilayered theatrical and dramatical experience. Somewhere, somehow in this impossibly complex mix of elements, as Malouf (2015) observes some paradoxes in opera such as this “arguably most over-civilised of forms, puts us in touch with the primitive ... releases in us the most naked emotions” (p. 16). “Opera is an experience that can go surprisingly, incomprehensibly deep,” would be my summary of this chapter of Malouf's book (pp. 13-28).

## **2.9 Pathways to production**

Visual aspects of production have received much attention in recent decades, sometimes at the expense of the music. In contrast, the music score tends to be subject to the *relatively* subtle modifications of interpretation (for example, Solti's *Meistersingers*,

Haitink's *Figaro*) compared with re-conception for alternative forces. A solution for *my* adaptations, however, appeared to be precisely in the domain of the score – or rather, *the music*, as perhaps it may be realised *without* score. As attested to by number of papers and presentations at NOW, numerous creatives are seeking new ways to work with the affordances of digital technologies, with all aspects of production including media ripe for re-consideration. A presentation by Paul Grabowsky, for instance, featured new dimensions possible in performance with skilful use of *Ableton Live*, with the performer-programmer-operator present on stage as one member of the ensemble.

For the purposes of this PhD, the positive element in the frustrated production path has been stimulus to reconsider where my creative energies ought now to be directed in order to give myself better odds at realising new work. The “old way” of producing an opera, for many others and now for me, has become redundant. While requiring of me some learning akin to learning new instruments, a deeper engagement with select technologies now seemed more appropriate, in order to work and engage with the world in which I live.

### **2.9.1 Experimenting with virtual spaces**

My own hybrid orchestra in the VSL version of *The Crushing* was assembling on a virtual stage that I came to understand to be as real and valid as any other stage I had performed on. Moreover, it offered me the chance to combine forces in a way I formerly could not. With respect to presenting Baroque or Classical repertoire, the concert-hall with its physical stage in a town or city is very a product of our times rather than of Bach's or Haydn's time (Goehr, 1992; Small, 1998). Besides the intricate cultural artifice or edifice that elevates the modern concert hall to a sacred temple of art (Small, *ibid*), it struck me forcibly as absurd that, even more than for the music of Monteverdi, my own music should depend on access to those particular resources, institutions and personnel. The philosophy that *created* (and now sustains) such spaces with their concomitant forces and choices of repertoire, as explored by Goehr (1992), is indeed confronting. Arguably, there is nothing intrinsically more authentic or legitimate in a modern concert hall performance of Bach than there is in *my* performance of Bach using sample libraries, staged on a virtual stage, and broadcast electronically. I reflected on the fact that for the best part of a century, most music has been delivered and consumed/listened to in recorded form. Today digital media are the vastly dominant means of delivery of most if not all types of music.

As an exercise in the use of VSL's virtual spaces, I recorded and mixed four of Michael Dixon's<sup>40</sup> microtonal compositions. I placed each individual "player" on the stage, as illustrated below in Figure 1.

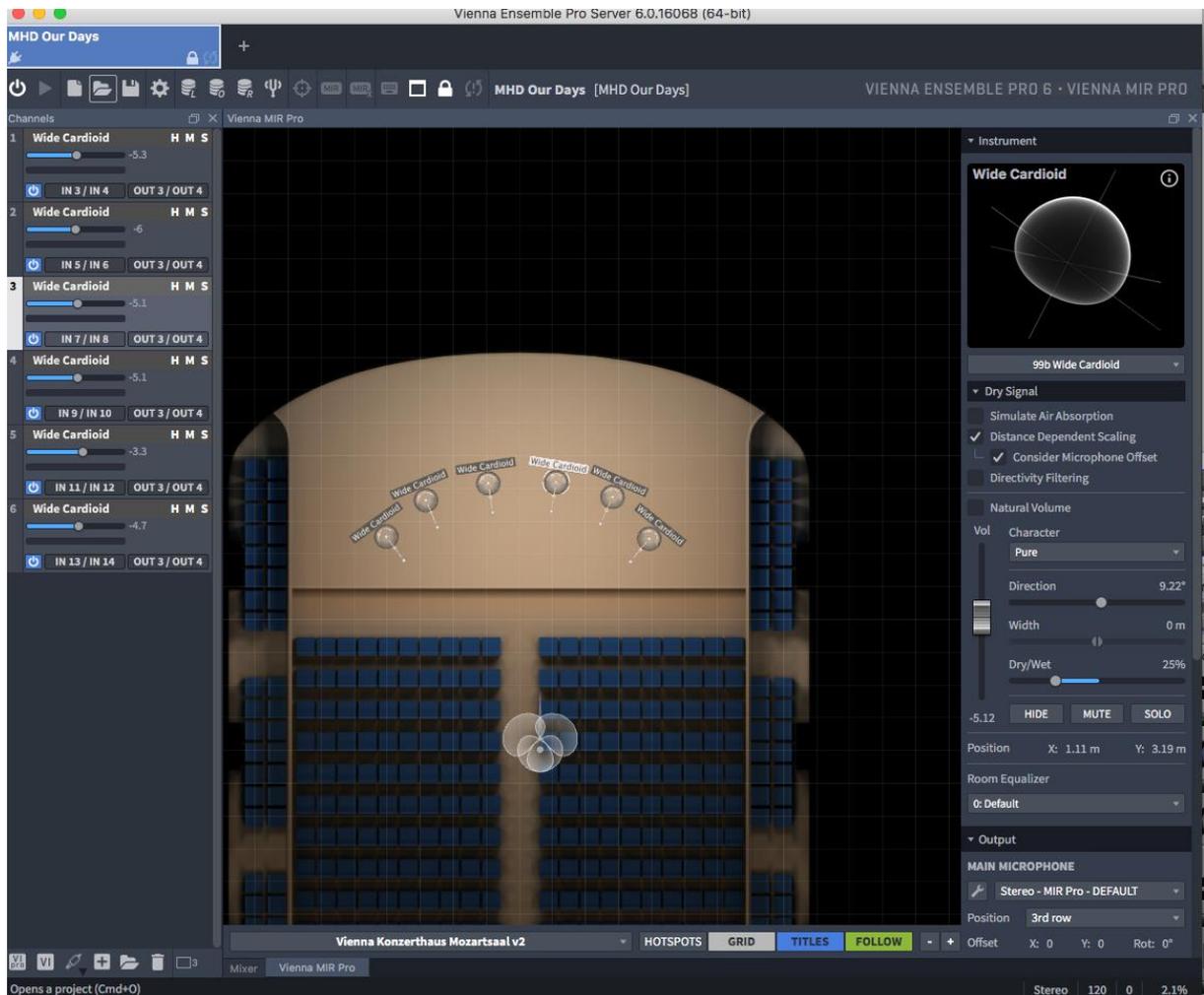


Figure 1 Virtual stage: Michael Dixon's microtonal compositions

The sounds assigned to each of those players was the audio of one horn track. The concepts used in the creation of this space – such as room size, microphone type and placement, dry/wet signal and room resonance, provided me with an excellent conduit into this hybrid world – a sextet of Michael Dixon on *this* stage, in *this* studio, hosted on *this* DAW. The audio file [2.9.1](#) (2:57) is linked.

<sup>40</sup> Michael Dixon is a Sydney-based horn player and composer. His interest in microtonal composition was the basis of his doctoral submission (Dixon, 2011).

Figure 2 is a screenshot of the same session including part of the edit window view of ProTools and a level meter.<sup>41</sup> Following feedback from the composer/performer, the first horn has moved down stage centre for the second mix.

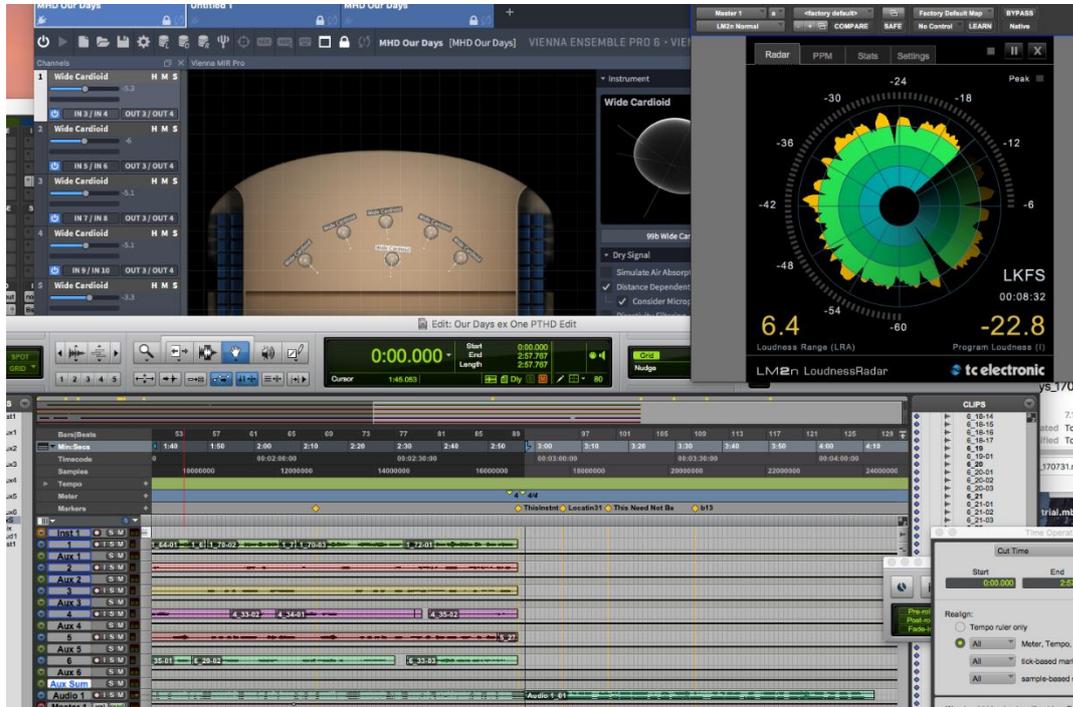


Figure 2 Virtual stage: Michael Dixon's microtonal compositions with level meter

I subsequently conducted a virtual stage experiment using the recorded voice of Katie Stenzel as Loretta, down-stage centre, surrounded by an array of string players.

<sup>41</sup> The depth and breadth of tools that can be integrated in the DAW environment remind the author why most recording musicians and engineers work with some variation of this setup.

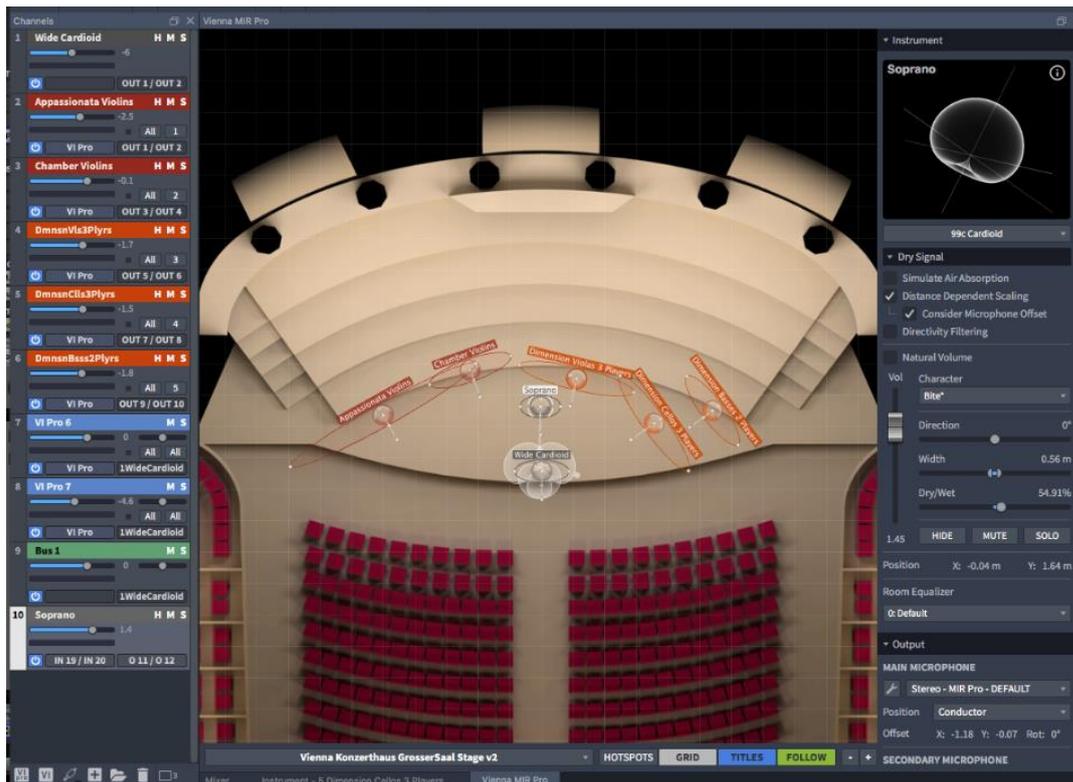


Figure 3 Virtual stage: Katie Stenzel audio with VSL sampled strings

This recording project had quite a profound effect on my thinking. First, the power of this software via its Graphical User Interface (GUI) enabled me to use my prior experience as a classically trained musician (with some concert experience and sound recording experience) to use the recording/mixing tools of the DAW studio, whilst thinking with concepts more familiar to me. Instruments were placed on a stage, microphones selected and placed in the hall, and the acoustics of the room were observed and adjusted to taste. The GUI provided for the placement and quality of sounds in the stereo field.

The second effect is related. Subconsciously, for too many years I assigned ultimate status to a live ensemble on stage with a live audience. At some level, perhaps I thought it also the most “legitimate” way to present music (although that proposition now looks absurd in print). As a result of undertaking and reflecting on this recording project for Michael Dixon, my eyes and ears were opened to alternative realities. These recordings allow a presentation of Dixon’s work, even more difficult to attain any other way (such is the mastery of subtle tuning required, with logistics multiplied exponentially by numbers of players needed). The chief benefit flowing to me from my work on these recordings was that I could now allow myself to work in any medium of my choosing,

without any sense that it is inferior to what a “real” orchestra can offer me (which in practice is all too often hypothetical).

### **2.10 Signing off, electroacoustically**

In response to my experience of *The Crushing*, I determined to decouple my ambitions from the concert hall and opera stage. I had come to see that working directly to the recording media gave me the tools to create original work *in terms of those tools and instruments*. This enabled me to bypass some of the biggest frustrations of being governed by assumptions, traditions and institutions that were no longer helpful to me, but were impediments to, rather than enablers of, my music. It was immensely freeing to allow myself no longer to be constrained to realisations of my music by live musicians in a concert hall located in a city on earth.

This new way of thinking for me was reinforced by ideas I encountered from the work of others. Brian Eno (2017) described the difference in process, “*I can work like a painter, directly on canvas*” (author’s emphasis). In this he was echoing Subotnik (2015) who saw it in those terms in the 1960s – indeed, Don Buchla, with whom he was closely aligned, called one of his modular synths the “Easel”, a name still used today (and a product still sold today) by the company that bears his name.<sup>42</sup>

As a further exercise I took a recording of the voice of Sam Hartley (from *The Crushing*) and, regarding my studio tools as my easel, I painted a new episode from the opera. The vocal track was sliced, copied and reconfigured on the timeline. Two stringed instruments were chosen from the VSL library, and for each of them, I improvised material *based on* the music that the orchestra and chorus would have played, had they followed my original score! These two parts contained the essence of the collective orchestral ideas. Once recorded I applied colours and effects from my “easel”. Classic studio tools, as with classic synthesizer tools, include delay and reverb. I tried out a couple of different plugins with various settings, settling on Metric Halo models. It was an enjoyable, stimulating process and I experienced something of what Eno referred to. I filed this away as a marker for where I wanted to *begin* my next project.

[2.10](#) The Years Turn, Sam Hartley (Bass Baritone), VSL, virtual stage, 1:39

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<sup>42</sup> See Buchla U.S.A. website <https://buchla.com/easel-command-and-208c/>

### **2.11 Making my mistake, *right***

Whilst seeking pathways to production of my opera *The Crushing* could be viewed as an overinvestment or a mistake in terms of time and energy, the ‘flesh wound’ led me to consider alternative pathways to production. Echoing the quote from Herbie Hancock at the beginning of this chapter, this next step ultimately made my ‘mistake’, *right*. The literature illustrates that opera never has been a monolithic, established form or set of parameters – in spite of prevailing traditions in the past hundred years

There is a growing number of creative people thinking laterally and using new spaces – real and virtual – to present their work to audiences. My research convinced me that I too needed to learn to work differently as a music composer, for different forces and different media available in the digital age. The next episode in this journey is discussed in Chapter 3.

## Chapter 3: Bunyip Endeavour

### for Endeavour Trio, electroacoustics, and animated illustrations

“Late one night, for no particular reason, something stirred in the black mud  
at the bottom of Berkeley’s Creek.”<sup>43</sup>

[3.0](#) *Bunyip Endeavour* Endeavour Trio recital, 2018, March 7, 25:23

[3.0b](#) Video, *Bunyip Endeavour*, Endeavour Trio recital, 2018, March 7, 26:18

### 3.0 Introduction to Chapter 3

The focus of this chapter is a new artistic work *Bunyip Endeavour* (*BE*), in which I developed thematic material from my 1995 opera *Bunyip!* (*B!*) into a new work for the instrumental ensemble Endeavour Trio<sup>44</sup>. It provided opportunity to collaborate with esteemed musician friends and colleagues and to work for the first time with visual artist Sally Molloy on a cross-media realisation. The Prophet 6 synthesizer (P6) arrived just a month before the concert, enabling it to play a small role in the concert and a large role in the post-concert period of reflection, assimilation and further research.

Discoveries made in preparation, rehearsal and performance of *BE* refracted my perceptions and altered my sonic canvas and my compositional methodology. This chapter discusses these dimensions of the work with references to the score and recordings. With respect to the overall arc of this PhD, more important than the form and thematic development *within BE* are the three dimensions of (1) the way that electroacoustic and electronic instruments came to play an important role in my research; (2) the way that music-thematic material was *modulated* into other forms in response to interactions with these instruments; and (3) the development of the story of Bunyip as semi-biographical and as metaphorically illustrative of the trajectory of the research. This chapter, therefore, links forward strongly to Chapters 4 and 5.

I offer here a selective analysis of excerpts of the score (see Appendix B) to illustrate aspects of its inherent thematic logic; its development from the earlier work *B!* from which thematic kernels are drawn; and to identify themes and ideas pertinent to the

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<sup>43</sup> Wagner, 1975, p. 1.

<sup>44</sup> *The Endeavour Trio* comprised Paul Dean (clarinet), Trish O’Brien (cello) and Stephen Emmerson (piano).

subsequent work *Bunyip Polymodular (BP)* (Chapter 5). Additionally, research tools were embedded in the project to focus and assist the development of techniques and ideas relating to the interaction between players, acoustic instruments, and electroacoustic techniques and ideas, I identified one signature way per player in which each of the musicians would lend their part to this second purpose. These are discussed in the context of the music examples below, and in the post-concert reflections and experiments in Chapter 3.3.

The work was conceived in theatrical terms with the story in mind and is accordingly presented in scenes rather than movements. In this vein I included the libretto in the score for the cello's rendition of the *Bunyip Fur Aria* which derives directly from the operatic setting. Some of the other melodic lines are lyrical, as though sung or as though they *may* be sung. At the time of composing *BE* I imagined such a development could well define the next work in the portfolio (and in a subliminal sense, perhaps it did).

Pragmatically I composed *BE* such that it could be performed with or without the electroacoustic elements, and with or without projected animated graphic art – this was optimistic in case the trio should choose to perform the work in future in an environment where arrangements for file playback were problematic, although I did discuss with Stephen Emmerson the possibility of triggering cues from a smart phone with a modest portable sound-enhancement monitor and a projector. *BE* certainly could work simply as an instrumental trio. The research, however, would have been immensely poorer for it.

### 3.1 The kernel

“A platypus told him he was a bunyip. But what is a bunyip? Although everyone had an opinion, no one really knew. So the bunyip set off to find out for himself” (Wagner, 1973, précis inside cover).

As discussed in Chapter 1, a successful collaboration with author Jenny Wagner for the *Out of the Box Festival* in 1992 led to a further collaboration based on her illustrated children's story *The Bunyip of Berkeley's Creek (BoBC)* (Wagner, 1973).<sup>45</sup> Jenny produced a libretto and I composed music for the 50 minute opera *Bunyip!*. Whilst the

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<sup>45</sup> A reading of the book *The Bunyip of Berkeley's Creek* is available at [https://youtu.be/-fg90\\_GixEo](https://youtu.be/-fg90_GixEo)

opera has not been performed and the original music has some deficiencies (related I believe to my unravelling health), the essence of Bunyip's search for identity and meaning and the musical kernels of my earlier work have remained with me and were ripe for further exploration in *BE* and subsequent major re-conception in *BP* (discussed in Chapter 5).

The chief virtue of using thematic material from *B!* in the creation of *BE* was that the thematic material continued to exercise my imagination and remained unheard by anyone but me. Stravinsky and Beethoven (for instance) demonstrated that extensive content can be created out of a precise *germ*, *kernel* or *generative cell*<sup>46</sup>, yielding music of *inherent thematic identity* and cohesion. Complementing this development of ideas in the music would be the development of the narrative story of the character Bunyip. Already enlarged from its form in *BoBC* to the libretto for *B!* it became clear during the early sketches of *BE* that the story would continue to evolve through the composition of the new work. Bunyip was, for me, always partly autobiographical – there was a growing parallel story of my years engaged with this bunyip that fed back into the protagonist's journey, and conversely, his into mine. David Malouf asserted that “you have to trust your discoveries in the writing as the writing unveils itself to you” (The Garret, 2018). Relevant to this project, the protagonist had come out of the waterhole to sing to me and with his senses attuned was exploring a bigger world than he had known. I found I was interested in what, together, we might find and what might be unveiled to us.

### **3.2 Bunyip Endeavour**

#### **3.2.1 At the waterhole**

Mystery is evoked in the opening sentence (quoted at the top of the chapter) both from Wagner's *BoBC* and her libretto for *B!* It was clear to me that *this* opening must underscore mystery and be not trumpeted<sup>47</sup> but whispered, *sotto voce*. The first sounds heard in this piece are from the synthesizer setting the scene at the waterhole. The melodic line of the synthesizer is a direct quotation of a subsequent clarinet passage,

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<sup>46</sup> The late John Gilfedder, my first composition teacher and mentor, employed these descriptors, and they are apt in this case.

<sup>47</sup> The robust, forte opening of *B!* preceded a “mystery” scene. I judged it appropriate to loudly announce that the performance had begun, for it was conceived to engage an audience of children in potentially a variety of settings.

starting ten bars before **O** in the score (see Figure 4). A discussion of this idea (linking the synthesizer part to the clarinet part) is provided in 3.3 relating to post-concert reflections, observations and research.



Figure 4 *Bunyip Endeavour* opening sounds - synthesizer (ex-clarinet)

Rather than *stating* the thematic material as a self-contained theme I favoured a suggestive swirl of voices *around* the theme, in muted tones, with the elements of the *kernel* dispersed across the three instruments in the opening episode (see Figure 5) where they are separated by register from low bass and high treble, and also reconfigured in time by rhythmic configurations. A *polymetric sum of elements* is created in that the subtle but perceptible five-beat meter and eight-beat low pedal of the piano part is offset by the two-part cello-with-clarinet lyric.<sup>48</sup> Although scored in the Phrygian mode of G (three flats) – inflected or conflated at times with a second pole or harmonic centre of A-flat (Lydian mode) – the perceived absence of firm groundedness, whilst still allowing a certain rhythmic periodicity and the presence of pastel melodic lines, is a desired result.

Complementary numbers and phrases are an element of this work, and one of them can be seen in the piano part in Figure 5. The third staff has a low sequence of notes and chords comprising five groups of eight (quarter-note) pulses. They are delayed an eighth note in this case for sonic reasons (I liked the effect) and pragmatic reasons (giving pianist time to play them easily). This pedal complements the more prominent piano part that references the five-beat measure, whilst building ever-longer phrases across the measures – a two part sentence (or question/answer) in the first two measures is followed by variations and extensions of both of these two parts, across the remaining six bars of the eight bar unit.

<sup>48</sup> Other qualities of the source *kernel* include: (1) a major second resolving to a perfect fourth; (2) two melodic lines that move in contrary motion (clarinet ascending against horn descending); (3) the polyrhythmic aspect of 2:3 and 3:5 contained in the phrase; (4) a harmonic dimension comprised of modal melodies superimposed on structures of seconds and fourths.

The image displays a musical score for the opening phrases of the 'Bunyip Endeavour' trio, covering bars 1 to 8. The score is written for three instruments: Clarinet in Bb, Violoncello, and Pianoforte. The time signature is 5/4, and the tempo is marked as quarter note = 52. The lyrics are 'A bit scary, a bit pretty ... dark and early light at the waterhole'. The score shows the first eight bars of the piece, with dynamics ranging from *pp* to *mp*. The piano part includes a complex texture with triplets and various articulations.

Figure 5 *Bunyip Endeavour* opening phrases - trio, bars 1 to 8

### 3.2.2 Late one night

At *A* the cello plays the phrase that originally set the opening scene of the story “late one night” and thereby introduces the second reference to the opera into this chamber work (see Figure 6). It is played at *p* dynamic on stopped harmonics, with a subtle relation to the underlying pulse and meter of the ensemble. Low clarinet is in a loose-fibred counterpoint to the cello. This clarinet and cello duo moves with an awareness of, but not in close adherence to the piano’s continued bass pattern. The piano, meanwhile, injects flashes and passages suggestive of birdsong. These continue intermittently throughout the work until the last measure (p.23 of *BE* shows elements of the opening pedal, underneath the development of the birdcall-like music).



Figure 6 *Bunyip Endeavour* - bars 17 to 20: late one night (cello)

*Late one night* is then exclaimed *forte* and more declamatory in style (see Figure 7), the concept being to name the growing anticipation of observers in, on or near the waterhole regarding what is happening beneath the surface. At this moment, the scene develops a more urgent focus.



Figure 7 *Bunyip Endeavour* - cello, bars 28 to 32

To me, these first few minutes of the score represent a kind of origin story. One might think of the watery origins of life on earth; or one might think of a stirring of something in the subconscious.<sup>49</sup> In any event, the scene delivers to us from the depths and the darkness, Bunyip.

<sup>49</sup> This imagery of what dwells beneath the surface attracted me to Jenny's stories from the outset. The Bunyip narrative can be read at various levels, just as *John Brown, Rose and the Midnight Cat* (1977) had so deftly given children a story about death.

### 3.2.3 Pre-dawn reverie

Following this scene, the cello plays gossamer harmonics utilising sound colours and microtonal inflections germane to the cello, as indicated by the notation in Figure 8.

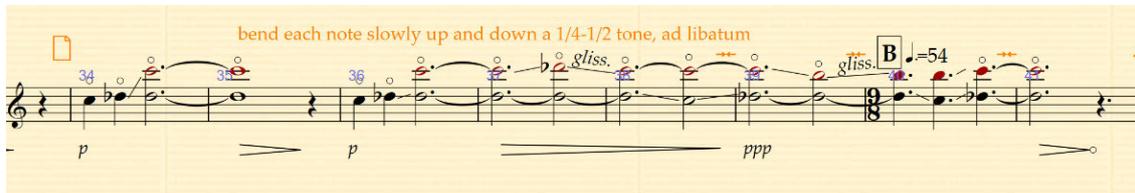


Figure 8 *Bunyip Endeavour* - cello, bars 34 to 41

In concert, this was accompanied by pre-recorded synthesizer based on the same material (even quieter in the recorded mix but intended to be an equal partner). Like the cello, the synthesizer has the facility to play microtonally, and the capacity to play delicate sounds. The recorded excerpt can be found in audio file 3.2.3.

#### [3.2.3](#) Cello harmonics, P6 (BE **B**), 0:22

Cellist Trish O'Brien was keen to try something new in the electroacoustic realm. Watching and listening to her in warm-ups and rehearsal, it occurred to me that there is a close connection between the sound of the cello playing stopped harmonics and a sound I adored on certain synthesizers. The phenomenon of a "self-oscillating filter" results also in a distinctive sound; the original rich, "buzzy" sound from the oscillator is transformed into a clearer sine-wave-quality sound of the harmonics two or more octaves (or another pitch on the harmonic spectrum) higher. This struck me as an ideal way to incorporate electroacoustic sounds in my collaboration with Trish. Regarding self-oscillating filters, my line of thinking was correct. In this example, however, I was still on the cusp of understanding and accomplishing what it was I was searching for. The sounds produced were pleasing to the ear and allowed for the desired interaction with the cello, and included clear tones from a resonant filter<sup>50</sup>, mixed however with tone from the sub-oscillator of VCO 1. The fuller picture emerged post-concert, and those next steps are discussed and illustrated below in Chapter 3.3.2.

### 3.2.4 Sunlight

The motif which I call the "solar flare" (see Figure 9) is introduced by clarinet at *C* (the clarinet is notated throughout this chapter at concert pitch). A major musical theme in

<sup>50</sup> A resonant filter boosts the signal at the cut-off frequency of the filter, with adjustable gain.

this work, it recurs in various guises, at different tempi and intensities. To my mind it represents a shaft of sunlight, a message from the *celestial* world. These are interspersed throughout Bunyip’s meetings and investigations in the terrestrial domain, until this solar flare calls Bunyip to the celestial sphere where Bunyip finds his identity as part of something greater still – with all of his earthly identity still valid, but “reconciled among the stars” (Eliot, 1944). The solar flare takes on further significance in Chapter 5, as I explore the relationship between the energy source of the oscillator and the source of light itself.



Figure 9 *Bunyip Endeavour* - clarinet, bars 63 to 64: solar flare motif

An important form of the solar flare is captured in the example at Figure 10 that illustrates an ascending line balanced by a descending line. It is symmetrical horizontally with a group of five eighth-notes, followed by a long note of five eighth-notes duration, and finally another group of five eighth-notes in zig-zag descending motion.



Figure 10 *Bunyip Endeavour* - clarinet, bars 136 to 137: solar flare symmetrical form

The solar flare permeates passages such as the following excerpts from the Tromping episode, illustrated in Figures 11 and 12.

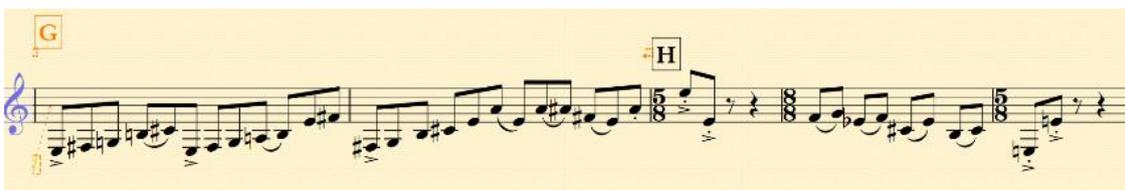


Figure 11 *Bunyip Endeavour* - clarinet, bars 118 to 122



Figure 12 *Bunyip Endeavour* - clarinet, bars 155 to 160

### 3.2.5 Bunyip tromping

In *BoBC* and *B!* Bunyip seeks his identity amongst and in relation to his fellow creatures. This quest comprises several episodes from *D* through to *P* on p. 17 (bar 269) of the score. Commencing this episode with an oscillation between second-inversion d-minor and e-minor triads, the piano sets up the basic reference *tromping* footfall pattern designed to convey something of the physicality of the journey (see Figure 13). Other themes and metres interact with and in counterpoint to it.<sup>51</sup>



Figure 13 *Bunyip Endeavour* - piano, bars 76 to 77: tromping footfall pattern

A punchy cello motif in the second, third and fourth bars of *D* is designed to add energy and counterpoint to the mix. It is drawn from *B!* where it was scarcely explored, and this untapped potential is one of the reasons it is introduced and developed here (see Figure 14).



Figure 14 *Bunyip Endeavour* - cello, bars 77 to 79: energy motif

This energy motif serves as a kind of refrain, but also complements the evolving clarinet melody (such as at *M* on p. 12, bars 198-192) and moreover, it is thematic itself in that

<sup>51</sup> An acknowledgement to Stravinsky is cheerily made for the basic construct from *L'Historie du soldat*, where the steady rhythm of the pizzicato bass is embroidered by the irregular metres of the ensemble. Figure 19 illustrates perhaps the clearest example in these passages of such polymetry.

it proceeds to infect the dominant melodic line with its vitality, culminating in the tutti unison passage starting at *N* (p.14 of the score, bar 221) (see Figure 15).

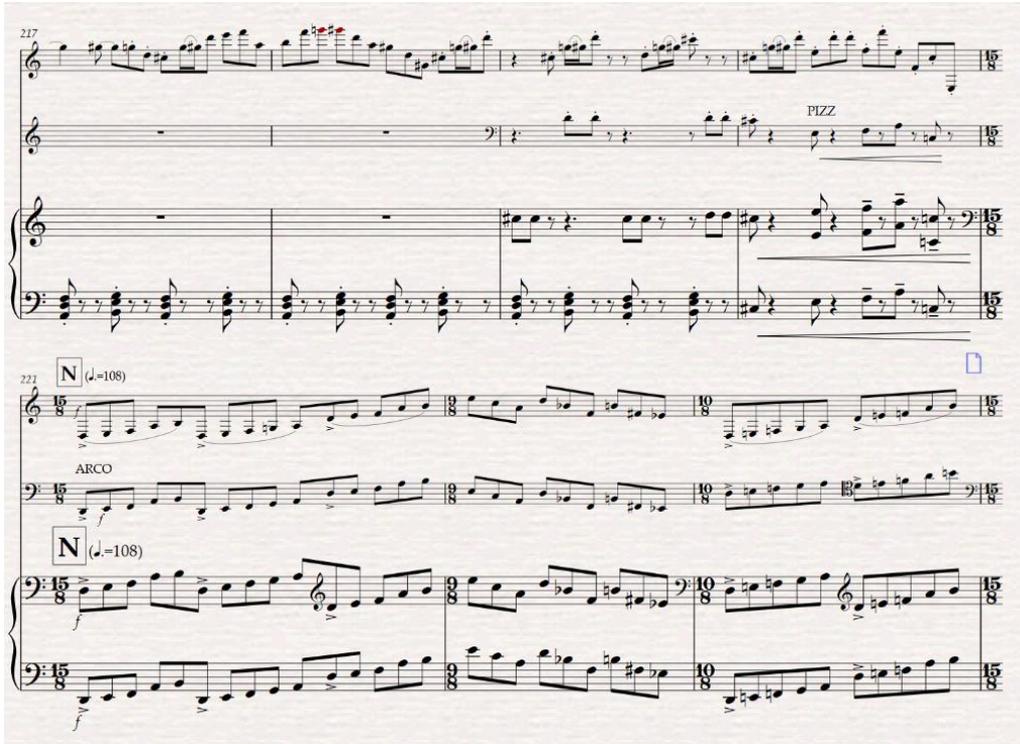


Figure 15 *Bunyip Endeavour* - trio, bars 217 to 223, tutti unison passage

The second element of the clarinet's music is first a quotation from *B!* in the jaunty tune (see Figure 16).



Figure 16 *Bunyip Endeavour* - clarinet, bars 95 to 105: jaunty Bunyip tune

### 3.2.6 Bunyip Fur Aria

This clarinet tune in Figure 16 derives from the same kernel as the *cantabile* cello melody at *O* and reproduced here in full in Figure 17 as it is a major theme of *BE* and

also of *BP*. The words are included in the cello part so the player is aware of its direct relationship to the operatic aria (whether or not the audience is aware of it). Trish O'Brien was appreciative of it and performed the melody as though it were an aria.

**Bunyip's "fur" aria** Violoncello 7

**2**

248 This Bun-yip fur up - on my arms, these  
*f* curl-ing toes with webs be - tween, these

253 bun-yip feath-ers on my knees, this fur-ry tail I can't quite see; oh  
 Bun-yip feath-ers on my knees, this Bun-yip fur up - on my arms,

257 1. these\_\_ cud-dly bun-yip things are me, Sir please\_\_ can you tell me

260 tell me please! These Are\_\_ these love-ly

264 Bun-yip things? Oh sir, please tell\_\_ me\_\_ please! Mmmmm ...

268 **P**  
*p*

Figure 17 *Bunyip Endeavour* - cello, bars 248 to 270: Bunyip Fur Aria (with libretto)

### 3.2.7 Bunyip meets wallaby and emu

In subsequent scenes inspired by *B!*, the tromping Bunyip meets other creatures. The cello carries the lead melodic role in representing the (furry) wallaby that passes by at *F*, with the metric patterns being altered to suggest quite a different gait (see Figure 18).



Figure 18 *Bunyip Endeavour* - cello, bars 106 to 110: wallaby metric incursion

A (feathery) emu passes by at **H**, with corresponding adjustments to the metric and rhythmic patterns (see Figure 19). Cello and clarinet represent the emu; while the piano continues the tromping pedal.



Figure 19 *Bunyip Endeavour* - cello, bars 119 to 126: emu metric incursion

### 3.2.8 From the track to the ecliptic

The solar flare kernel is declaimed on p.12 in the second and third measures of **M** by the clarinet. The rising and then falling of the flare again contains image-rich potential; most expansively in the concept of Bunyip's mind being transported out to the stars, finding it belongs there, then cascading back to earth – but now an earth situated in the cosmos, and a Bunyip with an enriched sense of identity. Such, at least, were the ideas inspiring me. Like Greg Quicke, the self-taught astronomer from Broome,<sup>52</sup> when I spent time observing I began to see patterns which, of course, have been observed by humans around the globe for eons and feature in our calendars, lore and mythologies. It

<sup>52</sup> See article with links to programs at <https://www.abc.net.au/news/2017-04-06/space-gandalf-who-is-greg-quicke-the-man-behind-the-beard/8421564>. Like Quicke, I was initially inspired by connections between the tides and the movement of the stars and planets. Unlike Quicke, I am no expert astronomer, but some viewings of planets on the ecliptic lent this idea to BE.

made sense now to extend Bunyip’s location to a place on earth that in turn has a place in the cosmos, and thus the journey “from the track to the ecliptic”.

The cello enters again at *S* (p. 17 of the score, bar 279), taking up the solar flare kernel and developing it in a long, slow ascending line (see Figure 20) as though toward the ecliptic. (The imagery of Movement VIII of Messiaen’s *Quatuor* is impossible to avoid). Rich low-register tones are used in a two-part array that develop the thematic material and revel in these unique and wonderful sonorous qualities of the instrument.

The image shows a musical score for Violoncello, consisting of three staves of music. The first staff starts at bar 279 with a tempo marking of quarter note = 54 and a dynamic of *mf*. It features a series of notes that ascend in pitch, with some triplets. The second staff starts at bar 283 and continues the ascending line, with a dynamic of *f* and a 3:5 ratio marking. The third staff starts at bar 288 and continues the line, with dynamics of *ff* and *f*. The score is written in bass clef and includes various time signatures and accidentals.

Figure 20 *Bunyip Endeavour* - cello, bars 179 to 292: ascending solar flare

The cello holds firmly to that line, at that pace, through to the conclusion some six minutes later. After playing solo at *S* the cello is joined at *T* by energetic clarinet counterpoint, and then by piano that builds the final episode from the pedals heard at the beginning of the work and from birdsong-like figures. The sense (perhaps more in promise than seems to be realised here) is of all the foregoing elements being transformed and fused into a new whole. Lacking Messiaen’s belief in God and such things, I nevertheless can be inspired by the idea of earth being a wonderful ecosystem, and I tried in this conclusion to lift the elements of the work and place them all slightly above the terrestrial domain, soaring and glittering among the stars. (I revisit this idea more comprehensively in *BP* and in Chapter 5.)

### 3.2.9 Back to the waterhole

In an exploration of the potential for electroacoustics to expand and develop material from the domain of the acoustic, the piano featured in a solo after the *Bunyip Fur Aria*

in the measures leading into *Q* recedes into silence to be replaced by (synthesizer and) pre-recorded, studio-modified piano. The material will be recognizable to the listener as fragments from the opening waterhole theme and from birdsong. It is a brief segment, and the material it is based on is even shorter. The interest here is the way it is developed and modified using delay techniques. The effect of seeing and hearing the pianist play, and then to see and hear the (now silent) pianist surrounded by electroacoustic versions of his own music arriving from different parts of the stage was most encouraging. For the listener, the transition in sound source from piano with lingering harmonics-timbre cello, to the electroacoustic piano plus synthesizer is seamless. It nourished my growing understanding that all of these sound sources are on a spectrum, and that one can choose to move easily along and between points on that spectrum.

### **3.3 Post recital reflections on electroacoustics and synthesizers**

Whilst at one level I composed the music for *BE* so that it would sound complete without the dimensions of synthesizer, electroacoustics, and graphics – at another level these latter dimensions became even more important to my research. Reflection and analysis of this performance and composition is discussed below, focusing first on the three signature research dimensions established at the outset (as indicated at the start of this chapter).

#### **3.3.1 Piano and electroacoustic extensions**

In this example I explored the idea of regarding the piano as a “sample” to be used in the synthesis of a new sound. I had experienced a strong sense of “owning” sounds that I had created on a synthesizer, as opposed to selecting one of the “factory” sounds delivered with the instrument. Additionally, it was liberating for me to regard a particular sound that I had synthesised, not as an emulation of anything, nor as substitute for anything, but as a sound in its own right with a unique set of qualities. Sound creation became a core element in my work with synthesizers. Related to this observation, I recognized that by “processing” an acoustic sound (Stephen’s piano) through a synthesizer filter and effects, the sound was “denatured” in the same degree to which it was altered from the original recording (which is itself already a step away from original performance in Stephen’s studio, having been filtered through my microphones, converted to .wav files on a digital recorder). Several (digital) hardware

and software synthesizers use this principle, substituting an oscillator for a sample of an instrument<sup>53</sup>. The point is not to create an “emulation” of the sampled instrument (as one might using VSL sample libraries) – but rather to create new timbres, new voices, or effectively, new instruments.

Exploring this idea further, I focused on a passage Stephen performed in concert and processed it through a (software emulation of a) synthesizer filter.<sup>54</sup> One result, in the following linked recording, is offered for illustrative purposes rather than as an example of a “finished product”:

### [3.3.1](#) Piano modified SEM filter, 0:48

The pulsating effect is owing to sequenced modulations within the software filter that I was exploring. Many variations, of course, along these lines are possible, from subtly altering the source audio to utterly transforming it. In this rough way I connected with an idea that was decades old in music instruments and technologies, and recognize it is a rich vein being actively pursued by numerous instrument makers, software developers, composers and performers. There is a spectrum of approaches that utilize samples as a part of what becomes the final sound in the music created, and I came to understand my small exercise described above, in those terms and in that context.

Recording and processing these few measures of music reminded me that a good deal of what we do as musicians is partly acoustic and partly electronic. By actively blurring the boundaries, I did my project and myself the service of removing glass walls between domains of music making. It was as though I discovered a new channel on a mixing console that had previously been bypassed; having activated it I found an array of new possibilities, and found that this channel fader, like all the others, moves freely and easily from one position to another, *ad libitum*.

### **3.3.2 Cello, synthesizer and magpie**

Reflecting on the P6 sounds that I used to interact with Trish’s cello in the passage cited above, I realised that the particular sound I had created was not what I had understood it to be. After some experimentation I started to find some most agreeable sounds from the (now self-oscillating) filter and to play some phrases with these sounds – *when it*

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<sup>53</sup> Three very different examples include Sequential’s Prophet X and Prophet XL; Spectrasonics Omnisphere; and Tasty Chips GR-1.

<sup>54</sup> In this case, an SEM filter from Arturia, modelled on Tom Oberheim’s famous filter of that name.

*struck me I was not alone in the music-making domain:* the sound was extraordinarily sympathetic to the music being made by the magpies outside my house where I was working. It is beyond me to assert of any (if any) sense of curiosity on the part of the birds about my sonic experimentation at that moment<sup>55</sup>, but there and then I considered the magpie “an excellent black and white oscillator and filter governed by a superb musical mind.” I recognized that the elements in the apparatus this songbird uses were similar to those I had in my studio and could not have been happier. This epiphany was a gift of this research at a personal level, but also surprisingly valuable in my comprehending the nature of synthesizers and of synthesis. I expand on this in Chapter 4.

With this discovery made, I considered how it could be applied to my music – for instance, what if I had known this, prior to our performance of *BE* on March 7, 2018? To answer that, I chose two passages on which to superimpose this new voice. For the remainder of this exegesis, I ask the reader to indulge my naming this particular synthesizer voice “Sweet Pea”. This is my household collective name for a family of Australian Magpies in whose territory we live. I feel that, by calling the voice Sweet Pea, I remove from it any pretence of it being representative of the greater population of Australian Magpies<sup>56</sup>; it is a stage name, an artifice and a game. It is also a term of endearment and, very happily, of increasing familiarity. And, having a stage name, Sweet Pea has a role to play in the final work of the portfolio – in fact a central, prominent part.

Having found a voice to work with, I tried assigning it to music from a MIDI file, which produced an acceptable result that was useful in future recordings. It was a different experience and a different result, however, to perform music directly at the synthesizer. When using a controller keyboard with a synthesizer, for example, variations in attack velocity may be mapped to inflections of pitch, volume and timbre. Other modulation sources are also at hand from the X-Y axis “joystick”, and a touch pad. Quick changes are possible between poly-synthesizer and mono-synthesizer modes (each with something unique to offer), note hold function, glide and speed of glide, arpeggiator,

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<sup>55</sup> There is no doubt, from my own observation and from observations described by Kaplan (2015, 2019), that these birds are in fact extremely observant and very curious. They are also excellent mimics (Kaplan 2019, pp. 172-177).

<sup>56</sup> One of eight sub-species of Australian Magpie (Kaplan, 2019) *Gymnorhina tibicen terraereginae* is the magpie in whose territory I live (p. 20).

filters, effects and modulation routing. In other words, shades and gradations of dynamic and colour are possible by performing the music live, which may be inaccessible when partly or fully pre-programmed or pre-recorded (on the sequencer). It *felt* like using a brush to paint notes, instead of using a monochromatic felt marker.

*Feathering* the music is, in this case I suggest, an apt description. For thematic material, I improvised on the music played by piano in the opening measures of *BE*, and found it satisfied both the criteria for thematic cohesion in context of the chamber work, and for evoking the bird for whom the sound is named. This following recording substitutes the very opening of the concert version of *BE*, with an alternative suggested opening – *Sweet Pea sings the Dawn*.

### [3.3.2a](#) Sweet Pea sings in the Dawn. 3:02

In the next example, Sweet Pea is placed in the mix where the previously discussed duo between cello and P6 took place. It was for the purpose of hearing her voice there, in context. The clip continues with modified piano (discussed above) joining the mix. A development would be to create/perform an extended episode between harmonic-cello and sweet pea, in a game of imitation (as magpies and some cellists do very well).

### [3.3.2b](#) Cello, feathered P6, modulated piano at *B*, 0:39

#### **3.3.3 Clarinet, MIDI and pathways to modular creation of new work**

Paul Dean's experiences with technology-enhanced performances were unfortunately mainly negative, and so I chose an approach to working with him on this project that could generate no anxiety due to failure of electronics or machinery. Because of our shared past, I felt well connected with Paul,<sup>57</sup> so was comfortable to work a little more abstractly on this particular collaboration. The third signature element of integration, then, between acoustic and electronic takes the MIDI data of a few phrases of the clarinet music and re-voices them on synthesizer. Every phrase from the synthesizer heard in concert was sourced from the clarinet part via MIDI data extracted from the digital score. As mentioned, the opening sounds of the synthesizer are taken from the clarinet music from ten bars before *O* in the score, shown in Figure 21.

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<sup>57</sup> He has commissioned several works from me as soloist or ensemble player including *Eulogy* (Wind Quintet, 1987), *From Fire By Fire* (Wind Octet, 1989), *Time and the Bell* (1990), *Towards the Still Point* (1991), and *Darkroom* (2012). When I compose for clarinet, it is still his sound that exercises my imagination.

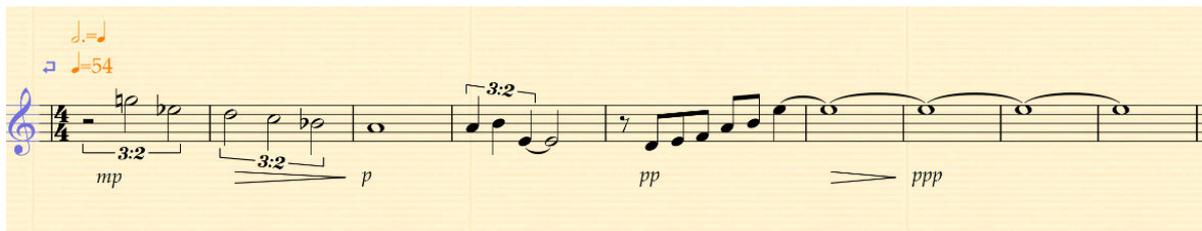


Figure 21 *Bunyip Endeavour* - clarinet as source for synthesizer, bars 238 to 247

Thematically, this is drawn from the solar flare kernel. In this case, a descending passage in an augmented rhythm followed by a faster (less slow) ascending form. As realised by the synthesizer, at the end of this passage a new descending line can be heard that does not appear in this notation. The reason is that the line is created by timbral inflections from a “filter sweep”, a reminder of the limitations of conventional notation to convey certain parameters of sound, as Davidson (2012) discusses.

The value of this exercise was threefold. First, the resulting differences of tone and effect reflect something of the choices facing orchestrators in every situation – what colour? what instrument? doublings? octave displacements? And yet there is a quality of *otherness* to the synthesizer lines. To borrow a phrase from Australian political journalist Phil Coorey, the (orchestration) agenda had jumped the fence and was bounding across the big paddock.<sup>58</sup> I became enchanted by the inherent possibilities of playing in “the big paddock.”

Secondly, whilst like probably every other composer and arranger of music I have made versions of one work for a different ensemble, the potential in these electronic tools and techniques struck me as uniquely rich. Given mindful employment of these technologies, the facility for elements of one work to be forming the fabric of another, very different work, impressed me as an idea I needed to develop as part of my compositional methodology. This *modular* approach would be my take on creating one work from another, my take on Boulez’s related pairs of works *Anthèmes I*, *Anthèmes II*, and *Dérive 1*, *Dérive 2* – in both of which pairs, instrumentation and duration grew for the second iteration. I was yet to discover just *how* electronics (synthesizer in particular) would shape my version of “II” or “2”, but I recognized that the digital and

<sup>58</sup> Coorey employs wryly humorous turns of phrase and has a knack of expressing the nub of an idea in a pithy vernacular.

electronic tools I had employed in *BE* – via a MIDI pathway whose fluency was just proven in concert – could be powerful, enabling allies.

Thirdly, the synthesizer was altering the way I perceived and thought about music in dimensions other than sonics. “Modulation” on the synthesizer is an homonym to “modulation” in harmonic theory. In modular synthesis<sup>59</sup> – the original Moog and Buchla modular synthesizers, and now a growing catalogue of more affordable Eurorack modules – the user is required to patch the control voltages from the source port to the destination port for whatever particular purpose is required. An instrument is a collection of modules, and the attraction lies in their supreme flexibility of signal routing. Modulation applies also on synthesizers like the P6, with “patching” limited to pre-figured circuitry of the instrument. Polymodulation, generally, infers numerous layers or instances, but specifically can have rich implications in sound design.<sup>60</sup> Details are discussed further in the following chapters and illustrated in *BP*, but in terms of the *idea*, I began to see *polymodulation* as a model or paradigm for how my music might be transformed from one version to another. A new hybrid approach to music creation, with the hallmarks of thinking acquired from *polymodular synthesis*, struck me as a very real and desirable outcome of this research. I needed to do some more “laboratory” work *en route* to finding a creative compositional methodology, but I was excited by the possibilities.

### 3.4 Insights from the visual artist

Exploration of the Bunyip story lent itself to cross-media collaboration and I was delighted when artist and PhD candidate (at the Queensland College of Art) Sally Molloy<sup>61</sup> agreed to participate in this project. Playing with ideas of imagery on a telephone meeting, we riffed across the story of “searching for Small” (Milne, 1978),

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<sup>59</sup> The main premise behind modular synthesis is that by connecting various modules together the user can construct unique signal paths capable of synthesizing sounds. In self-contained, non-modular gear, there are hardwired connections under the hood and the functionality is relatively fixed regarding the number of oscillators, LFOs, envelopes, etc., that are built into the device. With modular, there is the ability to expand the system in infinite ways, simply by adding more modules. Devices control or are controlled by other devices by means of CV (control voltage), the lifeblood of modular synthesis. Patch cables are used to send voltage throughout the system. <https://theproaudiofiles.com/the-what-why-and-how-of-modular-synthesis/>

<sup>60</sup> The P6 “Polymod” module played a part in persuading me to purchase this instrument. Some manufacturers use the term “cross modulation” for this comparable module.

<sup>61</sup> Sally and I have enjoyed a friendship over several years. She is a close friend of my daughter Marion. Hence I was acquainted with her whimsical, perceptive and contemplative talent. Nevertheless, I was surprised at what an effect it would have on my research.

and the resemblance of the potentiometer knobs on the P6 to a beetle. With the element of the buzzing sound made by both beetle and oscillator, the core of the synthesizer that was “the oscillator that goes *bhzrzzzzzrrr*” became “the beetle that goes *bhzrzzzzzrrr*”. The appellation acquired by the oscillator is metaphorical, but “Small”, of course, in Milne’s story *is* actually a beetle. There was, additionally, a satisfyingly playful correlation to the way our project was evolving – much as Pooh often stumbled upon solutions by happy circumstance, Small was found quite accidentally while Pooh and Piglet were trying (and failing) to trap a Heffalump. Sally sent me sketches of this beetle that she developed for her animated presentation at the recital (see Figure 22).

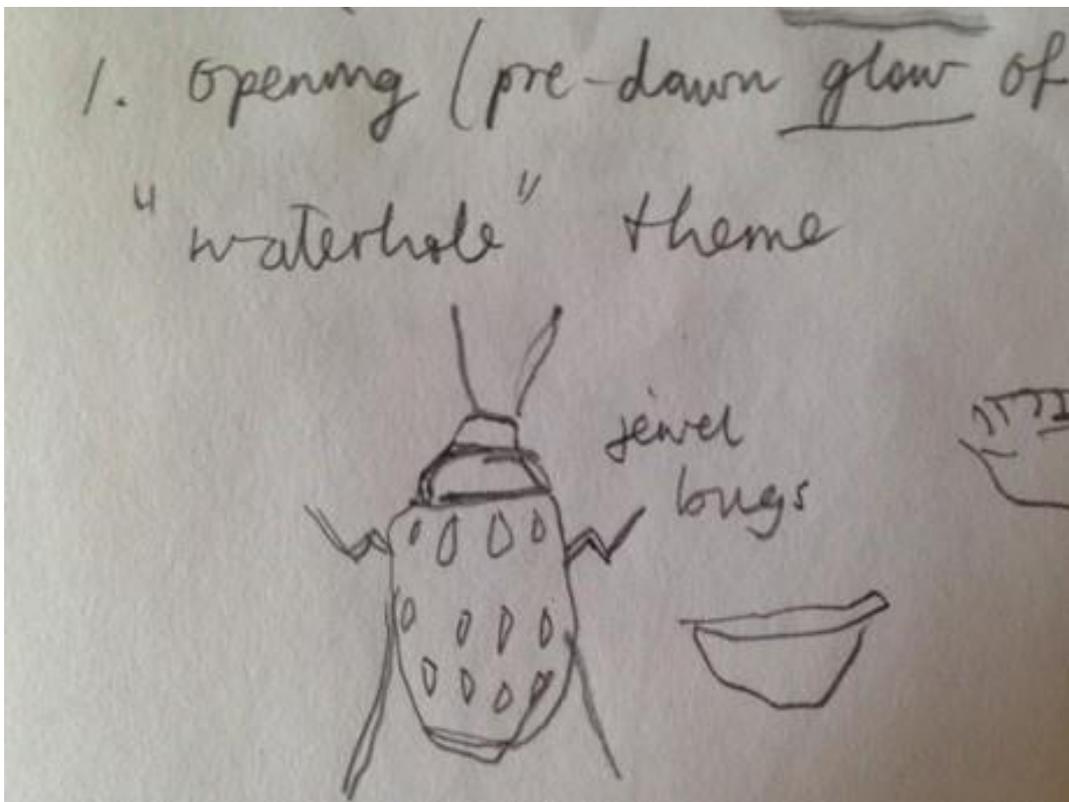


Figure 22 *Bunyip Endeavour - Beetle*, by Sally Molloy

Over a few meetings in person and by telephone, Sally’s perspective on the story was a real bonus to me in this project, revitalising my enthusiasm for the journey that began with *BoBC* with its illustrations by Ron Brookes, and opening to me the possibility of developing the story further in *BE* as Jenny and I had done with *B!* I appreciated Sally’s way of seeing things and her focus on details. In fact, her sketch *Ways of seeing* is a response to scenes where Wallaby and Emu bounce and trot by Bunyip as he tromps

along the track (see Figure 23). *How do they gaze* when they gaze at Bunyip? Anthropomorphized, the eyes challenge me to take the next step.

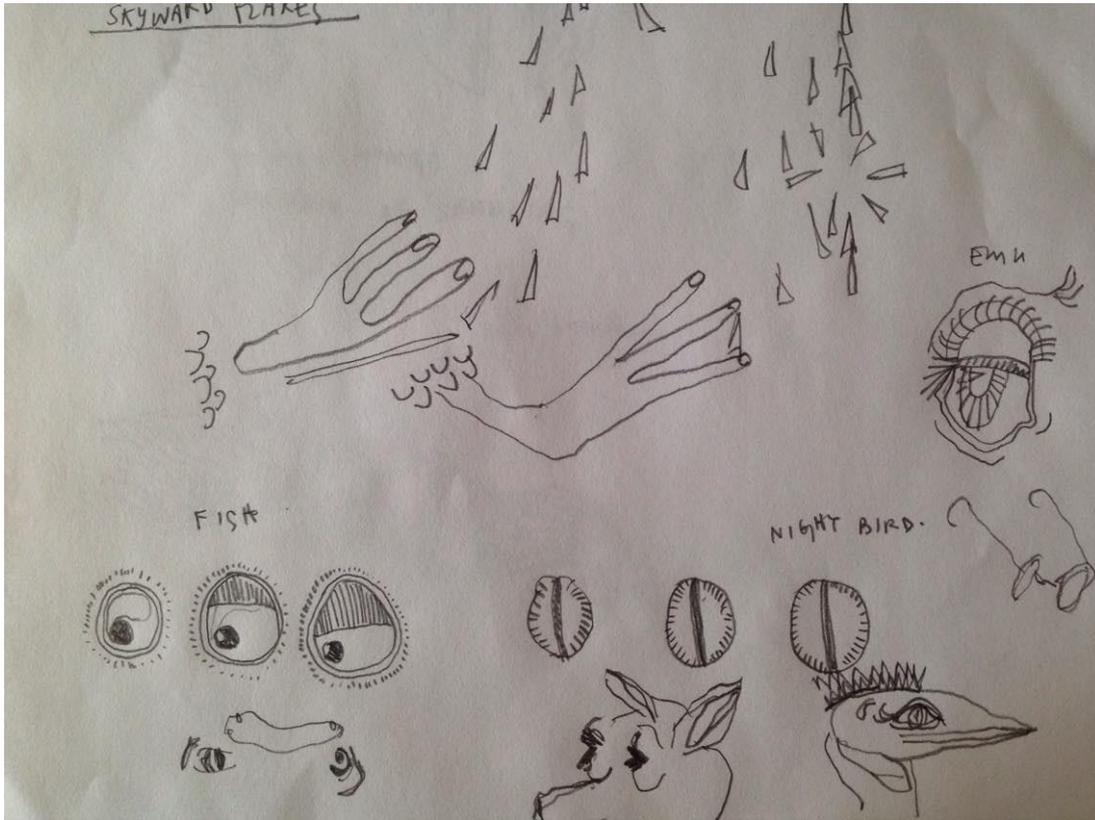


Figure 23 *Bunyip Endeavour* - Ways of seeing, by Sally Molloy

Bunyip's feet in this sketch were developed further for Sally's animated presentation at the recital. For a person (the author) who has spent quite some time working with feet and metre, this was a delightful double-entendre and counterpoint to the music and to the ideas that informed the music.

Figure 24 goes to the heart of the *BE* the project –like the P6 oscillator it was based on, *Beetle*, aka the jewel bug, has grown wings, has acquired colour, and it can fly!



Figure 24 *Bunyip Endeavour - Taking wings*, by Sally Molloy

### 3.5 First steps in the world of synthesis

The experience of working with the musicians of Endeavour Trio, graphic artist Sally Molloy, electroacoustic processes and the P6 proved highly consequential to my research. It was a case of, as Borgdorff (2012) and Nelson (2013) suggest, inspiration more likely being found in a rich environment working in unfamiliar ways, producing results beyond what the composer working alone can produce. Electroacoustic processes employed were an extension of research I had previously undertaken. The use of a synthesizer, however, was new territory for me – particularly in its unique, distinctive voices rather than its emulative voices. The significance of the BE project to my creative methodology required a period of reflection in the weeks following the recital to comprehend; it required an even longer period to assimilate and develop through my creative research. This is discussed and explored further in Chapters 4 and 5, and in the recordings of the five movements of *BP*.

## Chapter 4: On synthesizers, synthesis, and polymodulation

### 4.0 Introduction to Chapter 4

Thunder might not feature in everyone's mind as an example of music – although it appears to be at least an inspiration for such in numerous symphonies and operas wherein acoustic instruments are employed to imitate this natural electronic sonic phenomenon. Friction between ice particles in cumulonimbus clouds creates the charge of static electricity that ultimately discharges in the familiar dramatic way, involving the rapid movement of electrons from sky to earth or to wherever voltage can be equalised. As my prejudice against electronic music was nullified in the course of my research, I came to understand also that the synthesizer is driven by the movement of electrons, and in fact is close in nature to the ultimate source of all life on earth – sunlight. The relevance of this fact to my PhD is partly artistic and partly ethnographical, in that my mind had been changed by first hearing, and then understanding something of extraordinary beauty in the synthesizer.

This chapter addresses the discoveries I made in the course of my research regarding the nature of synthesizers. I will discuss the oscillator that became the heart of this PhD, how it inspired and guided my research and evolving compositional processes. I will describe how the analogue synthesizer gave me a deeper appreciation of the natural world, including a rich understanding of the physical properties of birdsong that have threaded through my music since I began composing, and a deeper understanding of my relationship with the work of Messiaen. Finally, I will describe how these and other practical and conceptual discoveries changed my approach to music creation as the synthesizer became my primary instrument of choice.

### 4.1 Won over by sound

I chose the P6 for my research because of its *sound*, which originates in its voltage-controlled oscillator. In being won over to synthesis I follow in the footsteps of some notable musicians and composers. Morton Subotnik (2015) was responsible for some of the particularities of Don Buchla's modular synthesizers and devoted much of his life to being part of the development of a new kind of music, created on this new class of instrument. The Buchla offered extraordinary fluency and spontaneity in contrast to procedures involving magnetic tape. Subotnik had conversations with Stockhausen and was aware of *Gesang der Junglinge* (1955-1956), but because he had some informed

inklings of what was to come with VCOs, cutting and splicing magnetic tape seemed cumbersome in the extreme. Suzanne Ciani “fell in love” immediately on seeing the instruments in Buchla’s synthesizer studio (Bächar, 2016). She asked him for a job on the strength of it (Bächar, 2015) so she could learn more about the instruments from building them in the company of their inventor.<sup>62</sup> In 2020 she is, like Subotnik, still performing and is celebrated as an artist and as a pioneer of synthesizer music. Caterina Barbieri, formerly a violinist and composer of acoustic music said:

It was only when I encountered the Buchla 200[e] synthesizer in 2013 that I started doing my own electronic music. It really changed my life; ***it taught me a way of listening to sound that years of classical training never revealed – a deep listening, a sort of microscopic perception of sound in its physicality, beyond its extrinsic cultural references*** [author’s emphasis] (Wilson, 2018).

Something akin to this occurred to me when I was working on sound design at the P6 in the weeks following the *BE* recital when I sought to create a sound *in response to* the cello stopped harmonics at **B** in *BE*. I did not wish to *emulate* the sound for the purpose, say, of substitution, but rather to find what the P6 version of that *type of sound might be*. My epiphany described in 3.3.2 suddenly and surprisingly gave me access to the natural world via the synthesizer because it operated, apparently, in the same way as the voice production apparatus of the Australian Magpie in particular and songbirds in general. This was a consequential awakening for me. As for Barbieri, there was also for me an aural engagement with the sound of the oscillator at a granular or molecular level. The following short video illustrates the core qualities of the analogue synthesizer that won my attention and keep me coming back to it.

#### [4.1.1](#) Video, Tone qualities of VCO, 2:00

Whilst Barbieri uses modular synthesizers, the fundamental sound qualities between hers and mine are the same because they (most crucially the oscillators) are voltage controlled. Power is always on and available, and the way the oscillators “speak” is discernibly unique – sometimes subtly, sometime exuberantly. The term “gate” from modular synthesis describes exactly what happens to make the oscillator speak: the gate

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<sup>62</sup> Suzanne Ciani soldered components on the Buchla 200, the synthesizer that she used for many years including on her 1970s performances and (only recently released) recordings *Buchla Concerts (2016)* and *LIVE Quadrophonic (2018)*.

opens and the current flows instantly. Charged particles move through a circuit, the oscillator converts direct current (DC) to alternating current (AC), and a buzz is produced, the raw tone to use *as you please*.

#### 4.2 Synthesizers and singers

To enable a better understanding of the elements of modular synthesizers, it is useful to compare the components of the synthesizer to those of a singer. Dieter Doepfer (2018), notable for making modular synthesis more accessible (and affordable) thanks to his developing the *Eurorack* modular system<sup>63</sup>, drew connections between electronic instruments and the human voice in an address at SchneidersLaden in Berlin. These are summarized in Table 1, with the final two rows added by me.

Table 1 Properties: synthesizers and the voice (Adapted from Doepfer, 2018)

Synthesizer element (function)	Vocal element (function)
Oscillator (origin of sound)	Vocal folds/vocal cords (origin of sound)
Filter (sculpting overtone profile, modifying timbre)	Mouth shape, throat shape, nasal cavities (sculpting overtone profile, modifying timbre)
VC Amplifier (signal gain)	Diaphragm and stomach muscles governing airstream volume and velocity (volume of sound)
Noise generator (transients)	Sibilants, breath sounds (transients)
<i>Voltage</i> (controls oscillator pitch, filter, amplifier ... any or many elements of synthesising sound and tone)	<i>Brain</i> (controls the muscles that affect pitch, volume, tone qualities ... any or many elements of producing sound and tone)
Envelope Generator (shaper of contour of voltage-controlled amplifier, voltage-controlled filter, or any other modulation destination)	Articulations and micro-dynamic contours, diaphragmatic energy, individual note shaping (affecting attack velocity, sustain, decay release parameters of intensity, other tony-modifying inflection).
Sequencer determines note order and parameters of sounds. <sup>64</sup>	Note order and parameters of sounds governed by learning, custom and volition.

<sup>63</sup> Using smaller components than the Moog modular, and built into existing “generic” format cases with existing power supplies as used by scientific instruments, Eurorack is relatively very cost competitive. An extensive inventory of Eurorack modules is now available to build one’s own custom array, with much innovative work being done internationally by boutique makers such as Verbos, Pittsburgh Modular, Orthogonal Devices, and numerous others, including Doepfer’s own company.

<sup>64</sup> Of course, the synthesist’s volition comes into play by determining the elements being sequenced.

### 4.3 Synthesizer and syrinx

My guide in natural-world synthesis, Sweet Pea has a defining advantage over the physical apparatus of the human vocalist: a syrinx.<sup>65</sup> Located at the top of the magpie's bronchi are two sets of syringeal rings allowing the bird to produce not one, but two fundamental sounds. Each of these two oscillators has independent tone-shaping musculature (filters), and this is readily heard in the songs and calls of magpies. Adding a level of richness, if human singers can produce multiphonics (fundamental plus audible harmonics) with their *one* oscillator; a magpie can produce harmonics from each of its two independent oscillators, thereby affording their vastly expanded sonic possibilities. Gisela Kaplan (2019) has analysed tone production and various calls of the Australian Magpie including the independent operation of the two oscillators (pp. 159-177).<sup>66</sup>

### 4.4 Oscillation

Within practically every electronic instrument there is an oscillator of some sort. The task of the oscillator is to generate a repetitive waveform of desired shape, frequency, and amplitude .... Depending on the application, the driven circuit(s) may require either a pulsed, sinusoidal, square, sawtooth, or triangular waveform (Scherz and Monk, 2016, p. 683).

The key to musical electronic instruments is that the frequencies generated by their oscillators are in the audible spectrum, so that the resulting waveforms can be *heard* – the phenomenon that launched the storied career of Russian physicist Leon Theremin in 1919.<sup>67</sup> The language of oscillators thereby is familiar to synthesists, just as it is to physicists and engineers. The oscillator is not limited to electronic instruments, however; it is the common element at the core of *all* musical instruments; the fundamental phenomenon is the same. Consider that in electronics, the oscillator

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<sup>65</sup> This is distinguishing physiognomy of the true songbirds. (Kaplan, 2019).

<sup>66</sup> It was a great delight to read her recent research that finds possibly every species of living songbird on earth originated in or near Australia – more precisely, in Gondwanaland. These species were protected by dint of geography from the effects of the meteor from Jupiter that smashed into the Yucatán Peninsula some 66 million years ago (Cox and Cohen, 2013) resulting in the extinction of most dinosaurs, among other profound changes to the earth's atmosphere and lifeforms. Kaplan places the age of the Australian Magpie at some 75 million years, and as musicians, rates these as having one of the most developed musical languages of any terrestrial species on the planet (top-tier marine mammals rule the seas). These birds were singing in the last 20 million years of the Triassic period, and for the 55 million years since, here in this place we live in the former Gondwanaland.

<sup>67</sup> <https://www.moogmusic.com/news/leon-theremin-1>

converts DC into AC current – a direct stream is converted into an alternating stream producing the core signal. Now compare this image with, say, a reed instrument. The direct stream of the player’s breath is converted into an oscillating stream by the action of the reed on the mouthpiece, which alternates between fully open and fully closed. With a transverse flute where the direct airstream from the player’s lips is converted to oscillating between fully across (out-of) the tone-hole and then fully into the tube, thereby sending pressure waves of air down the instrument, just as did the oboe or clarinet reed’s oscillation. The brass player provides the oscillation at their lips within the mouthpiece cup, and the simple yet wonderful apparatus and shape of a length of metal tubing converts this oral fart into the array of sounds from gross to glorious that we know and love from horns or trombones. The cello bow drags the string sideways by friction until tension overpowers friction and it snaps back, the sound from the resulting oscillation amplified in the body of the instrument; guitarists use fingers to do this; on the pianoforte, a hammer strikes the string to set it oscillating; the drumhead oscillates after excitement by striking with the hand, stick or beater. Each and all of these have in common the one indispensable element of music: sound produced by an oscillation, a backwards-and-forwards movement of the membrane or medium of the instrument. What we identify as tone is some kind of selective refinement of that sound.

The synthesizer changed how I hear sound. I understood Barbieri’s description (Wilson, 2018) of hearing sound at a molecular level, which strikes me as being both highly imaginative and yet essentially true. One does not see a water molecule in a snowflake for instance (there are trillions), and yet the snowflake is hexagonal because of the shape of a water molecule.<sup>68</sup> One might say that the snowflake bears a striking similarity to its molecular constituent. The sound of a rich analogue sawtooth wave is quite physical with its buzzy, grainy texture; one can discern the individual oscillations quite clearly across a range of audible frequencies. At very low frequencies, one can count them. At higher frequencies, the grainy becomes smooth but the effect remains as interesting.

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<sup>68</sup> The two hydrogen atoms form an angle of 120° with the oxygen atom, and this is the structural kernel of the snowflake.

#### 4.5 Cosmic connections to the natural world

With synthesis and with synthesizers, the connection to the natural world is not limited to the poetic and metaphorical. When Suzanne Ciani (2016) commented that “it is all waves” she makes an observation that goes to the heart of the solar system. The ultimate source of life on earth delivers its energy to the earth’s biosphere by way of electromagnetic waves. The visible part of that energy arrives in frequencies above  $4 \times 10^{14}$  Hz (infrared) to below  $8 \times 10^{14}$  Hz (ultraviolet), but visible or invisible, the entire biosphere is powered by the spectrum of waves from the sun.

The elements that constitute all organic and inorganic matter of, in and on the earth are the gift of an exploded star. In its intense furnace and gravity, our star is busy converting hydrogen into everything else on the periodic table by a form of additive synthesis – but whereas the additive synthesizer combines sine waves to create more complex waveforms, stars fuse hydrogen into helium (and everything else). The illustrations below show how complex waveforms can be made from adding sine waves together – all harmonics for the sawtooth wave, and just odd-numbered harmonics for the square wave, for instance. Conversely, in subtractive synthesis a tone rich in harmonics is the starting point, before passing through filters to sculpt that tone and alter its properties by subtraction.<sup>69</sup> Operating on the same principle as the Hammond tonewheel organ<sup>70</sup>, interactive apps such as the one used to create Figures 25 and 26 below are interesting, offering another perspective on the way synthesis “works”. Selecting just the odd harmonics (in the right mix), for instance, produces a square wave, whereas all of the harmonics are used to produce for a sawtooth wave.

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<sup>69</sup> Few synthesizers use additive synthesis, and computers offer the natural home for the process given the numbers of oscillators involved. The Fairlight CMI (an Australian design from 1979 to 1989) is a celebrated example, though rightly better known for its innovative use of sampling. On hardware synthesizers, the logistics of oscillators in this number are prohibitive.

<sup>70</sup> As Reed (2000) noted, the Hammond is effectively a mechanical additive synthesizer.



Figure 25 Additive synthesis - saw tooth wave, all harmonics<sup>71</sup>



Figure 26 Additive synthesis - square wave, odd harmonics

<sup>71</sup> Figures 24 and 25 are drawn from the interactive application found at <https://teropa.info/harmonics-explorer/>

#### 4.5.1 The tide cycle - an illustration of low-frequency oscillation and modulation

Several years of sailing and living near the sea have awakened me to the wonderful dance inherent in tidal patterns and tidal flows, and the influence of gravity on the earth and all its lifeforms. Researching the use of low-frequency oscillators in music synthesis has enlarged my understanding of the tide cycle, which in turn has informed and enlarged my understanding of sound production with synthesizers.

The sun is the gravitational centre of the orbit of all the planets within our solar system and is secondarily responsible for the shaping of the tides. Due to proximity to earth, the larger gravitational pull is from the moon. The illustration in Figure 27 is of a typical semi-diurnal tidal pattern, wherein the effects of the sun's gravitational force (period 24 hrs or 2 x 12 hrs) plays a secondary role to that of the moon (period approximately 24hrs 50mins – or 2 x 12 hrs 25mins). In synthesis parlance, the moon's gravitational force (the dominant wave) is being *modulated* by the sun's force. Spring tides occur when the sun, moon and earth are aligned and the tidal wave amplitude is accentuated; and neap tides occur when, from the perspective of earth, moon and sun are at 90 degrees and the tidal wave amplitude is attenuated. The illustration also shows that there are two peaks each day of different amplitude.

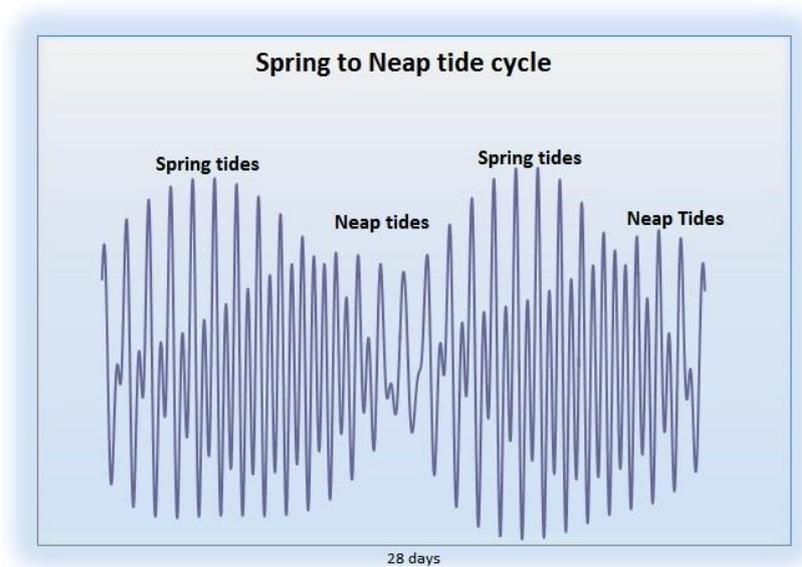


Figure 27 The spring to neap tide cycle<sup>72</sup>

<sup>72</sup> Illustration sourced from Marine Science of Australia at: <https://www.ausmarinescience.com/marine-science-basics/tides/>

The modulation of one low frequency oscillator by another produces this phenomenon that is at once regular but modulated – it is never monotonous; it is a bit elusive; and this marvellous ever-changing pattern is repeated each month.<sup>73</sup> In synthesis, low-frequency oscillators (LFOs) are employed for exactly this type of purpose. The moon alone, abstracted to an LFO, could modulate (say) the amplitude of a voltage-controlled amplifier (VCA) thereby causing periodic change in perceived volume of the sound. A second LFO of slightly different frequency and amplitude, could modulate the same VCA. The result would be analogous to the tidal patterning observed in nature – and indeed, I will refer to this again in the next chapter because it pertains to processes I have employed in *BP*.

Beneath the intricate “ebb and flow” of these orbital examples, however subtle and elusive, is a very accurate clock. The wave patterns relate to immaculately tuned constants – even the elliptical variants of orbits and the axis “wobbles” of the moon, earth, sun and planets are in relation to a clock.

#### 4.5.2 Time and rhythms

Structuring synthesizer music with the aid of the sequencer modules led to consideration of the clock and the timeline. Synthesizers were not about to frustrate any designs I might have had regarding polymetric, polyrhythmic compositions, but rather to work with them. The clock has a mixed reputation in classical music circles where the term “metronomic” is often used pejoratively. Nature, however, has a remarkable timepiece. T.S. Eliot explored many facets of time in *Four Quartets* (1944), as did Messiaen in his *Quatuor* (1942), and such observations have fascinated me for years, including in research previously pursued in *Surya Namaskar, Chaand Namaskar* (1993) and *Time and the Bell* (1994).

This present research caused me to consider time and the measurement of time in a way that again changed my approach to music creation. The clock I defer to is not a thing in a box helping me practice scales to a grid<sup>74</sup> – although it may be that, often is that, and perhaps is why some musicians dislike being reminded of it in concert performances. An atomic clock is a thing at the heart of the solar system that generates pulses that

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<sup>73</sup> A synodic month averages 29 days, 12 hrs, 44 mins, the period of the moon’s orbit as referenced to the sun, and not 28 days as indicated in Figure 4.5.1.

<sup>74</sup> A caricature of this satirizes Der Mensch in *Bunyip Polymodular* discussed in Chapter 5.

empower, shape and articulate the planet and its biosphere. It manifests in a mind-bending spectrum of frequencies and phenomena from the speed and frequency of light, to cycles spun across days, months, years and eons. This is not the enemy of music. It is intrinsic to music. It is, ultimately, the reason for music.

In Chapter 1 I recalled the earliest inspirations for music in my life were of the natural world – the birds in the forests and waterways where I grew up, and the music “of the spheres”. Of the latter, of course I mistakenly conflated sounds in my ears with sights in the galaxy – a happy conflation that is the subject of much philosophy, astronomy and cosmology from the ancient world to the present world.<sup>75</sup> The birds of the forest always will be extraordinary, and today I am immensely grateful that a family of magpies chooses to have some interaction with me in my studio and garden in their territory.

Another image from childhood is of a polyrhythmic phenomenon that preceded the appreciation of drumming patterns in pipe bands. Driving with family on rainy days or nights, following trucks for long periods on narrow roads where one could not pass, the windscreen wipers of the trucks often each had their own motor, and these were seldom synchronised. I would study them until I could count how many cycles of the left wiper occurred to how many of the right. Or how many cycles of *our* wipers to the ones of the car approaching or in front (whose wipers, less interestingly, *were* synchronised). This fascination was given new meaning thanks to inspired musicianship workshops with Margaret Crawford at the QCM who introduced me to the joy of learning to count and perform polyrhythms. This was developed with numbers and ratios of particular interest, and fed directly and naturally into the music I composed from *Time and the Bell* onwards, most explicitly in *Surya Namaskar*, *Chaand Namaskar*.

The clock I encountered in synthesis has not frustrated the impulses aroused in all of those experiences. Conversely it has enhanced and enabled them to find expression in my work such as in the foundational polyrhythmic, polymetric structure of Movements I, IV and V of *BP*, the polyrhythmic episodes of Movements II and III, and in the cyclic

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<sup>75</sup> Wanda Diaz Merced contributes to astronomy as a blind physicist who analyses astronomical events via audible data and process called “sonification” – it gives new meaning to the ancient Greek concept of “music of the spheres”, while also underscoring the relationship between oscillations of vastly different frequencies. Retrieved at: [https://www.ted.com/talks/wanda\\_diaz\\_merced\\_how\\_a\\_blind\\_astronomer\\_found\\_a\\_way\\_to\\_hear\\_the\\_stars?language=en](https://www.ted.com/talks/wanda_diaz_merced_how_a_blind_astronomer_found_a_way_to_hear_the_stars?language=en)

LFO modulations of amplitude, timbre, and spatial positioning of sound throughout the work, as will be discussed in Chapter 5.

#### 4.6 Modulated by Messiaen (an extraordinary synthesist)

##### 4.6.1 Harmonics

In my early freelance life, taking a cue from Messiaen (1956) I listened to the resonance of a low C and found the 11th harmonic. This was a revelation to me. After years encountering various theories and stylistic approaches to the resolution (or latterly non-resolution) of the augmented 4th/diminished 5th/tritone/*diabolis per musica* interval, the astonishing observation of Messiaen that a pitch approximating F# is in the resonance of a low C, and therefore becomes, building on the added note harmonic language of his compatriot Debussy, a part of the tonic chord of C. It is such a disarming and compelling logic, and the authority for it is nature itself – separate to, outside, above and beneath any stylistic approach to harmonic thinking and practice. It is an observable phenomenon. This changed the way I heard sound, the way I heard Messiaen, and the way I heard harmony and resonance.

It is important to my discussion to be clear about how Messiaen responded to this observation and other phenomena, and in what way he inspired me. By most tuning paradigms the 11th harmonic of C is not precisely an F#. It is somewhere close to half-way between an F and an F# – 49 cents below an equal tempered F#, and 51 cents above an equal-tempered F<sup>76</sup>. Without venturing into psychoacoustics, the fact of it being clearly *not an F* possibly *accentuates* to the ear (including the superb ear of Messiaen, evidently) its *F-sharp-ness*. But what Messiaen *did* with this observation is most interesting. Numbers of composers have responded to this same phenomenon and more broadly the tuning of the harmonics spectrum with, for instance, the inclusion of *passages* with natural resonance (for example Britten's *Serenade for Horn and Strings*) in the context of a work adhering to the tuning conventions *du jour*. At the other end of a spectrum, perhaps, a thorough-going recalibration of tuning of every note in every chord, with close realisations attainable only to the most skilled and devoted musicians. (The music of Ben Johnstone is exemplary). In between is the art of musicians and

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<sup>76</sup> To every aficionado of tuning, equal temperament contains only one interval that is "in tune", and that is the octave. It is widely used however, owing to its "jack of all trades" capacity to transpose freely from one key to another, and with each key sharing the same properties of in tune/out of tune-ness in the intervallic structures.

composers along a spectrum of the *subtle tunings*.<sup>77</sup> Additionally there are the natural adjustments made by singers and players of brass and stringed instruments, for whom the equal-tempered 3rd and 5th are simply unnatural and out of tune and are instinctively avoided wherever possible.

#### 4.6.2 Abstract blending

Messiaen's response resonates more deeply for me. His work illustrates abstract blending, as described by Chapman (2012) whereby the source material becomes less and less discernible as it is treated variously through *sampling*, *imitation*, *assimilation*, *syncretism* and finally, *abstract blending*. In this latter category, ideas are used in a conceptual way, "largely only revealed in analysis"; they are applied "in a different context than the original" (p. 236). This is a fair description of the way Messiaen's mind works, I would suggest. While I was researching for my Master of Music (Rankine, 1994) I was taking lessons on *tabla* from Dr Tarlochan Singh, and the contrast between his tradition and that represented by Messiaen was startlingly clear. With Dr Singh I participated in a lesson that was a ritual, just as he had learnt from his teacher, and that teacher from his teacher before him. This was not unlike the experience I had in my earlier years learning *piobaireachd*, including the similarity of learning to *sing* the music before *playing* it. But with Messiaen, one observes and learns something *over here*, and then creates a whole new thing, with the kernel of the idea, its DNA, *over there*. He is inspired to create something new, distinctive, and quite unlike the observed material. Whilst continuing to compose and perform work for equal tempered piano and well-tempered organ, singers and orchestras, he developed an extraordinarily rich, complex, and dazzlingly colourful harmonic language that is simultaneously a natural progression of the added-note harmonies of his compatriot Debussy, and yet is a whole, wildly original new language.

Another prime and pertinent example of Messiaen's *abstract blending* is his approach to setting birdsong. To recount briefly, his meticulously notated transcriptions collected over a lifetime were transfigured in his equally meticulous settings of music inspired by these transcriptions. His harmonies are chosen to recreate the "colours" of the bird's

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<sup>77</sup> I assisted my friend Michael Dixon in two concerts of such music in Leichhardt, NSW in the past decade. I also recorded four of his works, with him performing all of the horn parts using multi-track techniques for his research and publication. I comprehend what he and others are doing, and why. For myself, it led me back to Messiaen, as discussed above. The subtle tuning world, exquisite as it can be, is not my calling.

song, as he heard it, in the environment in which he heard it. Owing to his *synaesthesia* his experience was highly unusual and vivid. The original birdcall may not be apparent at all to the concert goer – although when I started listening to birds more analytically I came to a deeper appreciation of the melodic and rhythmic patterns in Messiaen's music. In place of the source birdcall is the music of an extraordinary and original artist. This subject is well treated by Hill & Simeone (2005, pp. 201-230).

#### **4.6.3 Birdsong**

With these foregoing paragraphs in mind, the reader may better appreciate how it is Messiaen inspired me in my response to the sounds of the P6. First, the *fact* of the resonance of the oscillator and filter and their sonic fingerprint inspired me to create music with the synthesizer, and to regard it an excellent choice among many excellent instruments on earth; indeed, the *right* choice for me, here and now. The P6 exuded natural sonic qualities I could embrace it into my canvas. The connection was made with birds because of an epiphany of a shared apparatus that enabled me to abstract the tone-making components of the P6 and conflate the oscillator with the oscines.

As a bonus, I experienced another type of liberation from Messiaen. Never since I composed *Theatre of the Yet Quiet Places* in December 1985 have I been able to create music inspired by birdsong without thinking of Messiaen. In every previous case I have self-consciously *not* sounded like him, even while it gave me a greater appreciation of his art. In Figure 28 and audio [4.6.3a](#) (0:09) a flock of rowdy lorikeets is evoked in this *senza-mesura* passage. No sign of Messiaen there, but a gestural response inspired by the antics of an endearing, party-loving bird.

Figure 28 *Eulogy*, Movement III, Theatre of the Yet Quiet Places: flock of rowdy lorikeets

Alternatively, episodes of rhythmically structured material are comprised of two parts, both illustrated in Figure 29 and audio [4.6.3b](#) (0:22). The solo clarinet is inspired by a grey shrike-thrush that caught and held my ear for a few minutes<sup>78</sup> when I was working on this quintet. This bird had a precise and wonderful phraseology and rhythmic language. The tutti passages are a theatrical construct: based on what I heard I imagined that after the “rabble” quietened down, a stage was rolled out and onto it, into the quietness, the grey shrike-thrush sang. In this imaginary theatre, other birds are acting as heralds, punctuating the soloist’s long story with a short fanfare refrain.

Figure 29 *Eulogy*, Movement III: grey shrike thrush and heraldic interlocutors

Birdsong has since been evoked in several of my works, but I think my basic orientation to it was established in *Eulogy*. Pertinent to this PhD is the fact that in *BE* I chose to write for the piano some passages of birdsong that very possibly do remind the listener of Messiaen. Furthermore, through the experience of *BE* and a period of subsequent

<sup>78</sup> Or more correctly, perhaps, as Eliot (1944) might have examined it, period in time and out of time.

reflection and research, the P6 and Sweet Pea gave me another lens and a different way of responding to birdsong, as illustrated in audio file [3.3.2a](#) (Sweet Pea sings the dawn) and as developed in *BP* and discussed in Chapter 5. Two stages of a transition in my compositional methodology had thus been performed.

In my interaction with the synthesizer and the correlations I heard between it and Sweet Pea, my response to birdcalls shifted to the more fundamental, elemental level of tone production. As a juvenile magpie listens and practises its calls, and as an adult magpie listens and develops its repertoire – including mimicry of select other calls and sounds in its territory – I decided I could adopt a similar attitude, learning to hone *my* songs and repertoire, doing my warm-ups as they do, coaxing tones out of my studio oscillators and filters, as they do from their syrinx. It is an indescribably lovely development in my orientation to these admired birds, to now feel a more direct connection and *not* to feel self-conscious about avoiding sounding like someone else. If momentarily I *do* sound like Sweet Pea, then I am honoured. She is a superb musician. Besides, magpies themselves are outstanding mimics as this video recording (Betty, 2019) attests.<sup>79</sup>

[4.6.3c](#) Video, MagpieKookaburraDogSirenWhistleHoneyeater, 1:22

After listening to calls and scrutinizing sonograms, Kaplan (2019) asserts that, with respect to mimicry, the lyrebird is the more convincing performer. However, “in terms of tempo, rhythm, amplitude or modulation, magpies were more accurate in their renditions than lyrebirds” (p. 175).

#### **4.7 Synthesizer as sonic research tool**

Synthesizers possess some unique properties and can serve as excellent sonic-research tools. The oscillators on my two analogue synthesizers can produce sounds across the audible spectrum going both higher and lower than the compass of pipe organs and orchestras. The effect of filters in subtractive synthesis, sculpting out harmonics from harmonically rich oscillators is instructive in the ways that harmonics and timbre are connected. The Attack, Decay, Sustain, Release (ADSR) envelopes attune the ear to properties that help define different instruments or different ways of playing an

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<sup>79</sup> Betty is a volunteer at the local Australian Red Cross Life Blood Donor Centre, where she spotted me reading Kaplan’s *Australian Magpie* (2019) after a plasma donation. She played me this video clip that she had recorded on her back deck, and kindly agreed to send me a copy to include here. It is a very low-fi recording, with some wind and handling noise, but does display the extraordinary powers of mimicry of magpies.

instrument. These all explore the nature of sound and as such, of music. Something that caught me completely off guard, however, was the chance to hear harmony as rhythm through the use of polymodulation. As far as I am aware, this is a unique feature of synthesizers. This is explored further in Chapter 5.4 and in Movement IV of *BP*.

#### 4.8 Electronics in art music

For a century, electronic instruments have offered unique and distinctive sounds for performers and composers who care for them. The Theremin (Moog Music, 2020)<sup>80</sup> and *Ondes Martenot* (Battaglia, 2014)<sup>81</sup> are two whose characteristic sounds and manners of playing are widely recognized. Perhaps the outstanding success of an electronic instrument on the classical music stage is the *ondes*, thanks to its use by Messiaen with performances by Jeanne Loriod in major works such as *Turangalila-Symphonie* (1949) and *Des canyons aux étoiles* (1971). The Trautonium (Hanly, 2017)<sup>82</sup> is best known in the German-speaking world, with prominent composers for it being Hindemith and Orff; it is more widely heard, if not known, thanks to Hitchcock's film *The Birds*<sup>83</sup>.

Magnetic tape introduced the possibility of and allowed various techniques for “sampling” – now so accessible as to be commonplace in the digital domain. In *Gesang der Jünglinge* (1956) Stockhausen demonstrated the great artistic potential for mixing recorded (child vocalist's) sounds with studio modified sounds. His work was achieved painstakingly by cutting and piecing together magnetic tape in hundreds of fragments played in various ways across multiple machines. The concept of using recorded sound to produce something quite *different* to its origin sound remains widespread and highly productive in many examples of current synthesis and synthesizers,<sup>84</sup> applied in a broad range of music. Varèse likewise embraced a spectrum of possibilities across his life's

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<sup>80</sup> The original was made in 1919; as of 2020 it is still being manufactured by Moog Music in three models.

<sup>81</sup> This instrument was made from the 1920s through to the 1950s and is now being made again in Paris.

<sup>82</sup> First made in 1929, this instrument evolved but typically could be played via keyboards and a metal plate.

<sup>83</sup> Hitchcock engaged two German trautonium composers Oskar Sala and Remi Gassman, who worked with his favoured composer Bernard Herrmann acting as consultant.

<sup>84</sup> Dave Smith's/Sequential's Prophet X, released in 2018 has a voice structure of four oscillators – two are digital oscillators (DOs), while the other two are wavetable oscillators with sampled waves from the company 8DIO. These samples are recordings of many acoustic and electronic instruments. Beyond the oscillator, however, the signals then progress through the instrument via modulations, filters and effect so that, as per Stockhausen's work, the resulting sound can be a highly modified (or transmogrified) version of the original. Computer-based software synthesizers such as *Omnisphere* offer these facilities in another form. A niche part of this sample-based spectrum belongs to libraries used to *emulate* as closely as possible the original source, such as the Vienna Symphonic Libraries or *East West*.

work with (for example) *Ionisation* (1931) demonstrating acoustic music *anticipating* electronic music, whilst revealing a scientific examination of the natural elements of sound; acoustic and electronic sources (Griffiths, 2011) in *Déserts* (1954); and in the purely electronic *Poème électronique* (1958). By contrast, Delia Derbyshire's 1963 realisation of Ron Grainer's musical idea for the *Doctor Who* theme involved recording to magnetic tape the tones of valve test oscillators. These were *re-recorded* to tape running at various speeds to attain the requisite pitches at playback speed, then cut and spliced together in hundreds of segments according to pitch – in other words, standard procedure for *musique concrète* at the time, resulting in a famously successful application of the technologies.<sup>85</sup>

#### 4.9 Debut of VCO synthesizers, and their synthesists

All synthesizers are electronic<sup>86</sup>, but not all electronic instruments are synthesizers. A history of synthesizers is outside the scope of this exegesis, but it is relevant to my research to mention something of the role of the VCO, which gave Bob Moog and Don Buchla a vastly more nimble means of tone production and manipulation than magnetic tape and vacuum tubes. Moog was a scientist with a strong interest in music and his inventions were largely driven by requests from composers and performers such as Herb Deutsch, who requested the now universal ADSR envelope generator for sound shaping (Kozinn, 2005). Buchla's modular synthesizer was created in response to composer Morton Subotnik's advertisement for an instrument builder who could provide him with what he needed, resulting in the *series 100* synthesizer and the landmark composition/recording *Silver Apples of the Moon* (1967).

Subotnik's subsequent request for the facility to shape sounds with the voice led to the first "envelope follower" (2017) whereby the voice could provide a template for mapping envelope parameters of the voice to the carrier tone of the instrument (which is distinct from the use of the voice with a vocoder). While Buchla abhorred the idea of a piano- or organ-style keyboard controller, Moog saw it would make the electronics

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<sup>85</sup> For an account of the creation of the original recording, project assistant Dick Mills speaks at an illustrated discussion <https://www.youtube.com/watch?v=usdIV55eIOw>. More details of the project, together with embedded video interviews with Derbyshire and Grainer, can be found at <https://www.openculture.com/2016/01/the-fascinating-story-of-how-delia-derbyshire-created-the-original-doctor-who-theme.html>.

<sup>86</sup> Computers and digital synthesizers ultimately rely on the movement of electrons in their data encoding.

accessible to more musicians, via an interface they already understood. In a 2020 interview, Ciani (C.C., 2020) notes that the antagonism between Moog (keyboard) and Buchla enthusiasts over the keyboard versus non-keyboard (or the touch-control surfaces Buchla developed), was very strong for many years, but now has somewhat abated.<sup>87</sup> Loved or loathed, the Moog made broad inroads into cultural consciousness not enjoyed by Buchla, from Carlos's *Switched on Bach* (1968), to Keith Emerson's work with *Emerson, Lake and Palmer*, to Isao Tomita's work re-conceiving classical repertoire and creating new film music (Tomita, 2014). Today there is a resurgence of interest in modular synthesizers without keyboards. Conversely, while still using a Buchla rig, Ciani also owns and loves an M1, and her modular rig is augmented by signal-routing apps and reverb/delay apps on an iPad. The growth in availability and use of Eurorack modules is complemented by the development also of synthesizers of every other type.

With a synthesizer, the keyboard is a control surface usually directed to pitch, but not only pitch, and not necessarily to pitch at all. The rich legacy of music produced with various synthesizers illustrates that keyboards need not limit the synthesizer in any way with regard to what is produced with the instrument.<sup>88</sup> The keyboard clearly is integral when it comes to the now-ubiquitous digital "workstation" and digital polysynthesizers that perform many duties on stage, in the orchestra pit or in the recording studio. Their capacities continue to develop as tools of emulation, just as enthusiasm for them as instruments for producing original sounds, and ways to make and shape those sounds, has not waned. There have always been efforts in all directions, with many points of crossover. Ciani after all achieved her commercial success doing advertisements with a Buchla, while Moogs are used in every genre. An array of *types* of synthesis is now employed, with a thriving industry and market for modular synthesizers, voltage-controlled synthesizers, all manner of digital synthesizers, software synthesizers, and

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<sup>87</sup> A current manufacturer of Eurorack synth modules, *MakeNoise* has produced the "0-Coast" (ie "zero-coast") respecting and drawing on elements of "East Coast" (Moog) and "West Coast" (Buchla) approaches to synthesis.

<sup>88</sup> It did strike me as slightly ironic when, after reading Ciani's comments about the limitations of pitch imposed by the keyboard, I listened to her *LIVE Quadrophonic* album (recorded in the 1970s, released in 2018) – harmonically it is essentially a 25 min composition based on the Dorian mode of D. There are many slides and glissandi, but the pitch set is clear and illustrates that, in spite of the ability of oscillators to produce *any* pitch, the synthesist may well still *choose to use a set of pitches*, and the sequencer (almost universal in synthesizers and certainly on Buchla synthesizers) is as capable of repeating pitches and pitch sets as reliably as is a keyboard.

computer code-synthesis. Many today are some form of hybrid. I have used or encountered most types, now, although I love one type above the others because of how it sounds and how it rewards me when I interact with it.

#### **4.10 Synthesizer as primary instrument of choice**

Having *heard* that the P6 is as capable as any acoustic instrument of producing interesting, beautiful, powerful, or delicate sounds, and having been enchanted by it, I embraced it as a voice in its own right. To be clear, I have no philosophical nor musical nor aesthetic nor ethical objection to synthesizers being used to *emulate* other instruments. Herbie Hancock is a supreme exemplar of a creative musician whose work involves choosing not one technology over another, but embracing the whole lot: acoustic, electroacoustic, electronic, original, emulative, scored, improvised, sequenced, processed. His 2014 Norton Lectures<sup>89</sup> along with his lifetime catalogue are an eloquent, compelling testimony to the possibilities and wisdom of this approach.

In the course of this research, between recording *The Crushing* and reflecting on *BE*, I put aside *emulation* firstly for practical reasons – my sample libraries were defunct without a powerful computer and its suite of software – but secondly because I found synthesis and synthesizers artistically and philosophically rewarding beyond my expectations. I wanted to see where they might take me.

#### **4.11 A new imperative**

My research to this point supported a plan for the final work in the portfolio in which, like Hancock and Varèse, I would use an array of technologies and sound sources. My rig would include ProTools (with various plugins), VSL sample libraries, digital scores, and the newcomers – hardware and software synthesizers. In a logical progression I would develop further the three electro-acoustic techniques and dimensions identified and essayed in *BE* (sampled and modified piano to create new voices; sound design responses to cello, leading to new voices and deeper engagement with synthesis; and MIDI language conduit, ex-clarinet, to fluidly create new content). Well into the project, however, my then still quite new, custom built studio PC became an expensive box of inoperative components a month out of warranty, rendering my ProTools files and the

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<sup>89</sup> Hancock, H. (2014). Retrieved at <http://www.openculture.com/2014/03/herbie-hancock-present-the-prestigious-norton-lectures-at-harvard-university.html>

interdependent collection of software and applications inaccessible and worthless. I had an urgent problem to resolve.

Over a reflection period of one week directly following this event I recalled that over the years the consistently reliable annoyance and frustration in my studio involved software and computers. They are enabling technologies, to be certain. The DAW gave me access to working *as though* in a well-equipped recording studio. It is not a trivial comparison. Bob Katz (2002; 2013) observed that never before has a music creator been able to take control of the entire process of recording music, from conception to creation to mixing, mastering, and delivery. It can be intoxicatingly empowering, very satisfying, and an aid to creative productivity. On the other hand, I have found computer problems are also prone to cause untimely interruptions to workflow. A necessary update on one application to support a piece of replacement hardware, for example, renders that application incompatible to another critical application ... and so on. This particular computer breakdown was more profound, comprehensive, unwelcome and untimely than any I had previously experienced.

I reflected on the other costs associated with working in a DAW-centric studio and came to see that, more troubling even than the details on the time and revenue balance sheet, there had been an incremental leeching of some of what made me love music in the first place. What I missed most was the experience of performing, and a tactile connection to vibrating instruments which, as Stravinsky (1957) noted, is crucial. When I booted up the computer to work on Dorico or ProTools, my actions were as a creator and a *programmer*. When I switch on the P6, however, I am a creative musician at an instrument that I can hear and feel and which excites my imagination.

#### **4.12 Reorientation**

A radical but compelling logic suggested that I could and should reorient myself and my approach to music creation. I would not replace the DAW and would forego all that it offered me. I would embrace the direct hands-on, ears-on, mind-on practices of a composer-performer. The rewards of synthesizers had exceeded my expectations. I had learned different ways to listen and was experiencing a renewed enthusiasm for being a musician. My recording and mixing would be done mostly in real-time.

I ordered the recording device and the hardware sequencer that seemed the best fit for my needs, and thanks to a fortuitous opening, added a Moog One synthesizer (M1) to

my studio and began re-conceiving the music for *BP*. This was a perfect opportunity to test the core elements of my thesis. The findings of my enquiry are the subject of Chapter 5 and the recordings that constitute the five movements of *BP*. It drew from me the skills I had learned in all former ways of working and focused my attention on the methodology of experienced synthesists.

#### **4.13 Exemplars and their “machines”**

To accomplish the recording of *BP* without the familiar tools of the DAW required me to revise my compositional methodology. My experience with multitrack recording techniques suggested that, with a standalone recording device, one solution would be to rehearse each part of my music, record it to a separate track and “bounce” the mix to stereo – a procedure proven over decades in the recording industry and still favoured by some. I assessed this would be part of my solution and, accordingly, acquired a suitable recorder (see details of the rig in Appendix D). I began by recording a couple of episodes using synthesizer voices as a multitrack project. It reminded me of the way I would work in the DAW, but without the many benefits of ProTools for editing. It reminded me also of one of the most common problems with studio recordings – the missing *frisson* attendant to live performance. My test multitrack recordings felt and sounded, therefore, like a serious compromise.

Better options were demonstrated by synthesists Caterina Barbieri (especially album 2015), Ehsan Gelsi (via his Bandcamp page and online videos), Suzanne Ciani (especially albums 2016, 2017), and Morton Subotnik (especially albums 1967, 1978 re-released digitally in 2001 and 2014 respectively). They have been performing their work live for years (decades in the case of Ciani and Subotnik) and have a proven, effective approach. I was strongly attracted to the idea of *performing* the work live as they do, with a hands-on, real-time engagement with shaping it. Perhaps it was because, having removed the computer from my workflow, things I felt were lacking in the way I had worked in the past<sup>90</sup> vied for consideration in a revised model of music creation. I came to understand that realising my final project with synthesizers required a different methodology that would affect the entire work from beginning to end. Different sounds were just one component of it – the instruments have much more to offer when, like any other instrument, they are approached in terms of their intrinsic *modi operandi*.

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<sup>90</sup> This could be due to the equipment or my implementation of it.

Each of the four artists mentioned above has a unique array of synthesizer modules, and one or more of those modules is a sequencer. Until this phase of my project I had overlooked this core module due in part to unfamiliarity<sup>91</sup> and in part because my sequencing needs had been met in Sibelius and ProTools (a different approach to sequencing, but sequencing none-the-less). By necessity, I needed now to learn about different types of sequencers and how artists used them in their work. In their distinctive ways, my four exemplars use a combination of pre-sequenced music that is manipulated in performance, together with other elements of live performance either based on or separate to the sequenced material.

#### 4.14 Sequencers and sequencing

Selecting a suitable sequencer for my studio was crucial. Barbieri uses an atypical sequencer<sup>92</sup> designed for Eurorack modular CV systems. Integer-based, it builds rhythmic durations based on multiples of a small reference value. If a series of three dotted eighth-notes and two eighth-notes was required, for instance, and the designated parts-per-quarter-note (ppqn) value was 16, then the integer series would be 12+12+12+8+8. The sequences can be up to thousands of notes long; they can be chained; loops can be created *across* sequences; and every note or defined group of notes is accessible and editable live during performance for gate length, velocity, chance of playing/not playing, transposition, and more. This seemed ideal to me and would have been the obvious choice for my studio, but for one crucial detail: at the time I had none of the requisite CV modules by which it sings! I needed a MIDI sequencer to use with the instruments in my studio.<sup>93</sup>

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<sup>91</sup> An encounter with a musician using an Atari computer to sequence music in the late 1980s, and of (probably a) Roland Juno synthesizer with sequencer, did not arouse my interest. That was around the time when I bought the DX-7 that I did not understand, and found excellent alternatives working with live musicians in the recital/concert environment. (*Eulogy* was from that period, and those passages recalled in the previous chapter represent music that is simply not compatible with the sequencers I heard at that time, and certainly not with my limited grasp of them at that time. Today, I think I could embrace the challenge.)

<sup>92</sup> Barbieri's sequencer is an *Orthogonal Devices ER-101*.

<sup>93</sup> Music Instrument Digital Interface (MIDI), must qualify as one of the most successful innovations in the digital music domain. Dave Smith (Sequential Circuits) and Ikutaru Kakehashi (Roland Corp) developed it in the early 1980s and bequeathed it *gratis* to the music world in 1983, hoping that all instrument makers would adopt it to allow instruments to "talk" to each other with a shared language, without unnecessary proprietary roadblocks and squabbles. Contrary to my earlier limited understanding, MIDI-driven performances need not be lifeless, square, metronomic, or unmusical – that depends on which MIDI instruments and which operator.

I identified the Squarp Pyramid as a candidate for my primary sequencer. It can play very long patterns; it can play different metres simultaneously; it can play polyrhythms; it can record music quantized (aligned to the closest beat or subdivision of a beat) or not quantized (as performed, nuances and inaccuracies intact); it can control 64 tracks of polyphonic music; and it can connect to all of my instruments at the same time with more MIDI channels available than I could care to use. Whilst the Pyramid is grid-based, it can simultaneously handle several grids which need not be the same duration, with a shared clock to ensure there a common reference point. This sequencer was available from the manufacturer so I proceeded to purchase one.

#### 4.14.1 MIDI recording

The edit window in any DAW typically displays a MIDI track as a “piano roll”, and therein is the clue to the versatility both of the piano roll and of MIDI. Leading musicians of the early 20th century including Debussy, Stravinsky, Ravel, Richard Strauss and Mahler all recorded some of their music on piano rolls and, when played back on the right instrument, they were for some time the most satisfactory way of capturing a piano performance. Some decades later Conlon Nancarrow shifted his attention to the player piano and invested his energies into punching piano rolls manually, allowing him to create works best understood as player-piano works, as distinct from versions of piano works (Borten, 2015; Hocker, 2000).<sup>94</sup> In that sense Nancarrow created his own genre. Rather than *performing* the recording from the piano keyboard, manual hole-punching allows for a different set of possibilities. Textural complexity for instance can far exceed the scope of what any pianist(s) could perform, and (apparent) virtuosity is taken to another level. In DAW parlance this method of recording would equate to “programming”. The image reproduced as Figure 30 represents a passage from Nancarrow’s *Study No. 49 for Player Piano*<sup>95</sup>, and would be understood by a musician familiar with the DAW-MIDI environment. As a de facto score, MIDI piano rolls are as accessible to some studio musicians as tablature is to a player of lute or guitar<sup>96</sup>. Studying this image, it is apparent that this work is not

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<sup>94</sup> Stravinsky was doing versions of his music by punching in the holes rather than playing in via the keyboard in the 1920s for the Pleyel company.

<sup>95</sup> Nancarrow, Study No. 49c. Ende des Lochstreifens, accessed at <https://www.juergenhocker.eu/arbeitsweise.htm>

<sup>96</sup> My son-in-law Jake Murray, a professional studio engineer in London, demonstrated great fluency reading such graphics in a session I had with him in London in 2015. In the interests of best

designed to be performed by a pianist. A hand-drawn ruler is visible at the top of the image, and some pencilled vertical layout lines indicate something of how Nancarrow went about calculating placement of notes on the timeline.

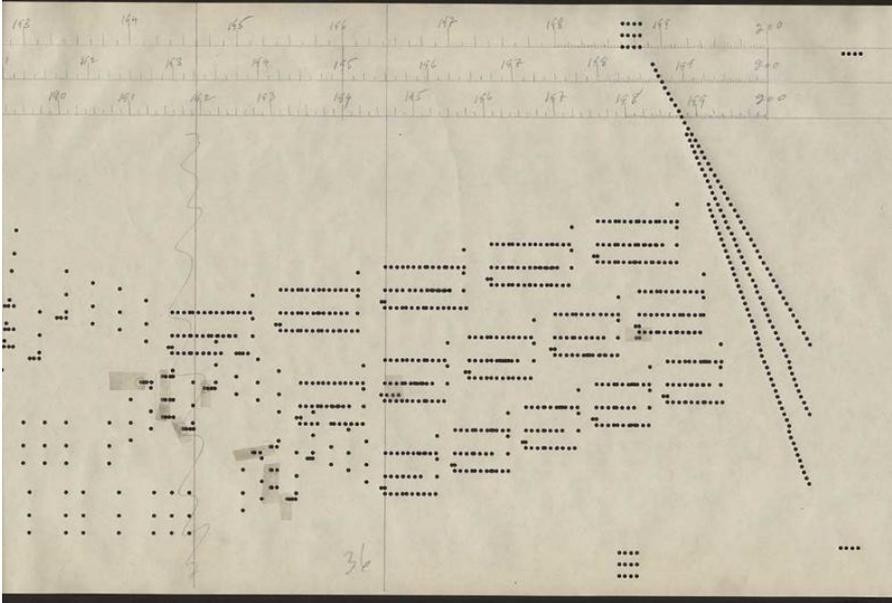


Figure 30 Nancarrow, *Study No. 49c*. Ende des Lochstreifens<sup>97</sup>

#### 4.14.2 The clock and the grid

Insofar as the player piano roll represents a score or a sequence, it is unencumbered by an imposed, quantized grid. It is capable of all the nuance that any programmer or performer might wish to bring to their performance. There are two aspects of MIDI and timeline that I needed to understand as my research progressed in the domain of sequenced synthesis, as these posed potential problems to my creative methodology.

First is the understanding that I do not necessarily need a malleable timeline (as in a capacity for rubato). Polyrhythms and polymetres are best articulated, according to my experience working with them, when the underlying pulse (or small reference value) is very steady. As Oliver Knussen observed,<sup>98</sup> within the polyrhythm there is an inbuilt sense of anticipation – almost a feeling of elongation – immediately preceding the synchronisation of the first sounds of each of the new cycles. These inner tensions and

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communication with certain clients he has since developed his skills in reading manuscript, but his music-reading-literacy skills were acquired in the reverse order to my own.

<sup>97</sup> Nancarrow, *Study No. 49c*. Ende des Lochstreifens. Retrieved from <https://www.juergenhocker.eu/arbeitsweise.htm>

<sup>98</sup> My diary notes recall this observation from a masterclass I attended with Knussen, Melbourne, January 1988.

contours are analogous to the way different tones in tonal or modal music each have unique identity and specific (harmonic) gravity. On a larger time scale, metric modulations as achieved in Elliott Carter's music rely on the accuracy of the reference pulse, in order to make sense. This is the case also in my music, and so the attribute of an electronic sequencer that adheres rigorously to a clock is an attribute I realised I could embrace. With the right sequencer the duration of a beat can change, when required, by changing the number of small values that comprise a beat.

The second aspect is more problematic in my music. The grid connotes a regular measure of equal length, such as having your manuscript paper preconfigured with barlines and with metre (and just the one) predetermined. The ease of moving from one metre to another that I prefer is at odds with the sometimes severe limitations of digital devices. One solution to the dilemma of the grid was provided (again) by Messiaen who demonstrated that music can be notated in 4/4 whilst being essentially something else altogether.<sup>99</sup> Another layer of calculations could be required to achieve my goals with the aid of a grid-based sequencer – but this is a problem with a solution, as will be illustrated in Chapter 5 and examples from *BP*. Having to perform such calculations reminded me of the type of thinking that allows a musician to write and read a score; or allows a live-coding musician to generate a recital work from a laptop on stage. *It is a process of abstracting the elements from one language or domain and translating it into another.* The score, the MIDI file, the piano roll, the lines of code, the technical interaction with the instrument, are all *intermediaries* between musical idea and performed sound. The Pyramid was the best option available to me when I needed it; would work with the other instruments in my studio; and would allow me to progress my research into realising my musical ideas in the domain of electronic music via a polymodular synthesis.

#### **4.15 Translating research into practice**

The following chapter presents and discusses the results of my research as I embraced synthesizers as my instruments of choice; how this altered my creative methodology as a composer and a composer-performer; and how the recorded music has been modulated accordingly.

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<sup>99</sup> As discussed, in Movement 1 of *Quatuor pour la Fin du Temps*.

## Chapter Five: A polymodular synthesis

“Unpredictable; yet inevitable”<sup>100</sup>

“It’s too early to tell”<sup>101</sup>

### 5.0 Introduction to Chapter 5

This chapter discusses the complementary development of both subjects of *BP* – music and research – with illustrations of core findings of the research processes and correlating recordings of the five movements that constitute the musical work.

As the result of my research, *Bunyip Polymodular (BP)* is technically and metaphorically a work of polymodular synthesis. The recordings comprising *BP* are profoundly different to the ones I imagined when I began sketching the work in Dorico and ProTools. Thematic *kernels* and several broad formal concepts from the earlier, PC-hosted phase are intact, but their realization has been modulated by interaction with synthesizers throughout the creative process. Secondly, where *BP the music* is constituted in the development of musical ideas expressed by electronic instruments and based on an inspirational story – there is, to use a term of compositional craft, a *second subject* – *BP the research* is constituted in the development of my musical thinking. With respect to my creative work, the identification of a dynamic polymodular interaction between mind and electronic instruments resulted in a multi-dimensional synthesis of art, idea, science and technology.

#### 5.0.1 Development

In the modular synthesizer world, keyboards are more the exception than the rule, but in spite of the inspiration I drew from artists who perform with modular instruments it took me some time to shift my focus from the keyboard to other ways of controlling my own synthesizers. At the outset of my research as I began to develop skills with

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<sup>100</sup> This was one of the defining qualities of “great ideas” in music, according to the inspirational John Gilfedder. He was my history lecturer and first composition teacher at Queensland Conservatorium of Music where I studied in 1982 through 1986. As with some of his other pithy observations on music and culture, this one has stayed with me as it pertains to unravelling and solving the problem of form and development in music, and in reconciling the various constituent elements of a musical work.

<sup>101</sup> In the Spielberg movie *Bridge of Spies*, Mark Rylance plays the part of captive Russian spy (Rudolf Abel) on trial who, weighing up the potential terrible consequences and the chance of their eventuating, utters these lines.

synthesizers, I drew quite frequently on the Korg OASYS<sup>102</sup>. I explored its sound design parameters to compare results with comparable operations on first the P6 and later the M1, and it was instructive in learning about the shared and the unique qualities of the analogue and digital synthesizers. Its conveniently large and layered voice count, and its voice qualities allowed for a more direct realisation of earlier drafts of music conceived to work with VSL voices in the DAW (*BP III*, discussed in Chapter 5.3, is the music most closely related to earlier forms of the work, although it played an important, serendipitous role in my research, as discussed). As I trialled new methodologies in test recordings, I performed some parts live at the keyboard for the unvarnished qualities it brought to the mix (especially, perhaps, because a seasoned keyboardist I am not) – but also, and more importantly, because of the spontaneity it afforded me in creating content. By not having every decision made in advance, I was requiring of myself that I would “think on my feet”. I came to realise this was important to me. It developed my identity as a composer-performer, and it brought elements of risk, of chance, and of spontaneous creativity into play.

My presumption that performance necessarily required a keyboard, however, was naïve and was disrupted by the next phase of research. In reviewing my draft workshop recordings, I identified that the analogue and digital synthesizers did not respond similarly to a common approach. This mismatch was due not to the inherent integrity or qualities of the voices between the instruments, but rather to the interactive processes germane to these instruments in performance. The OASYS is capable of a great subtlety and detail in the sound design stage, but once in combination mode or in sequencer mode (as required in this case) its relatively small control surface was next to no use because the tone shaping and modulation mapping were buried in menus and submenus. Effectively, one could hear it only as one programmed it, albeit with some external influence possible from the Pyramid. Conversely, every element of the voices on the M1 and P6 are accessible readily in performance, with or without the operation of the internal or the external sequencer. An epiphany occurred when I understood that

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<sup>102</sup> The Korg OASYS is a workstation synthesizer produced between 2005 and 2009 and I had acquired one during this time to produce audio for a number of projects. It has multiple synthesis engines including sample library and virtual-analogue synthesizer. I have a better understanding of this instrument today thanks to working for a few months with the more “primary” instruments I have acquired.

“performing” the synthesizer went much beyond performing on the keyboard. The challenge was to embrace these *other* dimensions of performance.

The M1 and P6 (including their sequencers) share qualities of a modular rig, and my performance focus shifted to embrace the tone-shaping modules of the instrument. I switched off the OASYS for much of the remainder of the project and, once again, reconceived the music for different forces. Some specific examples of “before” and “after” are given in the discussion of *BP* below. My performance is largely comprised of working with the sequencers in real time, and shaping and changing sounds (orchestration, as it were) in real time. Use of the keyboard, in real time, is now judicious.

### **5.0.2 The rig and the recording**

Each of the recordings comprise pre-prepared material, live rehearsed material, and live improvised material. On the Pyramid, the pre-prepared sequenced passages were recorded live, with or without subsequent quantization, in a process similar to recording audio on the Sound Devices MixPre 10 (see Appendix D). This was the most satisfactory approach with the combination of my music and that sequencer. The sequencer modules on the two synthesizers are relatively simpler devices, with material recorded by steps. The M1 sequencers have additional “lanes” for editing gate length, velocity, ties, rests, and modulation data, but I used these lanes sparingly. I found that for the purposes of this project, making modifications to the sounds via the control surface of the instrument in real time during performance was most satisfactory. Serendipitously I learned that this was the link for me between my M1 and P6, and their modular cousins that feature prominently among the recordings that have most inspired me during my transition to synthesis. After all, those instruments have no “patch memory” and so the modification of tone is by necessity always a part of the performance.

Embracing the elements of live performance kept me acutely aware of the transformative results of my research journey, embracing the experience of being a composer-performer, rather than a composer-programmer. I needed to rehearse the music and choreograph the “patching”. A degree of improvisation and spontaneity means that the work is different every time, albeit with the same thematic content and overall formal elements. I developed, rehearsed, sequenced, performed and recorded

each of the five movements at the instruments comprising, broadly speaking, my synthesizer modules as described in the introduction audios/videos and the elements of my rig described in Appendix D.

### 5.0.3 How the work is presented

*BP* is represented in sound and video recordings, and the work is complemented in the exegesis with descriptive analysis and illustrations. Notated examples in the paragraphs below are given with the caveat that these are not extracts of a score, nor transcriptions of a performance. The term *score* carries a burden of connotations beyond the purpose of these illustrations. The illustrations, however, are offered to provide a graphic representation of pertinent elements of the music.

In keeping with this new performative compositional methodology, some of the works are introduced as a brief video recording where pertinent details of the work can be heard, and the studio equipment and basic performance logistics visualized. These files are independent of the audio recordings of each of the complete movements, but like all of the audio/video examples are linked in the text. (A backup copy of these files is located in this [Dropbox folder](#).) The works below are presented in order of movements and scenes rather than the order in which they were created. They document the results of my experiments as my research progressed from its concept stage at the conclusion of *BE*, to its submitted form as recorded, electronic music.

### 5.1 Movement I. At the Waterhole

One complete performance of this work and examples of alternative performances are referenced in this discussion. An introduction to the sounds used is included in [5.1a](#) (video, 4:10). The structure of this movement, as per the recording in [5.1b](#) (video, 19:00) or [5.1c](#) (audio, 17:45), is as follows (with timeline in parentheses):

- Sweet Pea sings in the dawn (0:00 – 1:48)
- Pedal introduced, comprising a five-tone bass plus fifteen-note, mid-frequency cycle based on Waterhole Chord (1:48 – end of work)
- Late One Night melody live over pedal (from 6:25)
- Additional Sweet Pea obligato/counter-melody (from 7:50)
- Arpeggiated live passages in M1, based on waterhole chord (12:15 – 14:10)
- Late One Night – Sweet Pea + Moog voices in counterpoint.

- Fade out with bass pedal

Because a core aspect of this PhD is the relationship between the method of realisation of the music and the resultant nature of the music, for the purpose of a particular example a second audio recording of the work is provided in [5.1d](#) (14:11). This performance uses the same instruments and the same thematic material, but is distinguished by being modified in the DAW (Reaper) where a little “layering” of the sounds was applied – some of Sweet Pea’s music was copied from one location to be heard again, for instance, in the episode starting at about 7’15”. In the DAW it was contracted from a 25-minute workshop-performance to this 14’11” recording. The performance represented by this modified recording *could* have been live, with a little planning of voice allocation and possibly extra use of a sequencer track; and certainly it could easily have been recorded more-or-less as it stands using multi-track techniques with the recorder (no DAW required). In my research trajectory, part of the benefit in producing 5.1d was in reminding me of the very different dynamics of working in a DAW environment, compared with performing the music. I enjoy the ability to shift events about freely on the DAW timeline, and see no reason not to do so in the interests of producing the recording of a work – but I have come to especially value the experience of producing music as a performer, at the instruments, direct to the recorder, in spite (or because of) the “limitations” of *not* being able to revisit the work in the DAW for further layering, editing, or structural modifications.

### 5.1.1 The waterhole kernel

The harmonic/rhythmic pedal in the opening of *BE* – the “waterhole chord” – remains integral to the imagery and story of *BP*. A different approach to realising this material was required, however, as what was effective in the trio, particularly in the piano writing, was not well suited nor germane to the analogue synthesizer.<sup>103</sup> Several options

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<sup>103</sup> A myriad of sound-design choices notwithstanding, fundamentally the analogue synthesizer produces harmonically very rich sounds that do not lend themselves to complex chordal treatments that work better with “clearer”, “thinner” sounds. Even modern VCO analogue synthesizers, which are much more stable than their predecessors, are appreciably less stable than digital oscillators – in other words, tuning presents a problem with harmonic content. On a practical matter, analogue synthesizers are predominantly monophonic. The Moog One I have, with sixteen voices (across its three layers) is the first polysynthesizer Moog has made in approximately thirty years. Conversely, a modern digital synthesizer/workstation may have dozens, scores, or even hundreds of simultaneous voices.

were tested before designing a group of interlocking sequences, as represented in the basic, kernel notation shown in Figure 31.



Figure 31 *Bunyip Polymodular: Waterhole chord, pedal kernel*

In this notation, the reader can see the sixth bass tone is the same pitch as the first; this C is the beginning of the next cycle/loop. On the treble staff, the second measure has the same material as the first as upper part repeats after 15 quaver pulses (in five dotted crotchet beats), while the bass part repeats after 25 quaver pulses (in five, half-dotted minim beats). After five measures of the (nominal) 15/8 in the example, we will have heard five full loops of the treble material, and three full loops of the bass material; the patterns will realign, representing one complete cycle of this composite *pedal*.

In both parts the register of the actual sounded pitches register depends on the settings of the oscillators and may change over time. Similarly, as evidenced by video introduction and the video and audio recordings, the timbre changes over time. Acoustics being universally applicable, however, lower voices will suit well the slow-moving bass part (lower staff in the example), and conversely, higher voices or registers suit well the faster (relatively, in this case) passages.

Nature is the inspiration for the perpetual movement within each voice of the pedal that is achieved by assigning one or more Low Frequency Oscillators (LFOs) as modulation sources to dynamics, timbre and placement in the sonic field. The prime model for this movement is the observed patterns in the tides (as discussed in Chapter 4.5.1). By this line of thinking, as per the example of Messiaen and corresponding to Chapman's (2012) "abstract blending", three separate LFOs, close but not identical in their period, influence spatial movement, volume, and timbre.<sup>104</sup> In one case, one LFO modulates the frequency of another LFO to explore the concept of *tidal flow*, as distinct from tidal period. In terms of frequency ratios, rather than a purely mathematical decisions based

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<sup>104</sup> Filter cutoff frequency, filter resonance, and relative blend of the two filters of the M1 are modulated.

on, say, the exact ratio between the period of the moon's versus the sun's gravitational pull on the earth, the *concept* was applied to create a tide-like movement of these parameters. Numbers played a role in my thinking, and almost always were a starting point but, like the decisions taken in sound design the final choices regarding these modulations need always to please the ear. Learning to create using synthesizers has been a very large component of this project and I was often struck by how large an effect on the outcome could result from a small adjustment to one parameter of one sound.<sup>105</sup> In this vein, whilst the use of the LFO in analogue synthesis for sound modulation is theoretically related to the digital LFO of the Pyramid, or to “automation” lanes in a DAW recording session, the sonic outcome is surprisingly different. Observed with my own instruments, voltages behave differently to numbers and produce different sonic results.

## 5.2 Movement II. Tromping

The recording of this movement, complete and excerpts, illustrate the ways in which my compositional methodology was modulated in the transition from acoustic realisation of certain musical ideas (in *BE*) to electronic realisation by sequencers and synthesizers. A short introduction at the Pyramid and OASYS is linked in [5.2a](#) (5:17).

In ritornello form, the broad structure of this movement as per [5.2b](#) (14:47) is as follows:

- Emu 1, introduction, free form movement and “feather shuffling” (0:00-0:57).
- Ritornello 1, Tromp 1 (0:57)
- Wallaby 1 (1:30)
- plus Piano Riff 1 (1:55)
- Running 1 (2:25)
- Wallaby 2 with Bunyip Fur Aria ad lib (2:50)
- Ritornello 2, Tromp 2, Wallaby and Emu inflections (4:04)
- Running 2 (4:44)
- with Emu inflections (6:05)
- Piano Riff 2 (8:20)
- Emu 2 (8:47)

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<sup>105</sup> I recall Lutoslawski saying something similar about removing or changing one note in a complex, 12-note orchestral texture: it changes *everything*. He was a distinguished guest at the QCM in 1987.

- with clangorous Riff (9:54)
- Ritornello 3, Tromp 3 (10:33)
- Aleatoric piano with fragments of Emu, Wallaby, Tromp (11:00)
- Piano Riff, cadential melodies dissolving into the haze, with lingering Fur Aria (12:32-14:47)

Tromping references the narrative of Bunyip on a journey to find his identity. It shares something of the “footfalls on earth” rhythms and patterns heard in *BE*, but also explores dreamier, more whimsical interpretations of the musical kernels. The polymetric, polyrhythmic kernel to Tromping is illustrated in Figure 32.

The image shows a musical score for a piece titled 'Bunyip Polymodular: Kernel to Tromping'. It is written in 12/8 time and consists of two systems of four staves each. The first system includes a tempo marking of quarter note = 84. The music features complex rhythmic patterns with triplets and quintuplets, and a steady bass line of oscillating chords. The second system continues these patterns with further rhythmic variations.

Figure 32 *Bunyip Polymodular: Kernel to Tromping*

The oscillating D min – E min second inversion chords notated on the second staff of each system serve in this work, as they did in *BE*, to provide the steady “tromping” beat of Bunyip making his way along the track. The basic four-in-the-bar pulse at times yields also to six-in-the-bar, or 3:2 hemiola, such as in bar 5 of the example. At various times it changes in its voicing, and at other times it yields to an arpeggiated performance pattern with a degree of chance as to whether the notes will play or not play. A degree of randomness is applied with respect to octave transpositions of the notes. In one sequence (for the partly aleatoric episode starting at 11:00) pitch class randomization is also applied. The idea is to create the ground for an agreeable balance

of predictability and unpredictability, within identified parameters and limits. Some parts are designed to need little attention, so that I can focus on performing other parts and balancing the ensemble.

The Wallaby music, fourth staff in the illustration *would start* in 9/8 (more explicitly, 2+2+2+3 / 8) were it notated on its own terms, and proceeds to change metre through the course of its episode. There are a couple of sequenced variations of it, and a live version where I imagine Bunyip tries to fall into step with the Wallaby (such as the episode beginning at 2:50). The final elements in the rhythmic/metric mix of this scene are provided by the Running episodes (ex *BE* tutti passages, discussed below) and Emu (first staff), which may be understood as five pulses in the time of the wallaby's three, quarter-note beats. The notes of this Emu material are usually subdivided (or "ratcheted") in performance, with occasional octave randomization *as effects* to create a rhythmic tremolo that adds a sense of rapid movement. An additional rhythmic element is added by the Emu's music at hemiola (3:2) speed (third staff) with respect to its own base tempo. It is used sparingly where a slightly chaotic "crowd scene" might be, were it presented on stage.<sup>106</sup>

### 5.2.1 Sequencing on the Squarp Pyramid

With respect to rhythm and metre, sequencing on the Pyramid raised similar questions to those raised by preparing the notated illustration in Figure 31. The music on each of the four staves is unique metrically, and three of them would be more simply notated in a different way. However, could I not do on the sequencer what Messiaen did with *Liturgie de cristal* of his *Quatuor*? (No one is playing in 4/4, and yet the score is notated in 4/4.) The Pyramid has its own idiosyncrasies when it comes to nomenclature. For instance, in a polymetric movement like this one Pyramid performs every measure with a shared denominator<sup>107</sup> in the same time period – one measure of 12/8 takes the same time as would one measure of 4/8 or 15/8. With the current firmware there is no concept of compound time reflected in its operation. But the "workaround" I used was to set the "tromping" in 12/8, which made it easy to create either four or six beats in the bar (four groups of 3/8 or six groups of 2/8). Wallaby's sequencer track is in 12/8 so that the

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<sup>106</sup> Reminiscent, perhaps, of the interlocutors in Ives' *Unanswered Question* (1908, revised 1935), or a stray band at his *Putnam's Camp* (1912-1916).

<sup>107</sup> The author is aware of the objection some raise to the term with respect to time signatures. The prevalent language we have for duration, however, uses subdivisions of notes by ratio, such as "eighth note", which is a fraction. In any event, the usual conventions of metre do not apply with the Pyramid.

relative rhythmic values are accurate with respect to the tromp, and the “barlines” are simply disregarded – the first phrase is, in terms of eighth notes, 2,2,2,1,1,1. Emu’s sequencer track is in 10/8, creating the desired 5:3 ratio to the *apparent* 6/4 (the tromp hemiola pattern, or corresponding to the Wallaby’s quarter-note or 2/8 beats); and Emu’s faster music is set in 15/8. Having digested these data regarding the idiosyncrasies of working with the Pyramid sequencer, the appellation *Squarp Time* is applied to it in my studio. The calculations are part of the transactional cost of working with the instrument.

When the Wallaby and Emu appear, in turn they change the nature of the rhythm and metre, although in the recording this may be perceived as secondary to the effects of modulating synthesizer voices. The *Bunyip Fur Aria* (see cello at *O*, pp. 16-17 *BE*, and in 5.4 and Movement IV below) is heard in new context, such as in the episode from 9:50 to 11:45 of the recording.

The tutti passage from *BE* (Figure 15) is also carried over to this movement. In the example given in the introduction [5.2a](#), additional notes were added to indicate groupings, and the vocoder was used to allow for real-time control of dynamics and effects. In the recording [5.2b](#) however, these running passages have become something else altogether with the drive of the source *BE* passages giving way to a heat-hazy, dreamy rendition of the scene, thanks in part to realisations suggested by the instruments when rehearsing the material. (This modulation of musical material is explored with other musical passages in 5.3.2 and, especially 5.3.3.)

### **5.3 Movement III. Der Mensch.**

The primary recording presented in [5.3a](#) (19:50) is an improvised workshop performance designed to test the material and the methodology. It is the earliest recording of any movement of *BP* presented in this folio. The vocoder is used, introduced in the short video [5.3b](#) (3:52). Whilst presenting a more mature, polished performance of this movement was considered, this version was selected because of the important role it played in my research journey. The experience underscored ways in which composition and performance serve to produce research outcomes, separate to producing an object that stands on its own. The research outcomes were significantly enhanced, serendipitously, by the fact that I shared this recording with several people who all generously gave me feedback on it that served to affirm, to modify, and to better

focus and define my research trajectory from that moment on. (This was not a formal survey. The people involved were family and friends whose feedback was not requested, but spontaneously offered.)

Two short episodes of alternative, subsequent recordings are included below, illustrating the modulation of the thematic material on exposure to purely analogue voicings, but the (semi-improvised) structure of [5.3a](#) is as follows:

- Spoken, illustrated introduction<sup>108</sup> (0:00 – 1:05)
- Sweet Pea introduces the scene, riffing on Bunyip’s question “what do Bunyips look like?”, and makes a diagonal nod to the scale passages coming up (from 1:05)
- Scale “bricks” (sequenced), first construction (2:15)
- Sweet Pea, opening riffs ctd. standing in for voice of Bunyip (3:53)
- Scale “bricks” (sequenced), second construction (4:25)
- Man: vocoder, “Botanist, biologist ... Bunyip’s nowhere on the list” (4:57)
- Scale “bricks” (sequenced), third construction, with addition of triplet, sine-wave voice, morphing to arpeggiated piano riff (7:05)
- Add to the vocoded Man: “Pardon me if I sound prejudiced, my dear, Bunyip’s simply nowhere on the list, my dear” in a ragged waltz; Sweet Pea standing in for Bunyip again, vocoded man solo on waltz theme (8:32)
- Scale “bricks” (sequenced) fourth construction (12:20)
- Extended solo (P6) on theme of *der Mensch* processing the information before him and ultimately melting down (12:50)
- Coda, vocoded Man, “Bunyips don’t exist” (18:42 – 19:50)

The core concept is that the *Man*,<sup>109</sup> brilliant by his own reckoning, is unable to see what is right in front of him. The creature before him is obscure to his reasoning, rational mind.<sup>110</sup> An idea carried over from *B!*, what better way to illustrate this

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<sup>108</sup> The spoken “welcome to the recital” was of course a prop to help me visualise an audience and to put me in the frame of mind for a full “reading” of the work. I sent this version to several people, not in any formal way but in the course of maintaining contact with them and sharing experiences; their unsought, spontaneous feedback was encouraging and instructive.

<sup>109</sup> The man is a scientist in *BoBC* and a librarian/scholar in *B!* My scene title references these in a humorous vein.

<sup>110</sup> In a fitting corollary, European immigrants to Australia for two centuries made certain assumptions and judgements about indigenous fauna and flora, oblivious to what was before their eyes and ears (Kaplan, 2019).

rectangular block of a mind than with rectangular blocks of music: scales! Sequencers opened new possibilities for the treatment of these ideas – indeed, the grid-based sequencer does this only too well – and the nexus of sequenced and improvised material offers a great deal of scope and discretion regarding each performance.

### 5.3.1 Learnings from this workshop recording

Whilst not technically peer reviewed, I documented this performance *imagining* the audience of people I would send it to. In part at least, and certainly only informally, I believe this constitutes a form of dissemination and sharing, with the feedback helping to contextualize and validate my research as discussed by Emmerson (2018). Of the five respondents, four were unequivocally positive, two very much so, and one was not enthusiastic, particularly regarding my choice of sounds and style.

Positive feedback included an email from a friend who had a few comments to make, including:

perhaps strangest or most discombobulating (in good way) was your composerly Voice threaded through it in a medium so different to how i [sic] am used to hearing it – a medium i associate with eg tangerine dream and other psychedelic synthy groups – but with the sensibility of classical grounding and structure, a real sense of anchoredness and being taken on a journey by a masterful storyteller. it is quite unlike anything i have ever heard before, and i think it tremendously exciting!!<sup>111</sup>

Aside from appreciating the affirmation from someone who has played and sung some of my works, has heard most of what I have composed, and whose opinion I value, the comment that meant most to me was particularly insightful and concerned my “composerly Voice” with its “sensibility of classical grounding and structure”. This resonated with the meta-cognition I had whilst recording that performance, in finding ways to interact with the instrument that drew on my own experience, skills and predilections. I was aware of building episodes in real time as I played, like I would build episodes on manuscript for a future performance. I felt that this dimension of “compositional”, “structural” or “orchestral” thinking, explored now in the media of synthesizers and sequencers, was key to discovering my “voice” in electronic media.

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<sup>111</sup> Email, 18 May 2020, with letter cases as per the email.

Conversely, it was also key to finding the way synthesizers would respond to my musical ideas and change the way I developed them.

Another important discovery was that the P6 is a performance instrument with more to give “live” than can be accessed via a sequencer. Unrehearsed and spontaneous, the episode from 12:50 in the recording gave me a taste of the flexibility and power of the P6 that belonged exclusively to live performance. Coupled with the satisfaction that attended the (albeit untamed) experience, I understood that thereafter improvisation and spontaneity would be factored into my work performing with synthesizers. Constructive feedback from two of my other respondents was helpfully directed at how better to prepare for performances – one a highly accomplished performer and the other a highly accomplished composer-performer, their suggestions were timely, welcome and most helpful – as I anticipate will be clearer in the years and projects ahead.

### 5.3.2 The sequencer arpeggiator modulation

A musical figure that adds spice to the scale passages in 5.3a is illustrated in Figure 33.



Figure 33 *Bunyip Polymodular* sequenced accents

On the Pyramid I perceived a connection between the arpeggiator function of the sequencer and performative dimensions discretionary to instrumentalists. Just as a pianist might perform a chord “dry”, rolled or arpeggiated, the Pyramid allows for such variations as this recording illustrates. These examples have shorter and longer arpeggiated renditions of the illustrated figure. Parameters addressed by the Pyramid included adjustment of gate length (staccato vs mezzo-staccato), randomisation of note order, and randomisation of octave displacement, and the results can be heard in the ‘piano’ in [5.3.2a](#) (0:24). These parameter adjustments move beyond arpeggiation and into the domain of techniques that would include discretionary embellishments and “touch” (for example “off the bow”, “into the keys”, or “detaché” might apply in different situations).

### 5.3.3 The analogue modulation

To my mind, a different order transformation occurred when this same sequenced, arpeggiated figure was voiced on the P6. Of course, like any instrument the P6 is a world of possibilities, but the specific voices used in the recordings [5.3.3a](#) (2:14), [5.3.3b](#) (1:12) and [5.3.3c](#) (1:13) represent more than a variation of the figurations – it illustrates, I would suggest, the modulation of an idea from one form to another, potentially from one work to another. My perceptions may be altered by the fact that those recorded examples excite my imagination to create new episodes based on those sounds and techniques, but it seems to me this does not invalidate the perception that the Pyramid and the P6 transformed the musical motif into something else. Something about the nature of the sounds themselves and the synthesizer modules interacting with the musical motif yields a result that is more than the sum of its parts. There is an interactive process between musical idea and synthesizer that actively engages the process of developing new content. As with the Running (ex tutti) passages in *BP II* (Chapter 5.2) and several other examples in this exegesis, the VCO synthesizer surprised me and took me to another place, sonically and musically.

### 5.4 Movement IV. Bunyip Fur Instrumental

In the primary recording attached to this discussion, [5.4a](#) (24:15), this movement falls into two broad sections. First is a chorus of frog calls inspired by a sonic phenomenon of the P6 synthesizer (discussed below). The greater part of the movement follows (from 5:05) wherein an expanded form of the opening scene waterhole pedal underpins two further cyclic elements, both of which are long slow renditions of the Bunyip Fur aria – one in five phrases of five-beat measures, while the other is in five phrases of eight-beat measures. The rhythmic value of the beat between these two arias is shared, and in turn relates to the bass pedal – the dotted quarter-note value represented in Figure 30 is the beat value of the aria in 5.4a.

The structure of this movement, as recorded in 5.4a is as follows:

- Frogs at the waterhole, based on Bunyip Fur aria (P6, live) (0:00 – 5:05)
- Waterhole Pedal, expanded second form (Moog, sequenced), together with Bunyip Fur aria at two speeds (M1, live, multitracked) (5:05)
- Sweet Pea's voice takes one aria lead (P6 live) (7:48)
- Arpeggiated variations at M1 (live) (10:00)

- Frog chorus reappears as part of texture (12:00)
- Sweet Pea returns (20:15)
- and improvises through to end of movement (21:00)
- with M1 arpeggiation and frog chorus (from 21:20 – 24:15)

Two excerpts from another realisation of this movement are provided and discussed below in 5.4.4, because of their relevance to the research. A discussion of the recording 5.4a, however, comes first.

#### **5.4.1 Pulse-width polymodulation**

In researching synthesis, hearing harmony as rhythm provided a seam of sounds that vied for treatment in the musical work. Polymodulation on the P6 is the key to creating the frog chorus. The second VCO of each voice is purloined for duties as an LFO to its companion first VCO. This newly minted LFO is not heard in its own right but by its effect on the sound of VCO 1. In this case, a pulse wave of VCO 2 is directed to the filter of VCO 1 which is adjusted such that, in the lower phase of the LFO wave, there is no sound from VCO 1. Both oscillators are set to take their pitch command from the keyboard, so the inaudible pitch moves in equal degrees to the audible pitch. The pulsing tone (on-off) is the now part-time audible frequency of the LFO/VCO 2, expressed through its sister VCO 1 as a rhythm. Each pitch has its own signature, identifying “pulse rate”. Cross rhythms result from dyads or chords. The interval of a perfect fifth, of course, pulses at  $3/2$ ; a ninth at  $9/8$ , and so on. As discussed in Chapter 4, this capacity to hear harmony as rhythm is one of the delightful ways the synthesizer serves as a sonic laboratory. The waterhole in the Bunyip story provided the aquatic habitat for amphibians, and so this sonic phenomenon found a natural, narrative voice in *BP*. Taking a lesson from Sweet Pea and her role as recitativo artist and announcer of the story to follow, the frogs ponder and sing about the Bunyip in a variation of his signature tune. This is interspersed with amphibious renditions of the waterhole chord (0:00 – 5:05, and then intermittently from 12:00 in the recording).

#### **5.4.2 The pedal – Moog One**

The core material of this episode is partly developed from the pedal illustrated in Movement I. In this scene, however, the pedal based on the shared kernel is extended and developed. The bass material can be represented by this notation (Figure 34) where, for the sake of simplicity on the page, I have used half-notes to represent the half-dotted

half notes.<sup>112</sup> After three statements, the five-note pattern is opened from within and extended to one eight note phrase. This procedure is repeated, but on its repeat is extended to a thirteen (8+5) note phrase. The numbers, of course, are from the well-known series and are compatible with these same numbers used in other ways in BP.



Figure 34 Bunyip Fur pedal, bass element, extension of Waterhole pedal

Complementing this expansion of the kernel in the slow-moving bass pedal, the upper part (as seen in Figure 31, Chapter 5.1.1) is performed four times in succession. Each time, some of the notes may be rested, and the gate length varied (equivalent to staccato through to tenuto), glide (portamento) is selectively applied. Selectively and sparingly (owing to the nature of analogue synths, discussed earlier) a second pitch is added.

Figure 35 shows the edit screen of the M1 sequencer. In the image, step 6 is selected and the data at the bottom of the screen pertains to the top line of notes: the velocity, gate length and subdivision (ratchet) status are indicated for G#4. The second row of lower notes is more sparsely populated, with lower velocity values, shorter gate length,

<sup>112</sup> In my hand-written notation I use a plus sign after the note head, denoting a half-dot, such as in Figure 36, Chapter 5.5. When *Dorico* was being developed, I communicated this suggestion to Daniel Spreadbury for inclusion in the new software – however my hopes are yet to be realised. I set a score once in *Finale* wherein I created my own symbols; it required entering a half-note and an eighth note, hiding the eighth and adding the symbol “+” to stand for the augmentation dot, thus creating the notation for the half-dotted half-note. It was so labour intensive I have never returned to it. Whilst music notation software offers a great deal of power, this, to me, is a significant limitation. Just as sequencers in synthesizers all have some limitations, the most common being a limitation in rhythmic values and the number of them one can sequence, neither is notation capable of everything one might wish for. To put it another way, one can still do some things as a *hands-on performer of notation*, with the instruments of pen and paper, that can only be approximated by the machinery of computer software.

or both, to achieve the desired balance between the two voices. The arrows in steps 13 and 15 denote a slur (glide) to the next step.<sup>113</sup>

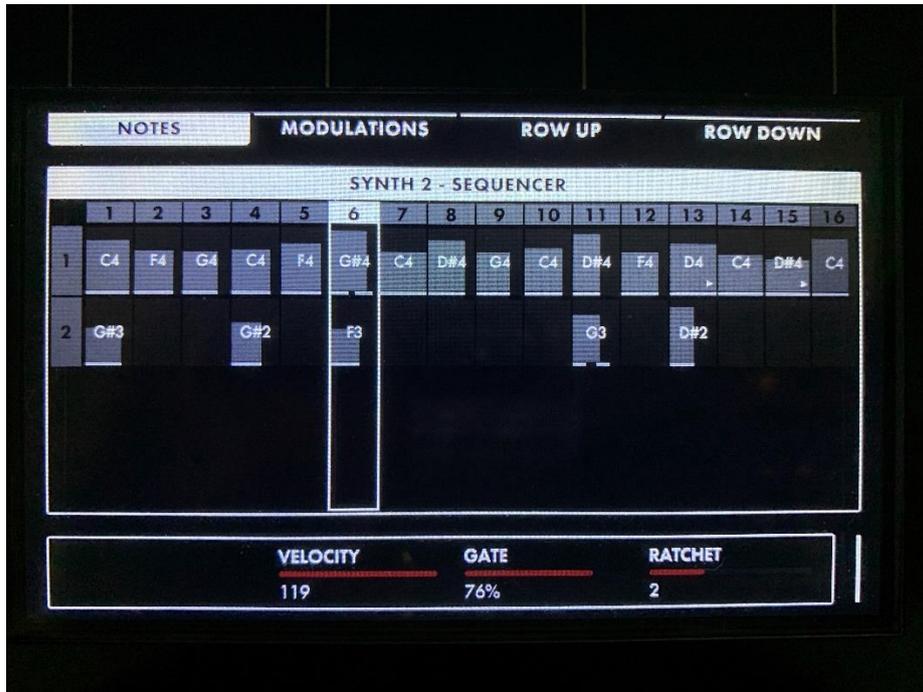


Figure 35 *Bunyip Polymodular Moog One* sequencer edit window

The remaining material comprises three melodic lines, all of which are variants of the Bunyip Fur Aria (as played by cello at *O, BE*, transposed to a fourth higher). Here it is presented in five phrases of five beats, in five phrases of eight beats, and thirdly, as an obligato line played live *ad libitum*. Collectively, the purpose is to create a mood of reverie, bathed in the theme of Bunyip contemplating his *being* and his *identity*. There is stillness (in clear cyclic array of material) and yet movement (of the relation between the parts owing to the varying phrase lengths. These qualities of stillness and movement are reflected in the voices themselves, particularly in the pedal. In my imagination, this is the scene in which Bunyip comes simply to accept that he is who he is. To Wallaby and Emu, he is an outcast. To the uber-rational (and staggeringly ignorant) *mensch*, he does not exist. And yet, contemplating the sky above and the earth below, *he is*. His reverie begins at the waterhole with the frogs, and leads to a sense of soaring, in turn leading into Movement V where the characters of his journey appear among the stars.

<sup>113</sup> This sequencer is basic compared to any DAW sequencer, however running to 64 steps with additional lanes available for notes and modulations, together with this screen for editing, it is an advanced example of a synthesizer sequencer.

### 5.4.3 Alternative version, digital vs analogue

As discussed in 5.0.1, the digital and analogue synthesizers in my studio respond differently to musical ideas, and alternative treatments of the material tend to result. From earlier in the drafting process, partial movement [5.4.3a](#) (12:35) is based on the same pedal kernel but sequenced on the Pyramid and voiced principally by the OASYS and Korg Wavestation.<sup>114</sup> The simpler pedal of Movement I is used but developed, such as by subdividing each half-dotted minim of the five-note pedal (illustrated in Figure 31) into three, creating the new polyrhythm of three against five (of the eighth notes, treble staff, in Figure 31). This can be heard first at 1:18. The episode develops further as voices transform from one timbre to another and, more pertinently, as Pyramid arpeggiations are introduced to layers in the texture: heartbeat pulses from 6:38 derive from the subdivided bass, while one aria melody itself is arpeggiated from 8:32. The relative clarity of the particular voices used make possible (or perhaps invite) this added textural complexity. It was observed that on the M1, this added harmonic and rhythmic detail detracted from, rather than contributed to the desired effect. Instead, the M1 version develops the pedal by way of the linearly developed sequence, and evolving modulations of timbre and position in the sonic field, both live and by LFO. Improvised lines are performed live with the sequenced parts, from approximately 6:50.

### 5.5 Movement V. Platypus Ecliptic

With reference to the recording [5.5a](#) (17:25), the structure of this movement is as follows:

- Platypus motif (0:00-1:08)
- Patterns A and A1 (Figure 35), slow flare ascending – *Line* (1:08)
- Pattern B celestial cycle (Figure 35) – *Circle* (2:24)
- Pattern A1 (3:23)
- Pattern B1 (4:01)
- Patterns, M1 form (Figure 36), Line and Circle in series (5:02)
- Celestial Sweet Pea (9:12), bridging across to ...
- Line (A) and Circle (B) patterns, simultaneously, Pyramid form (9:25)

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<sup>114</sup> A digital synthesizer of historical note, Dave Smith developed it when working for Korg in the late 1980s and early 1990s. Its innovation was user-editable sequences of sampled sounds in place of oscillators. (The Australian designed Fairlight CMI of Peter Vogel and Kim Ryrie pioneered the use of samples in place of oscillators, a decade before the Wavestation.) In this recording the Wavestation voices the bass line and its spin-off embellishments. The instrument was a gift from Alan Lawrence.

- Solar flare with Fur Aria, Platypus and Sweet Pea among the stars (14:25-17:25)

Named for the platypus in the story, the melodic voice that opens this movement is often playing but not always heard – just as the animal is seen when it surfaces, to disappear when it dives. Platypus was the creature in *BoBC* and *B!* who identified the Bunyip without fuss, then went about his business. The melodic sequence is based on the “waterhole chord” (Figure 4, piano part of *BE*), thereby linking Platypus in Movement V with the opening of Movement I and connecting thematically the terrestrial waterhole with the celestial scene of this movement. An additional function of this melodic line, which reappears several times in Platypus Ecliptic, is to provide some fast movement in counterpoint to the more expansive pace of the two phrases of the solar flare music.

Figure 36 represents the kernel of this movement in the form of a two phrase sentence. Each phrase is a different length, but the common element is in a polymetric design sharing “beats” that divide evenly into five.<sup>115</sup>



Figure 36 *Bunyip Polymodular*, Movement V, Platypus Ecliptic: solar flare motif as line (pattern A, first system) and circle (pattern B, second system)

The first, ascending phrase can be seen and heard as the solar flare motif encountered earlier in *BP*, and in *BE* (see Figures 8, 9). Here it is distinguished in being played much more slowly and expansively (closer to the cello music in Figure 19). In this recording the melody represented on the treble staff is mostly heard in the form of a second-inversion triad, sometimes arpeggiated, whose root is the notated pitch. Sometimes

<sup>115</sup> Simple time beats divide evenly into two; triple time beats divide evenly into three. Four is a subdivision of two, so the next possible division, which must be a *prime* number, is five. In my studio I call this *quintuple time prime time*.

(such as in Pattern A1 at 3:23) a first inversion major dyad whose root is a M7 lower than the primary melody tone, is added to this line, thereby creating a five-note moving chord, arpeggiated. The chords are serving more as “colour” than “function”, and one is reminded that harmonic choices in acoustic music (piano music of and inspired by Debussy being an obvious example) are perhaps not unrelated to use of resonance and filters in synthesis.

Often present in the texture as an accompaniment layer, the eighth-note pattern illustrated in the bass staff of Figure 36 is indicative and is discernible in the Pyramid sequences in the recording.

Against this underlying pulsing pattern, two treatments of melody are indicated. The first phrase proceeds upwards by 3+3+3+3+3+5+5 eighth-note values. The second, more poised, is a circumscribed five (groups of eight small values) against eight (groups of five small values). The first phrase could be described as *movement*, or *line*; the second as *stasis*, or *circle*. The relative length of the two phrases is based on two of the prevailing, favoured numbers of *BP*: five and eight.

A second version of the second, *circle* phrase evolved in response to the step-count limitation of the M1 sequencer.  $25 + 40 = 65$ , one step beyond the limit of 64. As I pondered ways to work within the limits of my sequencers, I discovered a different, equally elegant solution that adds up to 64 steps. A second form of the circle phrase (illustrated in Figure 36) comprises also of five values, but this time numbering 5+8+5+8+13. The first note of this second phrase, then, completes a group of three, five-pulse values with the last two notes of the previous, ascending phrase. The subsequent numbers 8, 5, 8 and 13 complete a zig-zag progression and elongation of time along the Fibonacci number series and thereby are also compatible with the guiding rhythmic ideas of this composition. This kernel, as represented in Figure 37, represents the core sequenced material in the recorded music in the episode from 5:02 until 9:25 of the recording.

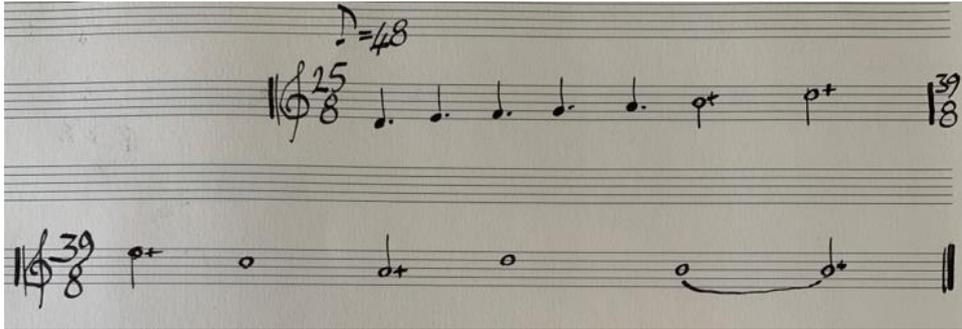


Figure 37 *Bunyip Polymodular, solar flare, second version*

The concept that inspired this movement is that Bunyip, being reconciled to the fact of his existence, discovers that he lives and breathes and has his being in a much larger world than he had dreamt possible. The waterhole, the track, the quest – these are terrestrial. The sky provides proof that earth itself belongs to something much bigger. As his mind soars upwards, he enters a dance along the ecliptic where his former identity and location are not negated but embraced, absorbed and enlarged. This movement is a meditative dance among the sun, moon and stars of the ecliptic. Constellations of the animals he met earlier are there; Platypus is there; the waterhole is there; Emu glitters past; the Fur aria is woven in; and of course, Sweet Pea, whose ancestors pushed the sky up off of the earth and assists with the timely lighting of the fire each morning, is the obvious choice for guide and companion in this cosmic dance where they all “pursue their pattern as before / But reconciled among the stars” (Eliot, 1944, *Burnt Norton*, ii, p. 14). A final reference and closing of a loop, related to the Eliot passage and to my autoethnographical perspective of the research, is attained in the final episode from 14:25 in the recording: the thrumming, phasing sounds of the stars are designed partly to evoke the night sky as I heard it as a child, with birds, crickets and cicadas in my ears.

The sense of time is explored at several levels. There is an oscillation between movement of the line and the stasis of the circle. Harmonic movement, taken over the duration of the episode, is a slow, cyclic progression, as much colour as function. Metric, rhythmic and thematic elements interact as the resultant music spins across the sky. The solar flare, present throughout the movement, is heard finally in the improvised music from 14:25. In my mind, aside from serving as a conclusion to *BP* as story and music, it is the musical conclusion of *BP* the research. To my mind, this final movement of *BP*, and the concluding episode in particular, is a development of and

answer to the cello solo (see Chapter 3.8) of the final minutes of *BE* (from *S* to the end). It represents the concluding part of the investigation of new musical content being created from a musical idea, when modulated by interaction with the electronic instruments used in this research.

## 5.6 A polymodular synthesis

*BP* represents more to my research than a musical work conceived for and realised by synthesizers. Some rethinking of music always occurs when translating it from one instrument or ensemble to another, particularly when one is concerned that the music sound idiomatic and natural to that instrument or ensemble. In the case of this project, however, rethinking transformed the process of music creation itself, from conception to realization. Modulation was applied in many voices and passages that comprise *BP* – and if the “polymod” module on the P6 enables the hearing of one dimension of sound in terms of another,<sup>116</sup> the term is more than justified in describing the transformation of my musical thinking as the result of engaging with the synthesizer.

An array of approaches to synthesizers is demonstrated in the five movements of *BP*. This is a consequence of trialling various options of the various instruments, testing their voices against the material I had previously drafted and was developing for *BP*. Any synthesizer has the capacity to realise music in an array of genres, but there seemed to be a comfortable fit with the OASYS and the music of Movement III, *Der Mensch* – music not far removed in conception to music for an acoustic instrumental ensemble. For my purposes and to my ears, any resemblances between the recorded sounds and acoustic instruments in *Der Mensch* do not concern me. To have a *denatured* piano was helpful to my creativity – it established that I no longer sought an “authentic piano” sound and saved me wasting time trying to achieve it. My time pursuing verisimilitude and convincing emulations ended with the collapse of my second and probably final VSL host computer. The denatured piano sound is a denatured piano sound from my OASYS, with a pleasing tone and a percussive quality, and for this project the notes above an E5 have an extended decay period. Virtual analogue sawtooth waves provided the foundation tone for another of the voices, and a sine wave voice, with a bit of design work, yielded tone reminiscent of the *Ondes* – exactitude was neither desired nor

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<sup>116</sup> A dramatic example of this is hearing harmony as rhythm.

sought, but the inclusion of a personal reference to Messiaen's electronic sound world was intentional.<sup>117</sup>

Different aspects of synthesis were explored in other movements and these were particularly rewarding. The voice of Sweet Pea, I suspect, will be one of my core sounds for many years not just for its sonic attributes but because of what it represented to me in my research. It is a synthesizer voice and cannot be mistaken for anything else; the many ways it can be used are a celebration of the instrument; it connects me to the natural world, it connects the instrument to the natural world; and it makes me feel more connected to the finest musicians on earth, benefiting the heart as well as the mind.

Frog calls at the start of Movement IV may be an agreeable episode in the music, applying a serendipitous discovery made when researching polymodulation on the P6. Similarly, some experimental sounds created with adjustments to filters and envelopes and some sequencer and arpeggiator randomizations led to the creation of new episodes, but also represents a defining shift in perspective on my part, and points to a world of possibilities.

In a sense, *BP* is the culmination of all of the previous variants of Jenny's and my Bunyip narratives, and the outcome of the adventures of Sally's and my "beetle", too. It draws together the formal, rhythmic elements I had hoped to find (albeit in a way I had not anticipated), and it does so in terms of the synthesizer which, at the start of this PhD, was not even a consideration. In learning to conceive and realise music for this uniquely rewarding instrument, in terms of a few of its many voices, the transformation of my sonic palette and the transformation in my creative methodology have been matched by a transformation in the way I hear sound and think music.

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<sup>117</sup> The exquisite tone of the *Ondes Martenot*, as on the Theremin, is the difference tone of two very high frequency heterodyning oscillators.

## Chapter 6: Conclusion

“And the end of all our exploring / Will be to arrive where we started /

And know the place for the first time.”<sup>118</sup>

### 6.0 Introduction to Chapter 6

This chapter summarizes my modes of enquiry and the major themes that have emerged through this research, culminating in both new artistic works and a deep, comprehensive review of my approach to creating music content. An autoethnographical lens helped me explore and describe the connections between life experiences and the developments in my creative work as composer, performer and producer of music. I describe this process as reimagining music creation a “polymodular synthesis”. This term describes also a model and methodology for my future work, the process whereby musical ideas are transformed from one form or medium to another.

### 6.1 Methodology – ARiM and the Autoethnographic lenses

Artistic practice has been at the centre of my research in this PhD and forms the major part of my submission. It led to the discovery of a dynamic polymodular interaction between my creative processes and my recently adopted electronic instruments, resulting in a multi-dimensional synthesis of art and technology.

Autoethnography provided me a means to “understand, contextualize and communicate the personal stories” behind my artistic experiences (Bartleet, 2013, p. 444). I was able to explore the strong linkages between music insights made during my research and peak life experiences. The research itself constituted a peak experience owing to the connections it forged between my artistic practice, personal values and observations of the natural world. Indeed, autoethnography emerged as perhaps the optimal methodology to describe my research in a project where the “unplanned and unexpected” emerged as central to the research process (Bartleet, 2013, p. 451). This exegesis thus became a vehicle for communicating both the process, which included periods of both discomfiture and exhilaration, and the results of my lines of enquiry. I hope I have been able to communicate my journey in a way that may be accessible and interesting to others (Ellis et. al., 2011) and may at best encourage others to embrace this holistic approach to undertaking and explaining their research. In an effort to

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<sup>118</sup> TS Eliot, (1944) *Four Quartets* Little Gidding V, p.48.

embrace the relationship between ARiM and the whole being, I am glad that the breadth of enquiry made by Plato is now embraced by many researchers.

## **6.2 Integration – line and circle**

In the forge of my studio, artistic research enabled me to integrate and transform aspects from my oldest musical memories; my love of birdsong; my experiences as a performer of pipe and flute; my previous exploration of rhythm, metre and melody; my experience working with acoustic players, singers, ensembles and orchestras; my experience in studios and with DAWs; and my growing interest in the art and science of sound design and synthesis.

The concept of time as both line and circle is useful in illustrating the integration of patterns and themes discussed in this exegesis and explored in the music of the portfolio. I evaluated *B!* as suitable core material for new work, due to the responsibilities associated with the intellectual gift that was bestowed on me (in Jenny Wagner writing her libretto); due to its persistent effect on my creative imagination; and due to the autoethnographical elements I perceived within *B!* and *BoBC*. When I began to sketch and develop ideas for new work based on the story and the musical themes, the narrative and the music developed in tandem. Line is represented here in the evolution of ideas and in the evolution of my craft and methodology as creator of music. The circle, explicitly expressed in the use of loops, pedals and formal design, represents aspects of my life and musical experience that are revisited, rekindled, recovered, enriched and understood, in some senses, “for the first time” (Eliot, 1944, p. 48).

## **6.3 Embracing Synthesis**

At the outset of this research I never imagined that the descriptors *electronic music*, *sequencer* and *synthesizer* might apply to my work. Now I consider these to be an inevitable, perfectly natural fit. There is a sort of logic in my path moving through distinct, discrete domains from scoring on manuscript for players and singers; to sample libraries and singers, mixed in the studio; to recorded singers processed in the studio with sampled and processed sounds and effects; to players and studio-prepared recorded sounds and synthesised sounds together on stage; and finally, sans-score, sans-PC, to a fully synthesized work recorded live as composer-performer. It certainly looks logical, expressed in sentences on paper. On reflection I conclude it was logical for me in

practice, too. It was a logic hard won, however, and not always apparent at the time of research.

Circumstances urged me to change the way I worked and once I cast off from my moorings in the domain that had nurtured *The Crushing* I was not inclined to settle on a solution that was less than compelling. The instruments assembled for *BP* engaged me because they drew from me a broader, deeper range of experience, skills, and interests than my former compositional methodology allowed, resulting in a rewarding polymodular synthesis of art, craft and ideas. Structuring synthesizer music with the aid of the sequencer modules led to consideration of the clock and the timeline. I found that synthesis was not about to frustrate any designs I might have had regarding polymetric, polyrhythmic compositions, but rather provided another medium through which to explore and express them. It has proven to be an extension of research I had previously pursued in works such as *Surya Namaskar*, *Chaand Namaskar* and *Time and the Bell*.

In embracing synthesizers and synthesis I became a composer-performer of my music, rather than a composer-programmer via the intermediary languages hosted in the DAW. My studio and creative methodologies were transformed from those where I created *The Crushing* and *BE*, to those where an Australian Magpie reminded me who I was, where I was, and why I make music.

### **6.3.1 Sound and Sound Design**

Throughout the creation of *BP* I have been mindful that the oscillator – the beetle of Sally Molly’s illustrations – is the origin of the sound that I have come to love and embrace. Sound design became a crucial part of the creative process as I explored the parameters of the oscillator and the use of myriad modulation matrices that can enhance (and detract from) that sound. Sound design gave me a sense of ownership and authorship and allowed me to identify as a synthesist. It enabled me to compose freely without the niggling voices (real and imaginary) that say, “you can’t use that, it doesn’t sound like a horn (or an organ or like Emerson/Reznor/Tomita/Ciani)”; or conversely, “that sounds too much like an electric guitar (or a flute or like Subotnik/Hancock/Wesley-Smith/Barbieri) – you can’t do that!”. Such (imaginary and real) responses highlight the prejudice that I needed to overcome to embrace an instrument as powerful, malleable and evocative as the synthesizer is. Creating my own sounds gave me permission to declare that the origin of *this* sound, like a horn tone, is

an oscillation, but if one listens one is sure to discern it is, in fact, a synthesizer – and this thing really can sing in a myriad of fascinating voices. I had allowed myself to say “This is my take on this work at this time, and these are my sounds at this time”.

### 6.3.2 Modulation

Modulation is integral to the art and craft of synthesis. Some examples are directly analogous to performance techniques on an acoustic instrument, such as the periodic alteration of a pitch to create a vibrato effect, the modulation of a filter frequency to create timbral variation, and figure patterning via the arpeggiator. Some are more basically integral to timbre, to create the tone or “patch” with which one begins to compose and perform. At the other end of the spectrum, modulation can create wild, radical, transformative effects that suggest or demand a very different compositional solution.

The *idea* of modulation is also explored in this PhD, a process of transforming music from one form to another. Arrangement is a core aspect of composers’ craft. I would suggest that “modulation” describes better the inherent transformations represented by, say, those synthesizer parts in *BP II* that began as the *tutti* passages in *BE* yet became something quite different. The notational aspect of the music conveys a good deal of what the listener might expect to hear when realised in acoustic music but fails to convey a transformative phenomenon that sometimes occurs when that notated melody, via MIDI, is voiced by the synthesizer. Modulation describes the creation of Sweet Pea’s voice for the P6 inspired by the stopped harmonic cello from *B* in that same work; it is more than a translation, more than a variation, and more than an emulation. The idea and the quality of the cello sound were modulated through the idea and the modules of the synthesizer to create something other, with a unique identity.

Modulation also describes well the process whereby a work conceived and documented using music notation, sample libraries and the tools of a DAW, and realised in the digital domain of the PC, could be realised instead in a studio with three synthesizers, sequencers, and a recording device. It is more than an arrangement because almost every measure of one version would be altered, subtly or utterly, in the other. The *kernels* are intact, but structurally there are as many differences as similarities. The sequencer modules required that I re-think form, pattern and thematic development in order that the synthesizer could give its best to *BP*. Once working with these

instruments, developments of musical ideas resulted from a sound, a pattern, or a way of interacting with the instruments.

The modulation of *BP* from its initial sketches into a recorded work for synthesizers impressed on me that in this my new studio environment there is a greater degree of fluidity inherent in the process of realising my work; moreover, there is a greater degree of fluidity in that work becoming distinctly *another work* derived from the thematic kernel. From my perspective, this dividend is far from trivial. My training using pen and ink on manuscript and preparing parts makes me mindful of the hours that can be invested in changing a work from one form to another.<sup>119</sup> Even in the recent *BE* project, when I reflected that the ending of the work warranted revision, the logistics of recording that change (in a performance captured as an audio file) were significantly daunting and in the context of four busy lives, this idea awaits its day. Compared to this, realising two forms of Movement IV of *BP* was a streamlined exercise. Of course, in this latter case I am performer as well as composer, thus simplifying the logistics. This facility arises from the material nature of synthesis itself – its circuits and voltages, as well as its zeros and ones. It is malleable, volatile, and primed for modulation to other voices, forms, articulations and realisations.<sup>120</sup> Concomitantly and by necessity, the method of working with the material is different, which in turn is both challenging and exciting. As a creator of music, I am glad to embrace this way of working, with the added sense that the final form and sound of the work itself are in my hands, often in real time.

### 6.3.3 The sequencer and the clock

The music kernels of *BP* were modulated quite profoundly and developed distinctively by the effect that sequencers had on my compositional methodology. I suspect I would enjoy working with CV sequencers and with a modular synthesizer rig, based on my preference for the unique properties of instruments built from the VCO, VCF and VCA, and the more fluid approach to time offered by some CV sequencers. A technique of “sequencing the sequencer” was used by Subotnik (2017) to record *Silver Apples of the Moon* (1967). Two and three sequences (one per sequencer) were used on his “three

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<sup>119</sup> For a number of years, I was an accredited arranger and copyist with the Music Arrangers Guild of Australia and Roemer (1985) was my bible. Orchestras, ensembles and bands would not play music unless the arranger/copyist was accredited.

<sup>120</sup> Subotnik (2015) was excited by the possibilities of this instrument in its earliest days, in part because of its volatility and malleability.

box” rig of *system 100s*.<sup>121</sup> Looking ahead, I am confident there is a great deal of potential to explore with synchronized and non-synchronized interactions between the MIDI sequencers I now have in my studio (Pyramid plus three in the M1 and one in the P6). These were used to develop *BP*, and there is no doubt much more that can be done to create interesting, evolving patterns.

### 6.3.4 From composer/programmer to composer-performer

As I found that the M1 and P6 are most rewarding when played<sup>122</sup> rather than when accessed as a patch or patch bay, I developed a performative approach to presenting *BP*. This altered my approach to the work as I drew on a more diverse and richer set of skills and musicianship. Over the years I have often wished to be more actively involved in performance. As composer-performer in the studio it is possible to work direct to canvas and it is a pleasure to physically do so. I observed that, instead of spending time solving the problem of notating an idea according to the codes of software such as Sibelius, Finale or Dorico in order that another musician can best understand and interpret my intent, I can rehearse it, perform it and record it to sequencer or to recording device, prompted if necessary by an *aide-mémoire* courtesy of the flexible and reliable media of pen, ink and paper.<sup>123</sup> By rehearsing and performing my work, there is a different quality of engagement with the music. Having rediscovered this dimension, I cannot now imagine doing without it. My physical being and kinaesthetic intelligence delight in being part of the compositional, performative process, whether performing rehearsed material or improvising.

The method that emerged for me to create my work was comprised not of any new ideas *per se*; but of a new synthesis of elements in my own experience, and in my creative methodology. Some of these elements were rekindled, having been dormant; some were reconfigured and recombined; still others were newly acquired. The methodology is

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<sup>121</sup> A 16- and a 15- value sequence provided a sequence of 240 control voltages; a 15, 13 and 7 provided 1365 values. Alternatively, selected values could be directed to pitch, and others to duration, thereby sharing the concept behind the cello and piano pedals from *Liturgie du Cristal*. Interestingly, Subotnik (2015) named Messiaen as one of his primary sources of inspiration amongst composers.

<sup>122</sup> The appellation “workstation”, “keyboard workstation”, or “music workstation” are generally applied to behemoth synthesizers like the Korg OASYS and KRONOS, along with equivalent-concept models from Kurzweil, Roland, and Yamaha. However it is hard for me to think of “playing” the OASYS after playing a Prophet. Like software synthesizers, “menu-diving” is the unavoidable way of making most adjustments, in place of a potentiometer dial or slider.

<sup>123</sup> The example of the half-dotted note is foundational in my work and I use it frequently. It is simple to notate and clarifies notation on the page whereas digital scores, like the most basic 8-note or 16-note grid-based MIDI sequencers, are often boxed in and render some simple things remarkably difficult.

certain to evolve, although I am confident that the elements and technologies of it are now clear thanks to the process of this research leading to the creation of *BP*. And if composition is frozen improvisation, as Stravinsky (1994) described it, then as composer I have just delayed the moment at which and the manner in which the improvisation is frozen, to coincide with the performance and recording.

### **6.3.5 Chance**

One “module” of the synthesizer doesn’t reside on the control panel nor have a potentiometer connected to it. It is the phenomenon of surprise and refers to the tendency of this nexus of instruments and methodology to catch me unawares. If I never understood the attraction that Ciani (and of course one thinks of Cage) has for random events generated by modules in their synthesizer rigs, now I do. Perhaps in due course I will look for help in pushing those boundaries to confound my expectations. In the meantime, I have come to enjoy being taken, not infrequently, to unexpected unplanned places, which are identified by Bartleet (2013) as such an important part of the research process.

### **6.4 The Score**

One of the surprising changes associated with my reconfigured studio and creative methodology concerns the status of the score. For centuries it was the central document of music and in my earlier freelance life was the thing I was commissioned to produce. Until *BP* I regarded the digital revolution to have impacted the score by offering notation programs as a replacement for paper and italic nib or 6B pencil. I had missed the broader, deeper point, learned in my research and made by others such as Hugill (2012), Draper (2012), Davidson (2012), Raines (2015), Rutherford-Johnson (2017), and Ross (2018) that the score, in fact, is no longer necessarily even a part of the equation. Indeed, as Davidson (2012) observes, the score serves very well to document certain aspects of certain types of music but can be much less effective for other types of music in other cultures or within our own culture. I recognize that *BP* has some feeder roots in other cultural springs than those that fed my former chamber, orchestral and operatic music. The timbral inflections I discovered that are important in a synthesizer sound are immune to the precise but circumscribed parameters of manuscript, and this void is apparent when considering the inadequacy of manuscript to convey the transformation in sound of “descending, then ascending melodic flare”

(Figure 3.9.3) from clarinet (air-driven reed and timber oscillator) to P6 (voltage-controlled electronic oscillator), or more exuberantly of the frog chorus opening *BP IV*. By embracing sequencers, recording, memory (via performance/improvisation), and MIDI data, I was now simply availing myself of an array of *other* ways to organise, present and document my work. For some observers this might seem a very unremarkable transition to make in the year 2020, yet it has been highly consequential for me and my creative work.

Those same observers may have been quicker than the writer to appreciate that synthesizers of all types are very widely used in the creation of music for concert, dance, theatre, film, broadcast and streaming and that to use them in my work would surely be obvious and natural. Culturally in some quarters, I would suggest, an elitist attitude persists that is dismissive of electronic instruments and sample libraries. My research has sought ways to be productive as a creative musician when not constrained by an obsolete set of assumptions about an obsolete set of conditions. It is interesting to consider that composers whose work forms the “canon” of the orchestral concert hall tended to work with instruments that were fairly- to very-recently-designed and constructed. In that sense, by embracing electronic instruments and digital technologies, I am simply doing what Monteverdi, Bach, Mozart, Beethoven, Debussy, Varèse, Messiaen, Stockhausen and Subotnik did – working with innovative and interesting new instruments, and crafting music that utilises the voices and explores the technical capacities of those instruments.

### **6.5 Sail to conditions**

“Sail to conditions” is the single best advice I have been given as a sailor. Injury can be avoided; tragedy can be averted; pleasure can be enhanced. At times it means waiting for more favourable conditions to make that passage. Another possibility is to sail to an alternate destination in a more productive relationship to wind and waves; or indeed to sail in another sea and in another vessel. These options all now seem worthy of consideration and pertinent to my work as a music creator. Big seas and strong headwinds are associated with fatigue and lack of progress and are strongly analogous to the frustrations experienced in attempts to produce *The Crushing*. Just as I have become more selective about when and where I sail, this PhD has made me aware that I have many options as a music creator and, furthermore, these options are inherently challenging, surprising, stimulating, rewarding and endlessly deep.

The person who suggested to me that sample libraries are the “poor man’s orchestra” clearly has a different experience to my own (a) because to work well with sample libraries requires significant resources, time, and technique (one might justifiably call it a “rich person’s orchestra”); but equally (b) because the orchestral “route” was almost certain to keep me in a disempowered state. In place of the faint hope of there ever being another chapter to my career as a symphonist, I have become a part of another community of musicians who, like the concert-music cohort, also have much to say about sound and art.<sup>124</sup> Many books and articles have been written that explore the history and the reasons why orchestras in 2020 are largely museum cultures. Much of this schism is identified with developments in the early-mid 20th century, as discussed by Ford (2002) and many others. Interestingly, Goehr (1992) recounts that Franz Liszt called for “the foundation of a musical Museum” in 1835 (p. 205), echoing views of Forkel and Weber from two or three decades earlier. (I imagine they may be stunned at what this museum has become). The guardians of orchestral and opera programming in Australia are statistically quite uninterested in the work of living composers, so how can I not be excited to find that, as with sailing, there are other boats and other seas on which to sail, better suited to the times and conditions I find myself in? It has been liberating to me through this research to realise that I no longer need to accept the position of being an under-employed symphonic or opera composer; there are other ways to make music, and other forums where new music is both welcome and expected.

Subotnik (2015) relinquished his secure position as a player and composer for orchestras for an initially tenuous position creating music with the Buchla synthesizer. He was motivated by an interest in what was so new, it hadn’t yet been imagined. He chose to become part of that *imagining*. He was also motivated by the sense that this new thing might be more socially egalitarian.<sup>125</sup> Having come to my position today, I

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<sup>124</sup> Many leading artists are working with sample libraries, whether it be in terms of emulation or in terms of unique, new sounds. I reflect that, had my custom-built PC continued to work, I would be doing so today because I began to enjoy some exciting discoveries of their power and potential. As discussed, however, circumstances led me further along the electronic path, for which I am now grateful.

<sup>125</sup> Perceptive readers might well point to the cost of instruments in my studio, to which I have no defense: the P6 and the M1 are premium analogue synthesizers. I am privileged to own them. The OASYS, in 2008, was relatively even more expensive. However, I know of many synthesists working on software emulations of classic synthesizers, as well as new software synthesizers designed for purpose and represent evolutions in synthesis. Many people prefer to work in software, and if one already uses a Mac or PC, the entry cost is almost trivial. There are also very many, very less expensive analogue and, especially, digital hardware synthesizers that have given access to synthesis for the cost of a decent student or semi-professional clarinet or cello.

am very glad to have had my ears and my mind opened to the possibilities of applying my skills and experience as a classical modern composer to the world of synthesizers. It is a wonderful time in history to be a synthesist – the instrument in all of its forms is enjoying a renaissance and a plethora of developments. Ciani has been surprised by this resurgence. In her early days it seemed obvious that electronic music would quickly gain wide acceptance; it did not. A new generation, she observed, has learned how to listen to the sound of synthesizers (C, 2020). And it is an instrument of our time, rather than instruments built on technologies of the paleolithic, bronze, iron and silver ages, many refined to their ‘modern’ forms essentially in the 17th to 19th centuries.

## 6.6 Looking ahead

The synthesizer was the wild card in this research. Formerly peripheral to my vision, once having heard what I heard it became something approaching an obsession – much, perhaps, as Stockhausen became comprehensively reoriented in his creative processes on hearing Messiaen’s *Mode de valeurs et d’intensités* in 1951, as noted by Ford (2002, pp. 132-135). It was life changing.

My time with synthesizers and synthesis has been very brief relative to my life in music. Veteran synthesist Daniel Fisher (2018) spoke of his expectation that it would take him “years” to explore all of the capabilities of the Moog One, but he planned to do so; as with any fine instrument, it was worthy of a long-term relationship, and this was his “Stradivarius” to keep and to learn. Between my M1, P6 and OASYS synthesizers and the Pyramid sequencer, there are several types of synthesis, techniques of sequencing, and an orchestra-sized array of sonic possibilities that I do care to explore, even without yielding to the temptations of modular synthesis and the more fluid approaches to time and modulation that it potentially offers.

I am settled on pursuing research along these lines because the rewards have already been very rich on a number of levels. Musically, nothing has given me this much pleasure and enthusiasm since my early years freelancing when I was privileged to work with some very exciting musicians and artists. No musical experience prior to this has been so comprehensively integrated into my larger life, nor made explicit connections as this has between music, magpies, tone, tides, the elements and the celestial bodies – which speaks to a priceless, integrating experience.

This PhD started with operas, and aspects of opera have been a part of its fabric in narrative themes, musical themes, the singing lines of Sweet Pea, and in the imagined theatrical setting of the music. It is not difficult to imagine there being perhaps one further version of Bunyip, the *new* opera, at some time in the future. The groundwork has been done in *BP*, including the methodology to modulate ideas from one form to another. This process has been integral and essential to my research – and yet it also recalls that when I began creating the music to *BP* exclusively in the domain of synthesizers, the resulting music had been found after modulation *by* a research pathway, and *from* a body of existing musical, formal and narrative ideas. Such a process could yield new work from other work in my catalogue, and I expect it will. More immediately pressing, however, is to find the work that starts back at the heart of this research – with the voltage-controlled oscillator. The Platypus music in *BP V* and the concluding episode have elements that I yearn to explore in more depth, in forms I have not yet found. The circle is in always looping back to the heart of the sound, but the line is in going somewhere new with it.

As I researched and produced *BP*, a group of colleagues was working to secure a production of *The Crushing* for film rather than stage. Naturally I hope it comes to something and my position was clearer thanks to this PhD. I am excited and reassured that collaborators (should this eventuate) will include visual and projection artists with decades of experience in virtual reality (VR), extended reality (XR) and various related innovations – I think of my virtual stage in Figures 1, 2 and 3, and where that led me. I would love to conduct a performance as already scored, but should there be developments, modifications or extensions, my new studio would replace the old.

The shape of my next new project is emerging and it will look and sound very different to *The Crushing*. Its sonic world will be created by two singers with unprocessed and processed voices, and synthesizers with two performers (one being myself, of course). A small audience will be invited to join us, and a larger audience may join us simultaneously or at a time and place of their choosing via the web. I am looking forward to starting on it very soon – an opera for the post-Covid world, using instruments and media of our time.

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## **Appendix A: Glossary of some terms relevant to the thesis**

I have compiled a list of some terms that frequently appear in this thesis and provide short descriptions. These descriptions are intended only for ready referencing and are not intended to provide a formal definition.

**Amplifier:** controls the signal gain/volume; it is necessarily part of the signal chain in synthesizers.

**Analogue synthesis:** the creation of sound waves by rapidly changing voltages in a circuit. Components that influence the shape of the resulting sounds include oscillators, filters, amplifier and envelope generator.

**Control voltage (CV):** a direct current (DC) electrical signal used to manipulate components in analogue synthesizers. These components may include:

Voltage-controlled oscillator (VCO)

Voltage-controlled filter (VCF)

Voltage-controlled amplifier (VCA)

**Digital synthesis:** the creation of sound waves using digital signal processing techniques. This covers an array of approaches to synthesis including digital oscillators and filters, virtual analogue, additive, wavetable, sampling, wave-sequencing and coding.

**Envelope generator:** shapes the sound by adjusting (D)A(H)DSR parameters

(Delay, between the control signal and the attack)

Attack, the beginning phase of the sound envelope;

(Hold, at maximum attack amplitude before decay)

Decay, when the signal starts to fade;

Sustain, how long the sound holds at the designated level; and

Release, how the sound tails off after release.

**Filter:** modifies the timbre of the sound by filtering in or out selected frequencies in the sound.

**Low frequency oscillator:** this is a secondary oscillator in synthesis that operates typically below 20 Hz, creating a rhythmic or cyclic pulse or sweep. This is used to modulate another signal to introduce complexities and effects into the resulting sound.

**MIDI** (Musical Instrument Digital Interface): a technical standard created by Dave Smith and Ikutaro Kakehashi in 1983. It specifies a communications protocol, digital interface and electrical connectors that enable communication between different electronic musical instruments, computers and related audio devices for the purposes of playing, editing and recording music.

**Modular synthesis:** an expandable approach to synthesis using modules rather than a preconfigured instrument. The main premise behind modular synthesis is that by connecting various modules together (with various patching options) the user can create unique signal paths and unique sounds.

**Modulation:** in synthesis, modulation is the application of a select parameter of a source signal to a select parameter of a destination signal, resulting in an effect on the generated sound. Broadly, an oscillator driven by a constant current and voltage will produce an unchanging tone of a certain quality. Anything that changes that tone from its steady state is probably due to some form of modulation.

**Oscillator:** the core component of the synthesizer in which a power source oscillates electrons to generate a repeating wave form.

**Sequencer:** a device or application that allows programming or recording of note and performance data and uses this data to control connected electronic voices.

**Velocity:** the speed of attack in digital music systems, numbered in MIDI terms from 0-127 (or 1-128). Often associated with dynamics, and especially with the attack dynamic of the note, velocity can be assigned to control other parameters of the sound.

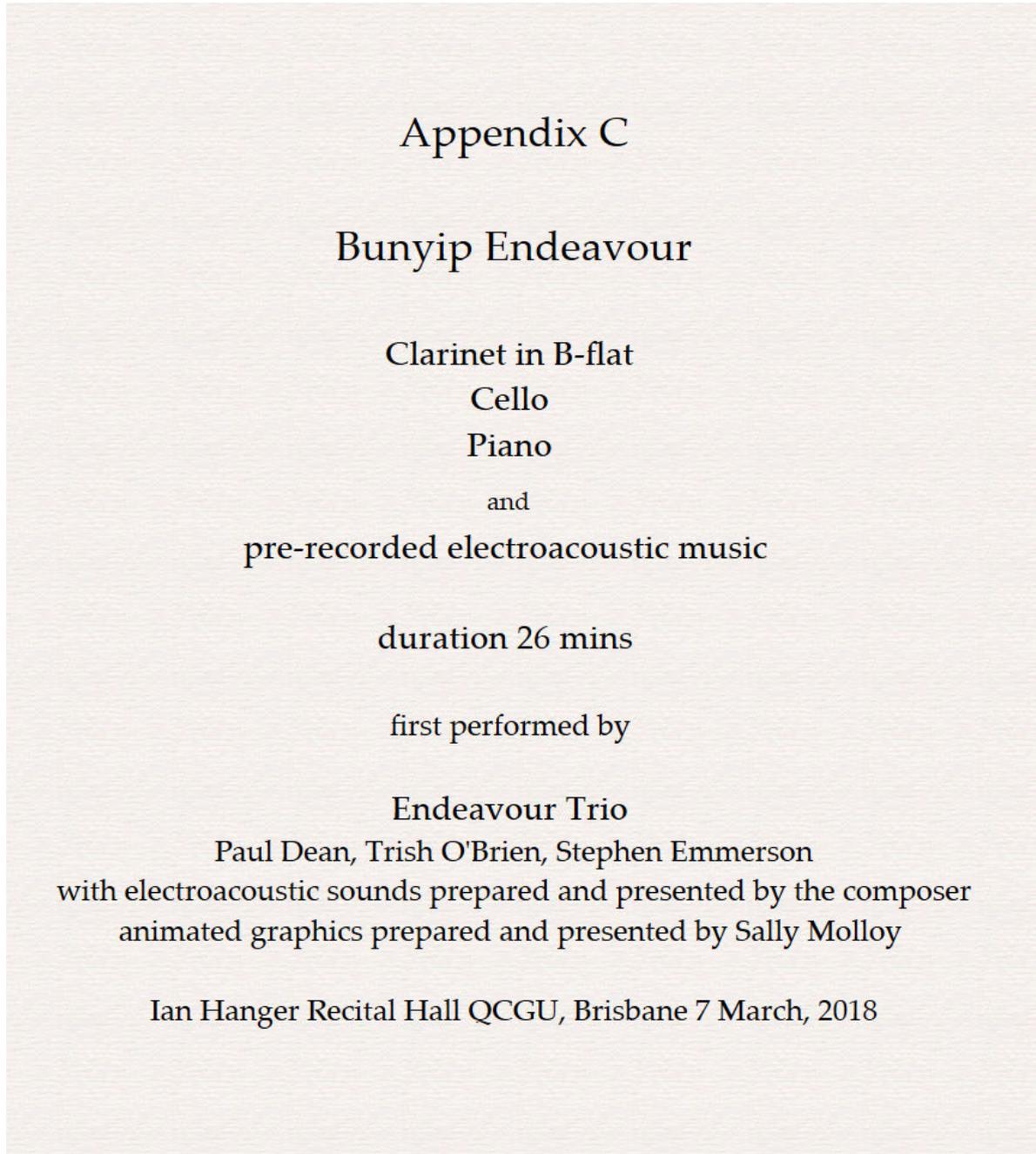
**Voltage-controlled oscillator:** an electronic oscillator whose oscillation frequency and amplitude are controlled by a voltage inputs. Audio-frequency VCOs are used in analogue music synthesizers and are noted for natural (and desirable) imperfections due to output instability resulting from temperature changes during operation.

## **Appendix B *The Crushing* scene descriptions – the 176-page score follows immediately after p. 126 of this document**

The following is a summary of each of the scenes in *The Crushing* (together with a link to the recording, the duration of the recording, and the page number of the score corresponding to the beginning of each scene). These descriptions are from the liner notes of the promotional CD discussed in Chapter 2.

1. **Scene 1** – “This place is broken.” The harvest season begins. Life on the farm is hard work. Aiden remembers forty years ago when life was innocent. But history beckons. ([2.0a](#), 8:48, p. 1)
2. **Scene 2** – Loretta “blew in on the wind.” Aiden, 19, likes what he sees. Selena has seen it before. ([2.0b](#), 6:24, p. 23)
3. **Scene 3** – “Anguish of earth.” History is dangerous. It is hidden under the farm. Selena and Aiden don’t see eye to eye about Loretta. ([240c](#), 9:44, p. 38)
4. **Scene 4** – “What do you think of the sugar cane?” Aiden falls head over heels for Loretta. It is the taste of a world away. ([2.0d](#), 8.10, p. 62))
5. **Scene 5** – “This place is built on blood.” 9 year-old Aiden witnesses the ritual. He sees Loretta change from a spirit to human form. The destiny of the Caine family is revealed. ([2.0e](#), 9:37, p. 79)
6. **Scene 6** – “It’s that time of year.” Lott reveals that she wants to change herself back into a wind spirit. She can’t do that without Aiden. ([2.0f](#), 9:00, p. 95)
7. **Scene 7** – “I see fire in your eyes.” Loretta’s last ditch attempt to seduce Aiden, but it’s too late. Aiden sees what Lott is up to. Selena and Aiden plot revenge for Zane’s death. ([2.0g](#), 12:08, p. 114)
8. **Scene 8** – “Fury.” Destiny is played out and the characters are drawn inexorably into its dance. Selena and Aiden exact their revenge – with unexpected consequences. ([2.0h](#), 10:32, p. 142)
9. **Scene 9** – “The same. And same again.” Aiden is 49 and has made peace with his past, but memories of Loretta and the past blow in on the wind at this time every year. ([2.0i](#), 3:08, p. 174)
10. **Bonus Track.** “*I See Fire*” Aria. Katie Stenzel, soprano and James Crabb, classical accordion. (audio [2.3b](#), video [2.3c](#), 2:13, corresponds to p. 114)

**Appendix C *Bunyip Endeavour* title page – the 23-page score follows immediately after p. 176 of *The Crushing***



The links to recordings of this recital are [3.0a](#) (25:23) and [3.0b](#) (video, 26:18)

## Appendix D: The *Bunyip Polymodular Rig*



Moog One synthesizer (foreground). A tri-timbral, sixteen voice polyphonic synthesizer. Released in 2019, it is the first polyphonic synthesizer released by Moog Music since the Memory Moog over 25 years ago. Starting with its VCOs the signal path is fully analogue up until the (optional) digital effects.

Sequential Prophet 6 synthesizer, desktop module (to the left of the M1). An analogue synthesizer released by Dave Smith in 2018 as an updated reimagining of his famous Prophet 5 synthesizer of 1978-84. It is a mono-timbral, six voice polyphonic synthesizer. The signal chain from its VCOs out is fully analogue except for the (optional) effects which are digital.

Pyramid sequencer (directly above the P6) by Squarp Instruments is capable of long patterns (up to hundreds of notes). Within certain constraints it can play different metres simultaneously; it can play polyrhythms; it can record music quantized (aligned to the closest beat or subdivision of a beat) or not quantized (as performed, nuances and inaccuracies intact); it can control 64 tracks of polyphonic music; and it can connect to all of my instruments at the same time with more MIDI channels available than I could care to use.

Sound Devices MixPre 10 (M10) (above the Pyramid). A digital multi-track recorder able to record eight microphones/lines at one time (four stereo pairs, in my usage). This allowed for the “one take” recordings of most of the music presented as *BP*. The M10 allows for drop-ins and other multitrack recording techniques familiar to recordists who worked or who work with electromagnetic tape. I did not use those particular features on this project, however I did bounce to stereo some of recorded material, using another facility within the M10.

The Korg OASYS (under cover to the left, but visible in some of the videos) is a workstation synthesizer produced between 2005 and 2009. It has multiple digital synthesis engines including FM (Variable Phase Modulation), sampling, wave sequencing, and virtual-analogue. Technically, OASYS is a software synthesizer/workstation running on a Linux kernel, housed in a hardware synthesizer styled instrument. (I used none of the “workstation” features of this instrument in *BP*, but rather utilised a few of its synthesizer voices via the Pyramid and live via the keyboard and vocoder).

## Appendix B (ctd)

### The Crushing

Loretta - soprano (soubrette)  
Selena - alto/mezzo  
Zane - tenor Aiden - baritone  
Old Aiden - bass/sbass baritone  
chorus - SATB  
young aiden - soprano

flute, oboe, clarinet in B-flat, bassoon  
horn in F, trumpet in b-flat  
percussion (snare drum, 4 toms, sbass drum, temple blocks,  
2 sus-cymbals, tam tam, vibraphone)  
solo strings (or small chamber forces)

#### Act1

Scene 1 p. 1  
Scene 2 p. 23  
Scene 3 p. 38  
Scene 4 p. 62

#### Act 2

Scene 5 p. 79  
Scene 6 p. 95  
Scene 7 p. 114  
Scene 8 p. 142  
Scene 9 p. 174

duration: 90 mins

# Appendix B (ctd)

## The Crushing

Rod Ainsworth

Peter Rankine

This Place

$\text{♩} = 120$

Flute

Oboe

Clarinet in B $\flat$

Bassoon

Snare Drum

SELENA:

ZANE:

Violin 1

Violin 2

Viola

Violoncello

Double Bass

*p* *pp* *p* *mf* *mf* *p* *p* *ARCO* *(l.v.)*

To Anvil

Go! get

Can I help, Mum?

8

Fl.

Ob.

Cl.

Bsn.

Sel.

Z/A

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*mf*

on with your work!

It's bug-gered!

It's on the blink!

Bug-gered

15

Sel.

Z/A

Vln. 1

Vln. 2

Vc.

Db.

*mf*

*f*

*mf*

*f*

bug-gered! Bug-gered a - gain, it's bro - ken a - gain!

Bug-gered Bug-gered a - gain! it's bro - ken a - gain!

Fl. *mf*

Ob. *mf*

Cl. *mf*

Bsn. *mf*

Sel. *mp* *ff* *mf*  
E-nough to drive me ber-serk! Zane, leave him a-lone!

Z/A *mp* *ff* *mf* ASIDE:  
E-nough to drive her ber-serk! Aid-en, not now!

Vln. 1

Vln. 2

Vc.

Db.



38 **1A**

Ob.

Cl.

Bsn.

Hn. 1

Sel.

*p* *p* *mp* *pp* *f*

This place, this place is bro - ken. No food on the ta-ble,

Z/A

*p* *p* *mp* *pp* *mf*

This place, this place is bro - ken. This place is bro ken!

**1A**

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*mf* *mf* *mf* *p* *f* *mf* *mf*

47

Sel. *port*  
scroung-ing a meal from the earth.

Z/A  
This place is bro - ken!

Aiden  
ZANE EXITS, AIDEN ENTERS  
AIDEN:  
*mf*  
Bro - ken a -

Vln. 1 *br.*

Vln. 2

Vla. *mf* *mf*

Vc.

Db.

52

Sel. *Liberamente (or spoken)*  
Thanks Aid - en, what would I do with - out you?

Aiden  
*f* *mf*  
gain? Here, let me!

Vln. 1

Vln. 2

Vla.

Vc.

Db.

1B Sweet Sugar

57

Fl. *mf* *p*

Ob. *mf* *p*

Cl. *mf* *p*

Bsn. *mf* *mp* *p*

S. D. Percussion Anvil: (Aiden Hammering metal) *mf*

Vln. 1 *p* *pp*

Vln. 2 *p* *pp*

Vla. *pp* ARCO *p* *pp*

Vc. *pp* ARCO *p* *pp*

Db. *pp* *p* *pp*

1B *J. = 46*

*mp*

65

Perc. *p*

Sel. *mf* *port.*

etc  
folksy, and feigning slightly tipsy  
(brandishing empty bottle, perhaps)

The su - gar is sweet to all who will eat it, but cert'n-ly ain't sweet to this girl! It is

Vln. 1 *mp*

Vln. 2 *mp*

Vla. *mp*

Vc. *mp*

Db. (PIZZ) *mp*

70

Fl.

Ob.

Perc.

Sel.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*mf*

*pp* *mf*

To Vibraphone

(or no pitch) *mp* *f* Sing:

slog, it is bit ter\_ a life of frus-tra tion the mer-cy of old moth-er nat ure!\_\_\_\_\_ HUH! Man and ma-chine a

76

Fl.

Ob.

Cl.

Sel.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*mf*

*mp*

ARCO

dot! on the un - i - verse! How can you win when the world is a - gainst you! House fall - ing down a - round your

Fl. *p* *mf*

Ob. *f* *p* *mf* *f*

Cl. *f* *mf* *(mf)* *f*

Bsn. *f* *p* *mf* *f*

Hn. 1 *mf* *mf* *mf* *mf* *mp*

Trpt *p*

Sel. ears! when ev-ry thing down to the small-est ball bear ing,

Bar. OLDER AIDEN *mf*  
It's that time of year. The

S. *p*  
It's that time of year.

A. *p*  
It's that time of year.

T. *p*  
It's that time of year.

B. *p*  
It's that time of year.

Vln. 1 *f* *p* *f* *p*

Vln. 2 *f* *p* *f* *p*

Vla. *f* *p* *mf* *f*

Vc. *f* *mf* *f*

Db. *f* *mf* *f*

PIZZ ARCO PIZZ (PIZZ)

gliss. gliss. gliss.

87

Fl. *p* *mf* *f* *p*

Ob. *p* *mf* *f* *p*

Cl. *mf* *mf* *f* *p*

Bsn. *p* *mf* *f* *mf*

Hn. 1 *mf* *mf* *mf* *mf* *mp*

Trpt *p* *p*

Sel. *f*

Bar. *p*

S. The har-vest is here. The har-vest is here.

A. The har-vest is here. The har-vest is here.

T. The har-vest is here. The har-vest is here.

B. The har-vest is here. The har-vest is here.

Vln. 1 *f* *p* *gliss.*

Vln. 2 *f* *p* *gliss.*

Vla. *pp* *f* *pp* *mf*

Vc. *mf* *f* *mf*

Db. *mf* *mf*

house fall-ing down and the small-est ball bear-ing,

har-vest is here. It's that time of year.

1C

♩. = 66

95

Trpt

Bar.

S.

A.

T.

B.

*p* *mf* *p*

*p* *f* *p*

RECITATIVE  
tempo ad libitum

Su-gar cane sprout-ing it's spear. The years turn, hist-(o)ry beck-ons.

*pp* *p* *f* *p*

Su-gar cane sprout-ing it's spear.

*pp* *p* *f* *p*

Su-gar cane sprout-ing it's spear.

*pp* *p* *f* *p*

Su-gar cane sprout-ing it's spear.

*pp* *p* *f* *p*

Su-gar cane sprout-ing it's spear.

MUTE ON

1C

Vla.

Vc.

Db.

ARCO

MUTE ON



107

Bar.

We grow old - er. Cold - er, cold - er. The years they turn. they turn!



Fl. *f*

Ob. *f*

Cl. *f*

Bsn. *f*

Hn. 1

Trpt

Vib.

S.  
ra ae - ter - nam. Ter - ra ae - ter - nam.

A.  
ra ae - ter - nam. Ter - ra ae - ter - nam.

T.  
— Ter - ra ae - ter - nam.

B.  
— Ter - ra ae - ter - nam.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

144

Fl.

Ob.

Cl.

Bsn.

Hn. 1

Trpt

Vib.

S.

A.

T.

B.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

Ter - ra ae - Ter - ra ae - Ter - ra ae - ter - nam!\_ Ae - ter -

Ter - ra ae - Ter - ra ae - Ter - ra ae - ter - nam!\_ Ae - ter -

Ter - ra ae - Ter - ra ae - Ter - ra ae - ter - nam!\_ ae - ter - nam!\_

Ter - ra ae - Ter - ra ae - Ter - ra ae - ter - nam!\_ ae - ter - nam!\_

1E

The Winter Wind

♩ = 102

155

Fl.

Ob.

Cl.

Bsn.

*mf*

*mf*

*mf*

*mf*

Hn. 1

Trpt

Vib.

Sel.

On the wind, the win-ter wind, ——— come a

S.

nam! ter - nam! nam! ter nam! ———

A.

nam! ter - nam! nam! ter nam! ———

T.

ter - nam! nam! ter nam! ———

B.

ter - nam! nam! ter nam! ———

1E

♩ = 102

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*p*

*p*

*p*

*p*

*p*

ARCO

167

Fl.

Ob.

Cl.

Bsn.

Sel.

breath of change. Chill, cold, en - vel - ops souls,

Fl. *f*

Ob. *p*

Cl. *f*

Bsn. *f*

Hn. 1 *p*

Trpt *p*

Sel. spread - ing through our veins. a smell, a taste, a

Bar. *mf* A smell, a taste,

S. *mf* A smell, a taste,

A. *mf* A smell, a taste,

T. *mf* A smell, a taste,

B. *mf* A smell, a taste,

Vln. 1 MUTE OFF *mf*

Vln. 2 MUTE OFF *mf*

Vla. MUTE OFF *mf*

Fl. *pp*

Ob. *pp*

Cl. *pp*

Bsn. *pp*

Hn. 1 *p* MUTE IN

Trpt *p* MUTE IN

Sel.  
jump in the shad-ows the curse that vis-its the Caines!\_\_\_

Bar.  
a jump in the shad ows the curse that vis-its the Caines!\_\_\_

S. *p* *pp* *p*  
a jump in the shad ows. Crush ing.\_\_\_\_ (ng) Crush ing.\_\_\_\_

A. *p* *pp* *p*  
a jump in the shad ows. Crush ing.\_\_\_\_ (ng) Crush ing.\_\_\_\_

T. *p* *pp* *p*  
a jump in the shad ows. Crush ing.\_\_\_\_ (ng) Crush ing.\_\_\_\_

B. *p* *pp* *p*  
a jump in the shad ows. Crush ing.\_\_\_\_ (ng) Crush ing.\_\_\_\_

Vln. 1 *p* *mp*

Vln. 2 *p* *mp*

Vla. *p* *mp*

Vc. MUTE OFF *mf* *p* *mp* PIZZ  
cello

Db. *mp*

1F

The Days

♩ = 68

191

Fl.

Ob.

Cl.

Bsn.

Trpt

Bar.

OLDER AIDEN *mp*

The days get dark-er each year. The old grow old-er the cold grows

S.

A.

T.

B.

*pp* *p* *pp*

(ng) Crush ing. (ng)

1F

♩ = 68

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*mp*

*mp*

*mf*

*mp*

ARCO

*mp*

204

Bar. *(sotto voce) mf* *f*

cold-er the west-er-ley wind of win-ter is here. Each year on the wind, the west-er-ley wind, she blows in

Vln. 1

Vln. 2

Vla. *mp*

Vc.

Db.



213

Bar. *p* *mp* *mf* *f* *(sotto voce) mp* **1G**

soft-ly at first, sweet-ly and light ly, a gust through my hair, a breath on my face, ling - ering,

Vln. 1 **1G** *mp*

Vln. 2 *mp*

Vla. *mf*

Vc.

Db.

Fl. *mf* 3 3 3

Ob. *mf*

Cl. *mf* 3 3 3

Bsn. *mf*

Bar. (HEAD VOICE) *p* *mf* 3 3 3

like our first kiss, \_\_\_\_\_ caus-ing a stir, mak-ing me tin-gle lay-ing it bare. the

Vln. 1 *mf* *p* *mp*

Vln. 2 *mf* *p* *mf* *mp*

Vla. *mf*

Vc.

Db.

Fl. *p* *p* *pp*

Ob. *p* *p* *pp*

Cl. *p* *p* *pp*

Bsn. *p* *p* *pp*

Hn. 1 *mp* *p*

Vib. motor on (med slow) L.V.  
*mf* *p* *pp*

Bar. *p*  
 mem-o-ry, the mem-o-ry.

Vln. 1 *pp*

Vln. 2 *pp*

Vla. *pp*

Vc. PIZZ

Db. PIZZ

♩ = 78 A Whim

2A

Flute *mf*

Oboe *mf* *mp*

Clarinet in Bb *mp*

Bassoon *mf* *mp*

♩ = 78 2A Lyrical, tender

Violin 1 *mp* *mf*

Violin 2 *mp* *mf*

Viola *mp*

Violoncello *mp* *mf* ARCO PIZZ

Double Bass *mp* *mf* ARCO PIZZ



240 LORETTA:

Lor. wat-ering the crop! Care - ful dream - y!

AIDEN: (peeing in paddock) SPEAK: SING:

Aiden Oh! stream of con seious næss. G'-

Vln 1 *mp*

Vln 2 *mp*

Vla

Vc *mp*

Db *mp*

245

Lor. *A whim! that's all, a waft of wind.*

Aiden *day. Aid-en How can I help? Whabrings you here?*

Vln 1

Vln 2

Vla *mf mp*

Vc

Db

251

Lor. *some-ting like that. On the wind\_\_\_\_\_ as ran-dom as that and*

Aiden *You blew in. With-out care or re-gard*

Vln 1 *mf*

Vln 2 *mf 3*

Vla *mf*

Vc *ARCO*

Db *mf*

257

Lor. **SPEAK** **2B** **SING**  
*f*  
 look what I find! A boy! You wish! I see a fine figure of a

Aiden  
 A man! You're going to stand and in-sult me?

Vln 1 **2B**  
*f-p* *mf* *mp*

Vln 2  
*f-p* *mf* *mf* *p*

Vla  
*f-p* *mf* *mf* *p*

Vc  
*f-p* *mf* *mf* *p*

263

Ob

Cl

Bsn

Lor. *mp*  
 man. of a man you could on - ly find on this farm. Filth-y with charm and

Aiden  
 Strap-ping!

Vln 1

Vln 2  
*mf* *p* *mf*

Vla  
*mf* *mf*

Vc  
*mf* *mf*

Db  
 ARCO

269

Ob

Cl

Bsn

Lor.

fire in your eyes,

Vln 1

*mf*

Vln 2

*mf*

Vla

*mf*

PIZZ

Vc

*mp*

PIZZ

Db

*mp*



272

Ob

Cl

Bsn

Lor.

an ember is dying. is almost extinguished.

Vln 1

Vln 2

Vla

Vc

Db

276 **2C** Leave Hello to You

Fl *mp mf > pp mp mf > pp sim*

Ob *mp mf > pp mp mf > pp sim*

Cl *ff mp mf > pp mp mf > pp sim*

Bsn *ff mf*

Hn *ff*

Snare Drum  
S. D. *p < f p < f p < f p < f*

Lor. *mf*  
hel-lo to you!

Sel. SELENA: SPOKEN *mp* SING *f*  
leave now leave now! a-

**2C** PIZZ (strum) *ff*

Vln 1 *ff*

Vln 2 *ff*

Vla *ff*

Vc (PIZZ) *f* ARCO *mf*

Db *f* (PIZZ) *mf*

282

Fl  
Ob  
Cl  
Bsn  
Sel.  
Aiden  
Vc  
Db

way from here!      Tres - pass - ing!

she's just pas - sing by.      Come on mum!      Let's in - tro - duce you.

288

Fl  
Ob  
Cl  
Bsn  
Lor.  
Sel.  
Vln 1  
Vln 2  
Vla  
Vc  
Db

mf f > mp      mf f > mp

mf f > mp      mf f > mp

mf f > mp      mf f > mp

mf

mf

Go!      Lor - et - ta,      my name is Lor -

PIZZ (strum)      ARCO

ff      mf > mp

PIZZ (strum)      ARCO

ff      mf > mp

SLAP PIZZ      ARCO

ff      mf > mp

ff      mf > mp

f      mf

f      mf

2D

Just Walking Past

293

Fl

Ob

Cl

Bsn

S. D.

*mf*

*f-p*

*ff*

(measured roll-sextuplets)

Lor.

(interrupted)

e(t)

Sel.

*f*

I don't care for your name, don't care for your bus'-ness, there's no need for your type a - round here!

2D

Vln 1

*f*

PIZZ

*ff*

Vln 2

*f*

PIZZ

*ff*

ARCO

*mp*

Vla

*f*

PIZZ

*ff*

ARCO

*mp*

Vc

*f*

*ff*

*mp*

Db

(PIZZ)

*mp*

299 *mf*

Lor. Your type? What does it mean? A strang - er a blow in? No bus' ness,

Vln 1 *mp* ARCO

Vln 2 *mp*

Vla *mp*

Vc *mp*

Db *mp*

304

Cl *ff*

Hn *ff*

S. D. *p < f p < f p < f*

Lor. talk, id-le talk. A girl is just walk ing past!

Sel. *mp* So pass, pass,

Vln 1 *mp* PIZZ *ff*

Vln 2 *mp* PIZZ *ff* SLAP PIZZ

Vla *mp* PIZZ *ff*

Vc *mp* PIZZ *f*

Db *mp* PIZZ *f* ARCO

310

Cl

Hn

S. D.

Sel.

Vln 1

Vln 2

Vla

Vc

Db

*p < f p < f p < f p < f p < f p < f*

pass! Take a hike! On yer bike! Go on! **SPEAK**  
*ff* **Piss off!**

ARCO *ff*

ARCO *ff*

ARCO *ff*

ARCO *ff*

2E

316

Fl *mp*

Ob *mp*

Cl *mp*

Bsn *p*

Hn *p*

S. D. *ff*

Aiden *mf* Pleading

Hey Mum! Mum, give it a rest!

2E

Vln 1

Vln 2 *p*

Vla *fp* *p*

Vc *fp* *p* PIZZ

Db *fp* *p* PIZZ

Fl *mf* *mf* *mf* *mf*

Ob *mf* *mf* *mf* *mf*

Cl *mf* *mf*

Bsn *mf*

Hn *mf*

Lor. *f*  
I'm go-ing.

Sel. *f*  
Get go-ing. 3  
None of her bus'-ness.

Aiden *f*  
Why do you do this? The world is-n't out

Vln 1 *p*

Vln 2 *p*

Vla *mp*

Vc *mp*

Got Us

Poco Rubato - recitativo

329

Fl  
Ob  
Cl  
Bsn  
Hn

*p*  
*mf*  
*p*  
*p*

Poco rubato, recitativo

*mf*

Sel.  
No, it's not. It's got us. Right here. It's got us. Right here!

Aiden  
to get you, you know? Got us.

Poco rubato, recitativo

Poco Rubato - recitativo

Vln 1  
Vln 2  
Vla  
Vc

*mp*  
*mp*  
*mp*  
ARCO  
*mp*

Just Saying Hello

A Tempo

2F

337

Fl

Ob

mf 3 3 3

mp

mf

Detailed description: This block contains the musical notation for the Flute (Fl) and Oboe (Ob) parts. The Flute part begins at measure 337 with a treble clef and a key signature of one sharp (F#). It features a melodic line with slurs and accents, including three triplet markings. The Oboe part is in the same key signature and features a more static, harmonic accompaniment with slurs and accents. Dynamic markings include *mf* and *mp*.

Sel.

*mf* *f*

There'll be no more flirt ing. You hear me?

Detailed description: This block contains the musical notation for the Soloist (Sel.) part. It is written in a treble clef with a key signature of one sharp (F#). The melody is simple and conversational, with dynamic markings of *mf* and *f*. The lyrics "There'll be no more flirt ing. You hear me?" are written below the notes.

A Tempo

2F

Vln 1

Vln 2

Vla

Vc

mf 3 3 3

mp

mf

mp

Detailed description: This block contains the musical notation for the string ensemble, including Violin 1 (Vln 1), Violin 2 (Vln 2), Viola (Vla), and Violoncello (Vc). The Violin 1 part has a treble clef and a key signature of one sharp (F#), featuring a melodic line with slurs and accents, and triplet markings. The Violin 2 part has a treble clef and a key signature of one sharp (F#), with a more static accompaniment. The Viola part has an alto clef and a key signature of one sharp (F#), with a static accompaniment. The Violoncello part has a bass clef and a key signature of one sharp (F#), with a static accompaniment. Dynamic markings include *mf* and *mp*.





3A

Anguish of Earth

♩ = 100

Flute *mf* *ff* *f-p* *ff*

Oboe *mf* *ff* *f-p* *ff*

Clarinet in Bb *ff*

Bassoon *ff*

Horn in F *ff* open

Trumpet in Bb *ff*

Percussion *f* *ff* *mf* *fp* *mf* *ff*

Soprano *f* Ang - uish of Earth!

Alto *f* Ang - uish of Earth!

Tenor *f* Ang - uish of Earth!

Bass *f* Ang - uish of earth!

♩ = 100

3A

Violin 1 ARCO *ff*

Violin 2 ARCO *ff*

Viola ARCO NON DIV *ff*

Violoncello ARCO *ff*

Double Bass ARCO *ff*

FL. *f-p*

Ob. *pp* *f-p*

Cl. *pp* *f-p*

Bsn. *f-p*

Hn. *ff*

Trpt *p* *f*

Perc. *f* 6

S. *sub p* *sub p* *p* *f*  
 Fes-ters slith-ers 'neath the soil, creep-ing groan-ing farm-ers' toil, fes-ters slith-ers 'neath the soil with farm ers' toil!

A. *sub p* *sub p* *p* *f*  
 Fes-ters slith-ers 'neath the soil, creep-ing groan-ing farm-ers' toil, fes-ters slith-ers 'neath the soil with farm ers' toil!

T. *sub p* *sub p* *p* *f*  
 Fes-ters slith-ers 'neath the soil, creep-ing groan-ing farm-ers' toil, fes-ters slith-ers 'neath the soil with farm ers' toil!

B. *sub p* *sub p* *p* *f*  
 Fes-ters slith-ers 'neath the soil, creep-ing groan-ing farm-ers' toil, fes-ters slith-ers 'neath the soil with farm ers' toil!

Vln. 1 *ff*

Vln. 2 *ff*

Vla. *p* *mf* *ff*

Vc. *p* *mf* *ff*

Db. *ff*

382 **3B**

Fl. *f ff*

Ob. *f ff*

Cl. *f ff*

Bsn. *f ff*

Hn.

Trpt

Perc. Cymbals *p < f* Snare Drum L.V. *pp p mp*

S. *mp*  
with farm - ers, Till - ing ploug - ing chip - ping turn - ring churn - ing stir - ing churn - ing tens - ing

A. *mp*  
with farm - ers, Till - ing ploug - ing chip - ping turn - ing stir - ring churn - ing stir - ing churn - ing tens - ing

T. *mp*  
with farm - ers, Till - ing ploug - ing chip - ping turn - ing stir - ring churn - ing stir - ing churn - ing tens - ing

B. *mp*  
with farm - ers, Till - ing ploug - ing chip - ping turn - ing stir - ring churn - ing stir - ing churn - ing tens - ing

**3B**

Vln. 1 *f-pp*

Vln. 2 *f-pp*

Vla. *f-pp*

Vc.

Db.

388

3C

Fl. *f-p* *f* *ff*

Ob. *f-p* *f* *ff*

Cl. *f-p* *f* *ff*

Bsn. *f-p* *f* *ff*

Hn. *ff*

Trpt *f*

S. D. *mf* *f* *f* Percussion TOMS Cymbals *pp*

S. *f* *mp*  
 stir with Vip-er's coil! with vip - ers' Ven - om burn - ing steal - ing yearn - ing tongue of fire and

A. *f* *mp*  
 stir with Vip-er's coil! with vip - ers' Ven - om burn - ing steal - ing yearn - ing tongue of fire and

T. *f* *mp*  
 stir with Vip-er's coil! With vip - ers Ven - om burn - ing steal - ing yearn - ing tongue of fire and

B. *f* *mp*  
 stir with Vip-er's coil! With vip - ers Ven - om burn - ing steal - ing yearn - ing tongue of fire and

3C

Vln. 1 *ff* *f-pp*

Vln. 2 *ff* *f-pp*

Vla. *ff* *f-pp*

Vc. *ff*

Db. *ff*

Fl. *f* *p* *f*

Ob. *f* *p* *f*

Cl. *f* *p* *f*

Bsn. *f* *p* *f*

Hn. *f* *mp* *f* *mf* *f* *f* *f* *f*

Trpt *f* *f*

Cym. *p* *f* *f* *p*

S. *ff*  
 fu - ry fire and fu - ry fire and fu - ry fire and Ash! Fill-ing skies, char coaled

A. *ff*  
 fu - ry fire and fu - ry fire fire fu ry Ash! Fill-ing skies, char coaled

T. *ff*  
 fu - ry fire and fu - ry fire and fu - ry fire and Ash! Fill-ing skies, char coaled

B. *ff*  
 fu - ry fire and fu - ry fire and fu - ry fire and Ash! Fill-ing skies, char coaled

Vln. 1 *ff*

Vln. 2 *ff*

Vla. *ff*

Vc. *f* *mp* *f* *mf* *f* *ff*

Db. *ff*

401

Fl. *fp* *ff*

Ob. *fp* *ff*

Cl. *fp* *f*

Bsn. *fp* *f*

Hn. *fp* *ff*

Trpt *ff*

Perc. *f* *mf* *f*

S.  
Fire and fu - ry Char - coaled - -souls! \_\_\_\_\_

A.  
Fire and fu - ry Char - coaled souls! \_\_\_\_\_

T.  
Fire and fu - ry char coaled souls! \_\_\_\_\_

B.  
Fire and fu - ry char - coaled souls! \_\_\_\_\_

Vln. 1 *gliss.*

Vln. 2 *gliss.* *(ff)*

Vla. *ff*

Vc. *ff*

Db. *ff*

3D Cain DUO

♩ = 96

407

Fl.

Ob.

Cl.

Bsn.

Hn.

Trpt.

Perc.

Sel.

S.

A.

T.

B.

*f* *ff*

*f* *ff*

*f* *ff*

*ff* *f*

Tam-tam (L.V.)

SELENA *mf*

Aid en Caine, just like his bro ther, can't keep his

3D ♩ = 96

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*f* *ff*

*f* *ff*

*f* *ff*

*f* *ff*

*f* *ff*

*f* *ff*

gliss.

MUTE ON ARCO *mf*

MUTE ON ARCO *mf*

MUTE ON ARCO *mf*

MUTE ON ARCO *mf*

*mf*

417

Sel. eyes on the job.

Aiden *mf*  
Sel - en - a Caine, pil-lar of strength. Salt of the earth, wo - man of wo - men.

Vln. 1 *mf* > *mf* > *mf* > *sim*

Vln. 2 *mf* > *mf* > *mf* > *sim*

Vla. *mf* > *mf* > *mf* > *sim*

Vc. *mf* > *mf* > *mf* > *sim*

Db. *mf*

PIZZ



3E

428

Sel. Drool ing lust- ing wast-ing his life, dream - er day - dream - er.

3E

Vln. 1 *sim*

Vln. 2 *sim*

Vla. *sim*

Vc. PIZZ

Db.

436 *mf* *f* *mf* port

Aiden Wom-an of wom-en, light of the town. Work-er hard work-er, moth-er and weird-o!

Vln. 1 *sim* *mf*

Vln. 2 *sim* *mf*

Vla. *sim* *mf*

Vc.

Db.

**3F** rubato ad lib

444  $\text{♩} = 78$  Duo Recitativo

Sel. The young-er son will learn, he will learn, will learn.

Aiden You can't have him back, you know.

**3F**  $\text{♩} = 78$

Vln. 1 *mp* *f-mp* *mp*

Vln. 2 *mp* *f-mp* *mp*

Vla. *mp* *f-mp* *mp*

Vc. *mp* *f-mp* *mp*

Db. *f-mp* *mp*

ARCO

3G

A Tempo ♩ = 96  
a tempo

Duo a tempo

Sel. 453 *f*  
Aid en Caine, just like his bro- ther, can't keep his eyes

Aiden *f*  
Sel - en - a Caine, pil-lar of strength. Salt of the earth,

A Tempo ♩ = 96

3G

Vln. 1 MUTE OFF PIZZ *mf*

Vln. 2 MUTE OFF PIZZ *mf*

Vla. MUTE OFF PIZZ *mf*

Vc. MUTE OFF PIZZ *mf*

Db. PIZZ *mf*



461

Ob. *mp*

Sel. on the job. Drool - ing lust - ing wast-ing his life, dream -

Aiden wo - man of wo - men. wom-en, light of the town. Work-er hard

Vln. 1

Vln. 2

Vla.

Vc.

Db.

468

Ob. *mp mp mp p*

Cl.

Bsn. *mf*

Hn. *mf*

Sel. *port*  
- er day - dream - er.

Aiden *port*  
work-er, moth - er and weird - o!

S. *mp*  
Mmm

A. *mp*  
Mmm

T. *mp*  
Mmm

B. *mp*  
Mmm

Vln. 1 *f mf p* ARCO

Vln. 2 *f mf p* ARCO

Vla. *mf < f* *mf p* ARCO

Vc. *f mf p*

Db. *f mf*

♩ = 100

**3H** Beneath the Soil

478

Fl. *p* *f*

Ob. *p* *f*

Cl. *p* *f*

Bsn. *p* *f*

Hn. *p* *f* MUTED

Trpt. *f* MUTED *mf*

S. *p* *pp* *mp* *pp* DIV

A. *p* *pp* *mp* *pp*

T. *p* *pp* *mp* *pp*

B. *p* *pp* *mp* *pp*

Fes-ters slith-ers 'neath the soil.

♩ = 100

**3H**

Vln. 1

Vln. 2

Vla.

Vc. *mf* *ff* *mf* SOLO 3

Fl. *f*

Ob. *f*

Cl. *f*

Bsn. *f*

Hn. *f*

Trpt. *mf*

S. *pp* *mp* *p* *mp* *P* *mp* *pp*

A. *pp* *mp* *p* *mp* *P* *mp* *pp*

T. *pp* *mp* *p* *mp* *P* *mp* *pp*

B. *pp* *mp* *p* *mp* *P* *mp* *pp*

Fes-ters be-neath the soil, the soil, be neath the soil.

Vln. 1

Vln. 2

Vla.

Vc. *f* *p* *mf* *f*

495

Fl.

Ob.

Cl.

Bsn.

Hn.

Trpt

Aiden

S.

A.

T.

B.

Vln. 1

Vln. 2

Vla.

Vc.

*mf*

*f*

*mf*

*p*

Stop Mum, let go!

*mf* *ff* *mf* *f* *mf* *f* *mf*

♩ = 72  
**31**

503

Fl. *mf* *p* *mf*

Ob. *mf*

Cl. *mf*

Bsn. *mf*

Hn. *mf* OPEN

Sel. *mp* Recitativo  
Gen - er - a - tions of

Aiden *f* *mf*  
Stop. Let go!

**31** "mp then colla parte"  
ARCO *mp*

Vln. 1 *mp*

Vln. 2 *mp*

Vla. *mp*

Vc. *f* *mf* *mp*

Db. *mf* *mp* PIZZ

512 *mf* *mp*

Sel. death, Sprout ing our mis-er - y. Su - gar, sweet sug - ar

Vln. 1

Vln. 2

Vla.

Vc.

Db.



520 *mf* *f* a tempo

Sel. sick - ly sweet sug - ar, grows up a - round us lock-ing us in, a pri-son in our own

Vln. 1

Vln. 2

Vla.

Vc.

Db.

526

Sel. home ne-ver can leave will ne-ver for-get the land will ne-ver let go

Vln. 1

Vln. 2

Vla.

Vc.

Db.



532 8va if nec.  
mp

Sel. I can ne-ver let go!

Vln. 1

Vln. 2

Vla.

Vc.

Db.

ARCO

Prelude to the Dance

**3J** ♩ = 70 playful dance

540

Fl. *mf*

Ob. *mf*

Cl. *mf*

Bsn. *mf*

Hn. *mf*

**3J** ♩ = 70 playful dance

Vln. 1

Vln. 2

Vla.

Vc.



546

Fl. *f*

Ob. *f*

Cl. *f*

Bsn.

ARCO

Vln. 1 *mf*

Vln. 2 *mf*

Vla. *mf*

Vc. *mf*

554

Fl. *mf*

Ob. *mf*

Cl. *mf*

Bsn. *mf*

Hn. *mf*

Vln. 1 *mf*

Vln. 2 *mf*

Vla. *mf*

Vc. *mf*

Detailed description: This page of a musical score covers measures 554 through 559. The score is arranged in a system with eight staves. The instruments are Flute (Fl.), Oboe (Ob.), Clarinet (Cl.), Bassoon (Bsn.), Horn (Hn.), Violin 1 (Vln. 1), Violin 2 (Vln. 2), Viola (Vla.), and Violoncello (Vc.). The key signature has one sharp (F#), and the time signature is 4/4. The music is marked *mf* (mezzo-forte). The Flute part begins with a melodic line in measure 554, which is then taken up by the Oboe, Clarinet, and Bassoon in measure 555. The Horn part enters in measure 555 with a sustained note. The Violin 1 part has a melodic line in measure 554, while Violin 2, Viola, and Violoncello provide harmonic support with rhythmic patterns. The score includes various musical notations such as slurs, accents, and dynamic markings.

Is She Nice?

3K

561

Fl.

Ob.

Cl.

Bsn.

Hn.

Sel.

SELENA

*mf*

You smell good! I hope she's nice.---

3K

Vln. 1

Vln. 2

Vla.

Vc.

Db.

ARCO

*mf*

568

Sel. Is she nice? — ZANE playful! I know where you got it from!

Z/A You don't trust my taste? She's a breath of fresh

Vln. 1 *8va*

Vln. 2

Vla.

Vc.

Db.

576

Fl. *mf*

Ob. *mf*

Cl. *mf*

Bsn. *mf*

Hn. *mf*

Z/A *f*  
air, of fresh air! of fresh air!

Vln. 1 *(8)*

Vln. 2

Vla.

Vc.

584 3L Just You Wait!

Fl. *mp*

Ob. *mp*

Cl. *mp*

Bsn. *mp*

Hn.

Yng. Aiden *f*  
Like a breath of fresh air

Vln. 1 *mp*

Vln. 2 *mp*

Vc. *mp*

591

Yng. Aiden *mf*  
Zane and Lot-tie sit-ting in a tree they're kiss-ing kiss-ing sit-ting in a tree

Z/A *f*  
Lit-tle brat! You wait! Just wait til it's your turn! just

Vln. 1 *f* *mp*

Vln. 2 *f* *mp* PIZZ ARCO

Vla. *f* *mp* PIZZ SOLO ARCO

Vc. *f* *mp* PIZZ *mf*

Db. *mp*

599

Fl. *mf*

Ob. *mf*

Cl. *mf*

Bsn. *mf*

Hn. *mf*

Z/A

wait you!

604

Fl. *p* *mp*

Ob. *mp*

Cl. *p* *mp*

Bsn. *p*

Hn.

Sel. *Liberamente*

He's gone Zane's gone.

*rall.*  $\text{♩} = 72$

**3M**

MUTE ON

*p*

*p*

*p*

*p* **TUTTI**

*p*

Fl.

Ob.

Cl.

Hn.

Sel.

Vln. 1

Vln. 2

Vla.

Vc.

*mp*

(lower line if tessitura allows)

Bur - ied un - der the farm.

Detailed description: This page of a musical score contains eight staves. The top three staves are for Flute (Fl.), Oboe (Ob.), and Clarinet (Cl.). The fourth staff is for Horn (Hn.), featuring a dynamic marking of *mp* and a long, sustained note with a hairpin. The fifth staff is for Saxophone (Sel.), with the instruction "(lower line if tessitura allows)" above it and the lyrics "Bur - ied un - der the farm." below. The bottom four staves are for Violin 1 (Vln. 1), Violin 2 (Vln. 2), Viola (Vla.), and Violoncello (Vc.). The score includes various musical notations such as rests, notes, slurs, and dynamic markings.

4A

She Saw Us

621 ♩ = 112

Fl. *mp*

Ob. *mp*

Cl. *mp*

Bsn. *mp*

Hn. *mp*

Lor. *mf*  
she saw us! she

Aiden *mf*  
she's blind as a bat!

4A MUTE OFF

Vln. 1 *mp* > *mp* > *mp* PIZZ

Vln. 2 MUTE OFF *mp* > *mp* > *mp* PIZZ

Vla. MUTE OFF *mp* > *mp* > *mp* PIZZ

Vc. *p* *mf* PIZZ *mp*

Db. *p* *mf* PIZZ

Bsn.

Hn.

Lor. saw us she saw us! Blind as a bat.

Aiden she is blind as a bat! Blind as a bat. And just as bat-ty! (sotto voce) mp

Vln. 1 ARCO mf f-mp f-mp PIZZ f

Vln. 2 ARCO mf f-mp f-mp PIZZ f

Vla. ARCO mf f-mp f-mp PIZZ mp

Vc. ARCO mf f-mp f-mp PIZZ mp

Db. (PIZZ) f

634

Fl. *mp*

Lor. *f*  
she saw us!

Aiden *f*  
Blind as a bat!

Vln. 1 *mp* ARCO PIZZ *f* *p* ARCO

Vln. 2 *mp* ARCO PIZZ *f* *p* ARCO

Vla. *mp* ARCO *mf* *mp* ARCO

Vc. *f* *mf* *p* PIZZ ARCO

Db. *mp* *f* *mf* *p* PIZZ ARCO

640

Fl. *mf*

Cl. *mf*

Lor. *mf* *f*  
Stop it! *p* stop, you don't know me! *f*

Aiden *f*  
I thank the wind for blow-ing you in huh? (half spoken) One day one day is e-nough I know I

Vln. 1 *mf* *f* *mf*

Vln. 2 *mf* *f* *p* *mf*

Vla. *mf* *f* *p* *mf*

Vc. *mf* *f* *p* *mf*

Db. *mf* *f*

4B This Spot

648

Fl.

Ob.

Cl.

Bsn.

Lor.

*mf* You don't know, *f* to de-fy your moth - er!

Aiden

know e-nough I know! *mf* I know e nough! *p* Won't

4B

Vln. 1

Vln. 2

Vla.

Vc.

Db.

PIZZ

*mf* *f*

656

Fl. *mf*

Ob. *mf*

Cl. *mf*

Perc. TOMS *p*  $\triangleleft$  *mf*

Aiden  
 find her way in here, won't come a-ny-where near it!

Vln. 1 *p* *mp* (div opt) *p* *mf* *mp* PIZZ

Vln. 2 *p* *mp* (div opt) *p* *mf* *mp* PIZZ

Vla. *p* *mp* *mf* *p* PIZZ

Vc. *mp* *mp* *mf* PIZZ

Db. ARCO *mp* *mp* *mf* PIZZ

Poco Meno ♩ = 108

662

Ob. *mp* *mp*

Cl. *mp* *mf*

Bsn. *mf*

Hn. *mf*

SNARE DRUM

Perc. *pp p pp p pp p*

Lor. *p* near it? *mf* Near it?

Aiden *mf* Right here. This spot. This hal - lowed spot!

Poco Meno ♩ = 108

Vln. 1 *p*

Vln. 2 *p*

Vla. *p*

Vc. *p*

Db. *p*

ARCO *mp*

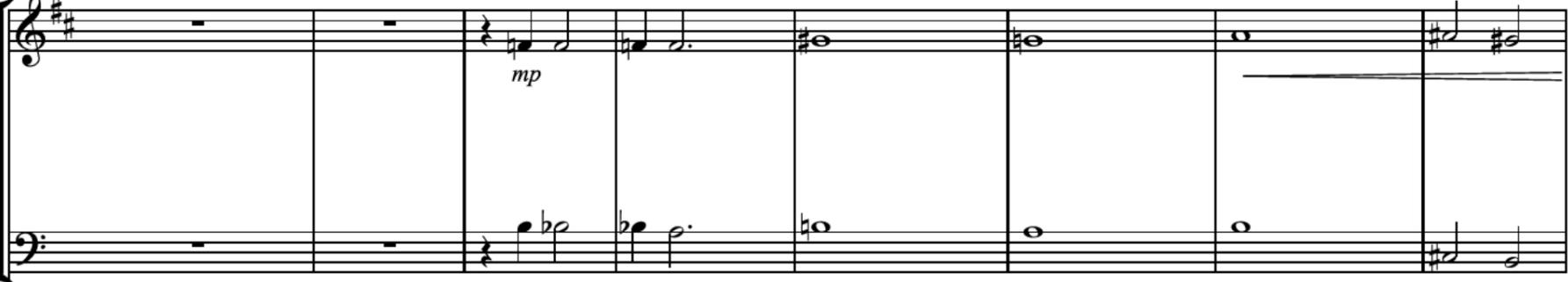
ARCO *mp*

ARCO *mp*

ARCO *mp*

670 **4C**

It is Hidden

Cl. 

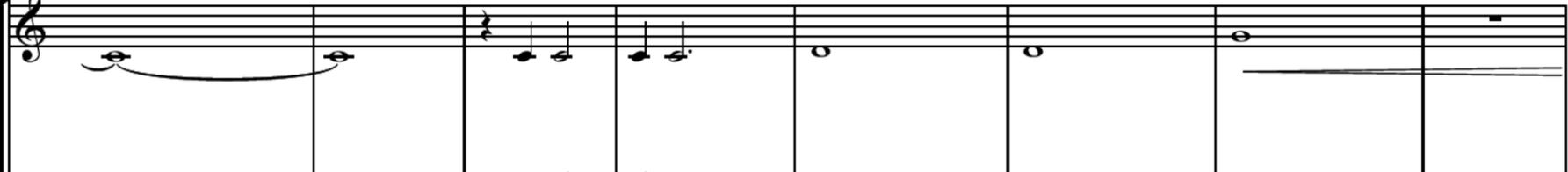
Bsn. 

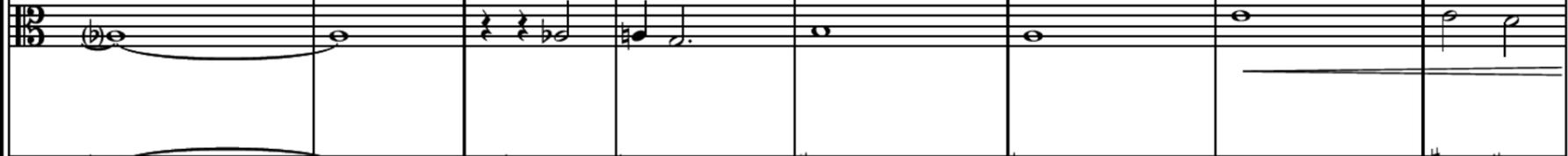
Hn. 

Lor. 

Aiden 

**4C**

Vln. 2 

Vla. 

Vc. 

Db. 

**4D** A Tempo ♩ = 112

678

Fl. *mp*

Ob. *f* *mp* *mf* *mp* *p* *pp*

Cl. *f* *mp* *mf* *mp* *p* *pp*

Bsn. *f* *mf* *mp* *p* *pp*

Hn. *f* *mf* *mp* *p* *pp*

Lor. I don't know that I like this!

Aiden

**4D** A Tempo ♩ = 112

Vln. 1 *f* *mp* *p* *PIZZ*

Vln. 2 *f* *mp* *p* *PIZZ*

Vla. *f* *mp* *p* *PIZZ*

Vc. *f* *mp* *p* *PIZZ*

Db. *f* *mp* *p* *PIZZ*

*ARCO*



706

Lor. *mf*  
It's not, at all, what I ex - pec - ted! not what I ex - pec - ted!

Aiden  
think of the su - gar cane? Wha - da - ya think, \_\_\_\_\_ What do you

Vln. 1 *mf* *p* *mf* *p*

Vln. 2

Vla.

Vc. *p* *mf*

Db.

713

Lor. *mf*  
Has the rough hewn ed - ges, of a hand - ful of earth! of a

Aiden  
think of the su gar cane? \_\_\_\_\_ of a hand - ful of earth!

Vln. 1 *mf*

Vln. 2

Vla.

Vc. *p* *mf*

Db.

4F

719

Fl. *mf*

Lor. *mf*  
hand-ful of earth! but the sy-rup, sweet sy - rup smooth in my-

Aiden

4F

Vln. 1 *p* *mp*

Vln. 2 *mp*

Vla. *mp*

Vc. *mp*

Db.



727

Fl. *p* *fp* *fp*

Ob. *fp* *fp*

Cl. *mf* *fp* *fp*

Lor. *mf* *f* *mf* *f* *mf*  
— mouth! makes my heart sing and my tongue ping what's the

Vln. 1 *DIV* *f* *PIZZ*

Vln. 2 *f* *PIZZ*

Vla. *mf*

Vc.



accel ... ♩ = 112

739

Fl. *f* *p*

Ob. *f* *p*

Cl. *f* *p*

Bsn. *f*

Hn. *f*

Lor. *f* *mf* *mp*  
 world a - way, of me - mo - ry. It is bit - ter - sweet, like like

Aiden *f* *mf* *mp*  
 world a - way, of me - mo - ry. It is bit - ter - sweet, like like

accel ... ♩ = 112

Vln. 1 *f* *mf* *f* PIZZ

Vln. 2 *f* *mf* *f* PIZZ

Vla. *f*

Vc. *f* *mf* PIZZ

Db. *f* *mf* PIZZ

Poco Meno ♩ = 102

747

Lor. *p*  
blood! like blood!

Aiden *p*  
blood! like blood!

Vln. 1 *mf* (PIZZ) *p* ARCO

Vln. 2 *mf* (PIZZ) *p* ARCO

Vla. *mf* ARCO

Vc. *mf* *p* ARCO

Db. *p*

4G

756 ARCO

Vln. 1 *mf* ARCO

Vln. 2

Vla.

Vc.

765

Vln. 1 *f*

Vln. 2 *f*

Vla. *f*

Vc. *mf* > *mp* *mf* *mp* > *p*



785

Fl. *f mp mf 3 3 3 f p pp*

Trpt *f mp mf 3 3 3 f p pp*

(8)

Vln. 1 *mf*

Vln. 2 *mp mp mp mp 3 mf*

Vla. *mp mp mp mp 3 mf*

Vc. *mp mp mp 3 mf*

Db. *mp 3 mf*

ARCO PIZZ



4I

790

Vln. 1 *mp*

Vln. 2 *mp*

Vla. *mp*

Vc. *mp mf*

Db.



# The Crushing

## Act 2

Rod Ainsworth

5A

You're it, Lott

(proof copy - June 2012)

Peter Rankine

951  $\text{♩} = 112$

Flute *mf*

Oboe 1 *mf*

Clarinet 1 in Bb *mf* *p* *mp*

Bassoon *mp*

Trumpet in C *mf* *p*

Vibraphone *mp*

958

Fl. *f*

Cl. *f*

Bsn. *f*

Vib. *f*

Vln. 1 *mp* *p* *f*

Vln. 2 *mp* *p* *f*

Vla. *mf* *f*

Vc. *f*

964

Fl. *mf* 6

Ob. *f* *mf* 6

Cl. *mf* 6

Bsn. *mf* 6

Hn. *mf* 6

C Tpt. *mf* 6

Vib. *mf* 6

Yng. Aiden **YOUNG AIDEN** *f* 6  
 Some-one is sit-ting in my tree! Some-one

Vln. 1 *mf*

Vln. 2 *mf*

Vla. *f*

Vc. *f*

Db. *f*

971

Cl. *f* 3

Bsn. *f* 3

Yng. Aiden Lott, you're it it's your turn now!

Zane **ZANE** *f* 3  
 Aid-en get a way! Get! for cry-ing out loud.

Vln. 1 *mf*

Vln. 2 *mf*

Vla. *mf*

Vc. *f* PIZZ

Db. *f* PIZZ

979 Liberamente

Fl. *mf*

Ob.

Bsn. *f > f > f > f > f > f*

Yng. Aiden *shout!*  
You're it Lott, it's your turn! NOW!

Zane *3*  
Ai-den, for cry-ing out loud! Get! Go!

Vln. 1

Vln. 2

Vla. *6*

Vc.

Db.

986 My Lovely Lott

Fl. *rall ...* **5B** ♩ = 72 *mf*

Zane **ZANE** *tenderly* *mf*  
My love-ly Lott my love-ly Lot in life... **Old Aiden**

O.A.

Vln. 1 **5B** ♩ = 72 *mf*

Vln. 2 *mf*

Vla. *mf* **ARCO**

Vc. *mf*

Db. **PIZZ** *mf*



1011

Fl. *mf*

Ob. *mf*

Cl. *mf*

Bsn.

Hn. *mf*

C Tpt. *mf*

Lor. let us let us let us I feel that now the time is

Zane let us let us let us

Vln. 1

Vln. 2

Vla. *mf*

Vc.

Db. *mf*



1038

Fl. *f* *mf*

Ob. *mf* *f* *mf* *mf*

Cl. *f* *mf* *mf*

Bsn. *mf* *f* *mf*

Hn.

Lor. *(mf)*  
bo-dy and one soul. This cut, I give my-self to you. With

Zane  
bo-dy and one soul. With our cut, I give my-self to you.

O.A.  
One ep-i-sode in his - to-ry. This life.

Vln. 1

Vln. 2

Vla.

Vc.

1048 **5D**

Fl. *mf*

Ob.

Cl.

Bsn. *mf*

Lor. *f* *mf*  
ev - ery drop of blood on the earth, a part of me be-comeswhole, and limb by limb I am cre - at - ed a -



Fl.

Ob.

Cl.

Bsn.

Hn.

C Tpt.

Vib.

Lor.

Zane

O.A.

S.

A.

T.

B.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*p* *mf* *mp* *p* *f*

*f* *f* *f* *f*

*p* *mf* *mp* *p* *f*

*mf* *mf* *f*

To B. D.

And brought in from the cold. Our fate! our fate!\_\_\_\_\_

bo - dy one soul\_\_\_\_\_ Sealed, sealed to ge-ther our fate!\_\_\_\_\_ our fate!\_\_\_\_\_

bo - dy one soul\_\_\_\_\_ Sealed, sealed to ge-ther our fate!\_\_\_\_\_ our fate!\_\_\_\_\_

bo - dy one soul\_\_\_\_\_ Sealed, sealed to ge-ther our fate!\_\_\_\_\_ our fate!\_\_\_\_\_

bo - dy one soul\_\_\_\_\_ Sealed, sealed to ge-ther our fate!\_\_\_\_\_ our fate!\_\_\_\_\_

bo - dy one soul\_\_\_\_\_ Sealed, sealed to ge-ther our fate!\_\_\_\_\_ our fate!\_\_\_\_\_

bo - dy one soul\_\_\_\_\_ Sealed, sealed to ge-ther our fate!\_\_\_\_\_ our fate!\_\_\_\_\_

*p* *mf* *p* *f*

*p* *mf* *p* *f*

*p* *mf* *p* *f*

*p* *mf* *p* *f* ARCO *p*

Fl. *mp* *mf*

Hn. *mf*

S. *pp* *mp* *pp* *pp*  
 Ter - ra, ter - ra ae - ter - nam, ter nam. Ae - ter nam.\_\_\_\_\_

A. *pp* *mp* *pp* *pp*  
 Ter - ra, ter - ra ae - ter - nam, ter nam. Ae - ter nam.\_\_\_\_\_

T. *pp* *pp* *pp*  
 Ter - ra, ter - ra ae - ter - nam, Ae - ter nam. Ae - ter nam.\_\_\_\_\_

B. *pp* *mp* *pp* *pp*  
 Ter - ra, ter - ra ae - ter - nam, ter Ae - ter nam.\_\_\_\_\_

Vln. 1 *mp* *mf*

Vln. 2 *mp* *mf*

Vla. *pp* *mp*

Vc. *pp* *mp*

Db. *PIZZ* *mf*

5E Born Anew

1084

Fl.

Ob.

Cl.

Hn.

C Tpt.

B. D.

Lor.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*mf*

*f*

To Vibraphone

*mf-p* *f* *mp*

Blood is let, the wind is still,

5E

ARCO

PIZZ

*mp*

*mp*

1093

Ob.

Lor.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*mp* *mf* *p*

life has been born a-new! Life be-gins, warmth has come I give my free-dom to you

*mp*

*mp*

*mp*

*mp*

1099

Fl. *f* *mf* *f* *mf*

Ob. *f* *mf* *f* *mf*

Cl. *f* *mf* *f* *mf*

Bsn. *f* *mf* *f* *mf*

Hn. *f*

C Tpt. *f* *mp* *f* *mp*

Lor. *f*

I have been trans formed, from wind and air. with this cut this scar, I give my-self to you

Vln. 1 *mf* *gliss.*

Vln. 2 *mf*

Vla. *mf*

Vc. *mf* ARCO

Db. *mf* ARCO



accel.

♩ = 84

The Wind is a Spirit

5F

1120

Fl. *f*

Ob. *f*

Cl. *f*

Bsn. *f*

Older Aiden

*mf*

The wind is a spi - rit, that vis-its this place, taun-ting with its breath.

accel.

♩ = 84

5F

Vln. 1 *f*

Vln. 2 *f*

Vla. *f*

Vc. *f* PIZZ

Db. *f*



1127

Ob. *f*

Cl. *f*

Bsn. *f*

O.A. *f*

A spi-rit\_ that can, with one cut\_ be come

Vln. 1 *f*

Vln. 2 *f*

Vla. *f*

Vc. *f*

Db. *f*

1134

Ob. *f*

Cl. *f*

Bsn. *f*

O.A. *f*

blood and flesh. But in that change from air to earth to mor - tal - i - ty comes

Vln. 1 *f* (f) TREM

Vln. 2 *f* TREM

Vla. *f* semis? TREM

Vc. ARCO

Db.

1141

O.A. *mf* *rall.* *mp*

deep - seat - ed un - rest re - leased re - leased on - ly by love,

Vln. 1 *pp*

Vln. 2 *pp*

Vla. *pp*

Vc. *pp* PIZZ

Db. *mp*

1151  $\text{♩} = 72$

Hn. *p*

Vib. Bass Drum (two beaters) *mp* *mp* *ff*

Sel. *mf* *f*  
This place, this place is built on blood.

O.A. *p*  
love, and death.

$\text{♩} = 72$

Vln. 1 Mute off *mf* NON-TREM *f*

Vln. 2 Mute off *mf* NON-TREM *f*

Vla. NON-TREM *f*

Vc. PIZZ *mf* *f*

Db. *mf* *f*

6A (FLUTE replacing CLARINET)  $\text{♩} = 92$   
Aiden's Loretta Humming

Flute *mf*  
Aiden's humming music - Aiden hums or whistles ... or clarinet plays cue

Clarinet 1 in Bb *mf*  
Aiden whistling to himself, sprucing himself up for the dance ...

Zane/Aiden *mf* *mf*  
Hmmm ...

6A  $\text{♩} = 92$

Violin 1 *mp*

Violin 2 *mp*

Viola *mp*

Violoncello *mp*

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1165

Fl.

Cl.

Bsn.

Hn.

C Tpt.

Vib.

Aiden

Vln. 1

Vln. 2

Vla.

Vc.

Side Drum

*f*

*mf*

gliss

gliss

*f*

*f*

1171

Hn.

C Tpt.

S. D.

SELENA  
Tempo recitativo

Sel.

Vln. 1

Vln. 2

Vla.

Vc.

*f*

*mf*

*mf*

*mf*

What do you think you're do- ing? You'd ig-nore your dut ies, for some hor-ri ble trick of a girl. You're blind! Blind, I

1176 FLUTE as FLUTE!!

Fl. *mf*

S. D. Temple Blocks *f*

Sel. *mp mf mp*  
 tell you! Hav-en't you heard of man - i - pu-la-tion. How dare you!

Aiden AIDEN *mf*  
 I live with it ev - ry day

Vln. 1 *mf f mf*

Vln. 2 *mf f*

Vla. *mf*

Vc. *mf*

1182

Fl.

Ob.

Cl. *mf*

T. Bl. *mf mp p*  
 to vibra ...

Sel. *mp mf mp*  
 You're struck, struck, with her mag-ic ap - peal. Struck with her charm, her blust-er - y free-wheel-ing

Vln. 1 *mp*

Vln. 2 *mf mp*

Vla. *mf mp*

Vc. *mf > mp* PIZZ *mf*

1189

Ob. *mf*

Sel. *mf* soul Far from it! She is trou-ble. *mf*

Aiden *mf* It is nat-ur-al.

Vln. 1 *mp* *mf*

Vln. 2 *mf*

Vla. *mf* *f*

Vc. PIZZ

Db. *mf*

1195

Ob.

Cl. *mf*

Lor. LORETTA: Here's trou-ble!

Sel. Mark my words!

Vln. 1 *mp*

Vln. 2 *mp*

Vla. *mp*

Vc. ARCO *mp*

Db. *mp*

6B

It's Nothing

♩ = 78

*mp*

1202

Lor. Warned. A-bout what?  
 Sel. Don't say you have - n't been warned!  
 Aiden *mf* No-thing. It's no-thing.  
 Vln. 1 *p*  
 Vln. 2 *p*  
 Vla. *p* PIZZ *mp* PIZZ *p* ARCO  
 Vc. *p* PIZZ *mp* ARCO *p*  
 Db. *p* ARCO *p*

6B

♩ = 78

Lor. You'll do what you can. Mad moth - er.  
 Aiden No thing that can't be ig-nored. to for - get my mo - ther. Moth-er who can't keep her mind off.  
 Vln. 1 *p*  
 Vln. 2 *p*  
 Vla. *p*  
 Vc. *pp* *p* *p* PIZZ *mf*  
 Db. *pp* *mf*

1214

Sel. Mo-ther who can't let go! No-thing will

Aiden Moth-er who's bit-ter and twist-ed as lem-on a moth-er who'll drown in her woe!

Vln. 1

Vln. 2

Vla. PIZZ *mf*

Vc.

1219

Lor. Mad mo-ther!

Sel. change it. No-thing wilchange it. But if on-ly you'd lis-ten. To mo-ther. If on-ly you'd

Aiden You can't bring himback Mad mo-ther!

Vln. 1

Vln. 2

Vla.

Vc.

1225 Side Drum

6C A Decade of Silence

S. D. *mp*

Sel. lis ten!\_

Aiden *mf*  
A dec ade of sil - ence a dec ade of fear, shel-ter - ing un - der the cane.

Vln. 1 *mf*

Vln. 2 *mf* ARCO

Vla. *mf*

Vc. *mf* PIZZ

Db. *mp* *cresc* *mf*

1230

Ob. *f*

S. D.

Aiden *f*  
Liv - ing in sha dow, locked in your head Can't bring him back! Can't make him flesh.

Vln. 1 *f* *f-mp*

Vln. 2 *f* *f-mp*

Vla. *f* *f-mp*

Vc. ARCO *mp*

1236

Ob.

S. D.

Aiden

Vln. 1

Vln. 2

Vla.

Vc.

*mf*

*mp*

*mf*

We ploughed him un - der. We let him fes - ter, and rot. Out

1242

Fl.

Ob.

Cl.

S. D.

Aiden

Vln. 1

Vln. 2

Vla.

Vc.

*f*

*f*

*f*

*p*

*f*

*mf*

*f*

*mp* (pitch or spoken)

there. We made him fes - ter and burn. Don't wait up.

6D

You Show Your Face

1250

$\text{♩} = 84$

Fl. *f*

Ob. *f*

Cl. *f*

Bsn. *f*

Hn. *ff*

C Tpt. *f* *fp* *f*

S. D. *f* *p* *f* *p* *f*

Sel. *f*

You\_ show your face. False in-no-cense.

$\text{♩} = 84$

6D

Vln. 1 PIZZ (strum) *ff* ARCO *mf*

Vln. 2 PIZZ (strum) *ff* ARCO *mf*

Vla. PIZZ *ff* ARCO *mf*

Vc. PIZZ *ff* *f*

Db. *ff* *f*

1255

Bsn.

Lor. *mf*  
It's that time of year I need love, a lov-er to

Sel.  
What brings you back? Why are you here? Time for what?

Vln. 1

Vln. 2

Vla. ARCO

Vc.

Db.



1261

S. D. Temple Blocks

Lor. *f*  
set me free. I tried, and I failed. So, here I am! If he's an-y-thing like his bro-ther?

Sel. *f*  
Go, find it some-where else! That,

Vln. 1

Vln. 2

Vla. *f*

Vc. *f*

ARCO

1267

Sel. won't hap pen a - gain.

Aiden E nough Mum. Time to let go! E nough.

Vln. 1 *p*

Vln. 2 *p*

Vla. *mp*

Vc. *p* *mf* *f* *mf* *f*

ARCO

1275

Fl.

Ob. *mf*

C Tpt. *mf*

Sel. Don't say you hav-en't been warnned.

Vln. 1

Vln. 2

Vla.

Vc. *mp* *p* *fp* ARCO PIZZ *p*

Db. *fp* *p*

1282 I Was Young

Fl.

Ob.

C Tpt.

To Vibraphone Vib.

T. Bl.

Old Aiden Older AIDEN *mf*

I was young, could not know. Blind as a bat!

S. *f*

He's blind as a bat!

A. *f*

Blind as a bat!

T. *f*

He's blind as a bat!

B. *f*

Blind bat!

Vln. 1 *mp* *mf*

Vln. 2 *mp* *mf*

Vla. *mp* *mf*

Vc. *mp* *mf*

Db. *mf*

6E

Revenge

1289

Hn.

C Tpt.

Sel.

Old Aiden

S.

A.

T.

B.

*mf*

*f*

*f*

Could not see my life in front of me Blind as a bat! All this re-mem-ber-ing

He's blind as a bat! All this re-mem-ber-ing stir-ring the fates

Blind as a bat! All this re-mem-ber-ing

He's blind as a bat! All this re-mem-ber-ing stir-ring the fates

Blind bat! All this re-mem-ber-ing

6E

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*mp*

*mf*

*f*

*mp*

*mf*

*f*

*mp*

*mf*

*f*

ARCO

ARCO

Cl. *f fp fp fp fp f*

Hn.

C Tpt.

Sel.  
claws at my mind, brings back all the hate! Fest-er-ing slith-er-ing und-er the skin with-ing and grasp-ing and

Old Aiden  
claws at her mind. All the hate. Fes - ter - ing slith - er - ing und - er the

S.  
claws at her mind, brings back all the hate! Fest-er-ing slith-er-ing und-er the skin with-ing and grasp-ing and

A.  
claws at his mind! all the hate! Fest - er - ing slith - er - ing un - der the

T.  
claws at her mind, brings back all the hate! Fest-er-ing slith-er-ing und-er the skin with-ing and grasp-ing and

B.  
claws at her mind! All the hate. Fest - er - ing slith - er - ing un - der the

Vln. 1

Vln. 2

Vla.

Vc. *fp fp fp fp f*

Db. *fp fp fp fp f*

Fl. *f* *f* 3 *mf* *f* 3

Ob. *f*

Cl. *f*

Bsn. *f*

Hn. *f* *mf* *f*

C Tpt. *f* 3 *mf* *f* 3

Sel. grasp-ing and writh - ing re-venge will be gin.\_\_\_\_\_

Old Aiden skin.

S. grasp-ing and writh - ing re-venge will be gin.\_\_\_\_\_ All this re-mem - b'ring. All this re-

A. re-venge will be gin.\_\_\_\_\_ blust-er- ing, blust-er- ing,\_\_\_\_\_ re-

T. grasp-ing and writh - ing re-venge will be gin.\_\_\_\_\_ blust-er- ing, All this re-mem - b'ring. blust-er- ing All this re-

B. skin. blust-er- ing, blust-er- ing,

Vln. 1

Vln. 2 *fp* *fp* *f*

Vla. *fp* *fp* *f*

Vc. *fp* *fp* *f*

Fl. *mf* *ff* *f* *ff* *f* *ff*

Ob. *ff* *f* *ff* *f* *ff*

Cl. *ff* *f* *ff* *f* *ff*

Bsn. *ff*

Hn. *mf* *f* *f* *f*

C Tpt. *mf* *f* *f* *f*

Sel. *ff*  
Re-venge Re-venge Re-venge

S. mem-ber-ing. re-venge re-venge re-venge

A. mem-ber-ing. re-venge re-venge re-venge

T. *f* *ff* *f* *ff* *f* *ff*  
mem-ber-ing Chok-ing blus-ter-ing, grasp-ing writh-ing re-venge Chok-ing blus-ter re-venge Grasp ing writh-ing re-venge

B. *f* *ff* *f* *ff* *f* *ff*  
Chok-ing blus-ter-ing, grasp-ing writh-ing re-venge Chok-ing blus-ter re-venge Grasp-ing writh-ing re-venge

Vln. 1 *ff* *f* *ff* *f* *ff*

Vln. 2 *ff* *f* *ff* *f* *ff*

Vla. *ff* ARCO *gliss.*

Vc. *ff* ARCO *gliss.*

Db. *ff* ARCO *gliss.*

1319

Fl.

Ob.

Cl.

Bsn.

Hn.

C Tpt.

Sel.

S.

A.

T.

B.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

will be gin... Let the fires burn... Let the fires burn... will be - gin... re-venge, re-venge, will be - gin.





7A

Fire Tango

1355  $\text{♩} = 96$   
*mf*

Lor. *I see fire\_\_\_\_\_ in your eyes,\_\_\_\_\_ an em-ber is dy - ing,*

7A

(8)  $\text{♩} = 96$

Vln. 1 *p* *mf* *mp* *mf* *mp* *mf* *mp* *mf* *mp* *mf* *mp*

Vln. 2 *p* *mf* *mp* *mf* *mp* *mf* *mp* *mf* *mp* *mf* *mp*

Vla. *p* *mf* *mp* *mf* *mp* *mf* *mp* *mf* *mp* *mf* *mp*

Vc. *PIZZ* *mf*

Db. *PIZZ* *mf*



1361

Lor. *al-most ex - ting ished, in need of a breath.\_\_\_\_\_ a life\_\_\_\_\_*

Vln. 1 *mf* *mp* *mf* *mp* *mf* *mp* *mf* *mp* *mf* *mp*

Vln. 2 *mf* *mp* *mf* *mp* *mf* *mp* *mf* *mp* *mf* *mp*

Vla. *mf* *mp* *mf* *mp* *mf* *mp* *mf* *mp* *mf* *mp*

Vc.

Db.

7B

1367

Fl. *mf*

Ob. *mf*

Cl. *mf*

Lor. *f*

al - most done. At nine - teen,

7B

Vln. 1 *mf*

Vln. 2 *mf*

Vla. *mf*

Vc. *mf*

Db. *mf*

ARCO



1372

Fl.

Ob.

Cl.

Lor.

a life\_ full\_ of pro - mise, but yours is a life of toil spent plough-ing the earth.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

1378

Fl. *f* *mf*

Ob. *f* *mf*

Cl. *f* *mf*

Bsn. *mf*

Lor. — A life with-out spark is a sin! Think of the winds \_\_\_\_\_ ig-nit ing your soul \_\_\_\_\_ re - lease the.

Vln. 1

Vln. 2

Vla.

Vc. ARCO

Db.

1385

Fl. *f*

Ob. *f*

Cl. *f*

Bsn. *f*

Lor. weight of the bag-gage of his - to-ry. \_\_\_\_\_ Let me breathe life, let me breathe life\_ in to you! I see

Vln. 1

Vln. 2

Vla.

Vc.

Db.

7C

MUTE IN - Harmon 1/2 stem

1392

C Tpt. *mp*

Lor. fire in your eyes, an em-ber is dy - ing, al-most ex -

7C

Vln. 1 *p*

Vln. 2 *mp*

Vla. *mp*

Vc. *mp*

Db. *mp*



1398

C Tpt.

Lor. tin(g) - guished, in need of a breath. a life

Vln. 1 *mf*

Vln. 2 *mf*

Vla. *mf*

Vc. *mf*

Db. *mf*

1404 **7D**

Hn.

C Tpt.

Lor.

al - most done. Let me breathe life in to you!

*f* *mp* *f*

**7D**

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*f* *mp* *ff* *f* *ff* *ARCO*

**7E**

VIB SOLO

1410

Vib.

*mp*

1416

Cl.

Vib.

*mf*

7F

♩ = 92

A Glimmer

1421

Cl. *f*

Bsn. *mf*

Vib. *f*

Old Aiden *mf*

A glim - mer of rec - og - ni - tion, gives way to sus -

♩ = 92

7F

Vln. 1 *mp*

Vln. 2 *mp*

Vla. *p* *mp* **ARCO**

Vc. *mf* *p* **ARCO**

7G

rall ...

♩ = 84

1426

Ob. *f*

Cl. *f*

Bsn. *f*

Hn. *f*  
OPEN

C Tpt. *f*

Vib. *ff*

Old Aiden  
pic - ion. I feel the ten - sion, I feel the charge in the air, the

S. *f*  
Charge in the air, the

A. *f*  
Charge in the air, the

T. *f*  
Charge in the air, the

B. *f*  
Charge in the air, the

rall ...

♩ = 84

7G

Vln. 1 *f*

Vln. 2 *f*

Vla. *f*

Vc. *f*  
*mf*

Db. *mf*  
ARCO

Fl. *f* *mf*

Ob. *mf*

Cl. *mf*

Bsn.

Hn.

C Tpt.

Vib. *mf*

Lor. **LORETTA** *mf*  
 Ter - ra ae - ter nam. a wail\_\_\_\_\_

Old Aiden *mf*  
 charge in the air, in the air, the air. Ter - ra ae - ter nam. a wail on the wind,

S. charge in the air, in the air, the air.

A. charge in the air, in the air, the air.

T. charge in the air, in the air, the air.

B. charge in the air, in the air, the air.

Vln. 1 *mf*

Vln. 2 *mf*

Vla.

Vc. NAT?/FLAT?

Db.

7H

1440

Fl.

Ob.

Cl.

Vib.

Lor.  
— on the wind. Ter - ra ae - ter nam. Ter - ra ae - ter-nam.e - ter - nal-ly

Old Aiden  
— a strange in-can - ta - tion, from a tur-bul-ant mind. Ter - ra ae - ter - nam. E - ter - nal-ly

S.  
Ter - ra ae - ter-nam.e - ter - nal-ly

A.  
Ter - ra ae - ter - nam.

T.  
Ter - ra ae - ter - nam.

B.  
E - ter - nal-ly

7H

Vln. 1  
*mf*

Vln. 2  
*mf*

Vla.  
*f*

Vc.  
*f*

Fl. *f*

Ob. *f* *>* *mf*

Cl. *f* *>* *mf*

Hn. *f* *>* *mf*

C Tpt. *mf*

Lor. here, a wail - ing wind. Ae - ter - nam!

Old Aiden here. E - ter - nal - ly walk - ing walk - ing the earth.

S. here, e - ter - nal - ly walk - ing walk - ing the earth. Ter - ra ae - ter - nam.

A. Ter - ra.

T. Ter - ra ae - ter nam.

B. here. E - ter - nal - ly walk - ing walk - ing the earth.

Vln. 1 *mf* *p*

Vln. 2 *mf* *p*

Vla. *p*

Vc. *p*

Db. *p*

ARCO

ARCO

Lust - recitativo  
tempo recitativo

1462 *f*

Old Aiden  
Lust, has hid-den the blind-ing-ly ob-vi-ous! Lust. has a lot to ans-wer for. Drawn to the flame!

tempo recitativo

Vla. *p*

Vc. *p*

Db. *p*



71 a tempo  
♩ = 112 She's Mad

1470

Fl. *mf*

Cl. *mf*

Bsn.

C Tpt. *mp*

Old Aiden *mp*  
— I fell.

71 a tempo  
♩ = 112

Vla.

Vc. *pp* PIZZ

Db.



1485

Cl.

Bsn.

Lor.

Aiden

Vln. 1

Vln. 2

Vla.

Vc.

said so!

*p* *3* *p* *3*

She thinks we are gone. Won't find us in here.

*mp*

*f*



1491

Cl.

Hn.

Lor.

Zane

Vln. 1

Vln. 2

Vla.

Vc.

*mp*

*mf*

*mp* *mf* *mp* *mp*

There are too ma-ny mem - o-ries! I don't like this place

*mp*

hid-den be-neath the soil.

*mf*

1497

Fl. *mf*

Ob. *mf*

Cl. *mp*

Bsn. *mp*

Lor. *mf*  
 let's go to the ball! Let's leave this place a - lone.

Vln. 1

Vln. 2

Vla.

Vc. *mp*

1502

Fl. *p*

Cl. *mf*

Bsn. *mf*

Hn. *mf*

C Tpt. *mf* STR MUTE

Lor. *mf*  
 Aid en, you're

Aiden *mf*  
 Let's not, Lor-et-ta, let's not. Can I call you Lott?

7J

Vln. 1 *mp*

Vln. 2 *mp*

Vla. *mp*

Vc. *mp*

1510

C Tpt. *p*

Lor. scar ing me. (ASIDE) *mp* (TO LORETTA) *mf*

Aiden Don't think that's pos-si-ble This is the spot. This is the spot. Ter - ran ae-

Vln. 1

Vln. 2

Vla.

Vc.



1519

Fl. *f*

Ob.

Hn. *f*

C Tpt. *mf*

Lor. *f* A wail, \_\_\_\_\_ on the

Aiden *f* ter - nam, \_\_\_\_\_ you screamed in the night, wailed to the moon, howled like the wind re - mem - ber - your cry?! Ter

Vln. 1 *mf* *f*

Vln. 2

Vla. *mf*

Vc.

1527 G.P.

Fl. *p*

C Tpt. *p*

Lor. *p*  
wind. \_\_\_\_\_

Aiden  
- ra ae - ter - nam.

Vln. 1 *mp* *mf* *p* *loco*

Vln. 2 *mp* *mf* *p*

Vla. *mp*

Vc. *mp* *p*

1535 7K  $\text{♩} = 70$

Fl. *mf*

Ob. *mf*

Cl. *mf*

Bsn. *mf*

C Tpt. (MUTED) *mp*

Vib. *mf*

Vln. 2 *mp*

Vla. *mp*

Vc. *mp*

Db. PIZZ *mf*

♩ = 80

1542

Fl.

Ob.

Cl.

Bsn.

Hn.

C Tpt.

Vib.

Zane

*rall.*

*mp*

soft

Vln. 1

Vln. 2

Vla.

Vc.

Db.

♩ = 80

*mf*

7L

The stage becomes a Fantasy Dance Hall (of Older Aiden's mind), right in the cane paddock, where Zane, 19 y.o. Aiden, and Older Aiden each sings and dances with Loretta

1550

Zane

Soft in the eve 'ning you came to me, soft in the candle-light you said, that no matter what became of us, you

7L

Vln. 1

Vln. 2

Vla.

Vc.

Db.



1559

Zane

...would be there.

AIDEN

Aiden

soft in the morn-ing you whis pered, soft in the mid-day sun you sighed,

Vln. 1

Vln. 2

Vla.

Vc.

Db.

1567

Aiden *sotto voce* *pp*  
 that no mat-ter what be-came of us, you would be there.

Vln. 1  
 Vln. 2  
 Vla.  
 Vc. *ARCO*  
 Db.

1577

Lor. **7M** **LORETTA** *mp*  
 Soft my soul it came to you, soft on the wind we changed from the first time I

Vln. 1  
 Vln. 2  
 Vla.  
 Vc. *p* *mf* *mp* *PIZZ* first inversion *ARCO*  
 Db.

1586

Lor. *mf*  
 danced with you, I was there. The first time

Zane **ZANE** *f*  
 Why do you cry for free dom. Why must you

Old Aiden *mf*  
 soft in the eve 'ning you come to me, soft in the

Vln. 1  
 Vln. 2  
 Vla.  
 Vc. *PIZZ*  
 Db.

1594

Lor. *f* — that I danced with you — *f* I — was yours, *mf* was yours —

Zane leave me now? *mf* Why — *mf* must you

Old Aiden *f* night time you cry that you don't know what be - came of us, — nor — do I. —

Vln. 1

Vln. 2

Vla. ARCO

Vc.

Db.

1601

Vib. Bass Drum *pp*

Lor. *mp* *p*  
I was there.

Zanc go?

Aiden **AIDEN** *mp* *p*  
You'd be there.

Old Aiden *mp* *p*  
We were there.

Vln. 1 *p*

Vln. 2 *p*

Vla. *p*

Vc. PIZZ *mp* *p*

Db. *mp* *p*

7N

Your Decision

recitativo

1608

Cl. *ff*

Bsn. *ff*

Hn. *ff*

B. D. *f*

Lor. **LORETTA** *f* Wrong de - cis - ion. \_\_\_\_\_

Sel. **SELENA** *f* You made a de - cis - ion. \_\_\_\_\_ You made a de -

7N

recitativo

Vln. 1 PIZZ (strum) *ff* ARCO *mp then colla parte*

Vln. 2 PIZZ (strum) *ff* ARCO *mp then colla parte*

Vla. PIZZ *ff* ARCO *mp then colla parte*

Vc. (PIZZ) *f* ARCO *mp then colla parte*

Db. *f*



1612

Sel. cis - ion to bleed.

Zane **ZANE** *f* For me to stay with me, to be made

Vln. 1

Vln. 2

Vla.

Vc.

1615

Lor. We bled to-ge ther. and now I can't leave! I thought it was right at the time. I am trapped Zane. Can't

Sel. Just like me. We are trapped Zane. Can't

Zane flesh. We bled to-ge ther. You said...

Vln. 1

Vln. 2

Vla.

Vc.



1621

Lor. breathe Zane. This place is crush-ing my soul. from the mo-ment we cut to the mo-ment we bled I've beenhained to the earth,

Sel. breathe Zane. This place is crush-ing oursouls.

Zane please / no more  
Stop. Please! No. No more!

Vln. 1

Vln. 2

Vla.

Vc.

ARCO

colla parte

Db.

1628

Lor. sea-son af-ter sea-son. year af-ter year I yearn for life on the wind, my lov-er, on-ly you can re-lease me from e-ter-nal life of

Vln. 1

Vln. 2

Vla.

Vc.

Db.

1634

Lor. mor-tal drud-ge-ry. I must die, must die, and burn. You must: there is no oth-er way! You

**70**  
tempo rubato  
(proffering knife)

Vln. 1

Vln. 2

Vla.

Vc.

Db.

1640 **a tempo**  $\text{♩} = 176$   $\text{♩} = 132$

Fl. *pp*

Ob. *pp*

Cl. *pp*

Bsn. *pp*

Yng. Aiden **YOUNG AIDEN** *ff* Sing - or speak.  
Mum! Come quick!

Lor. must!

S. *pp*  
Ter-ra ae-ter-nam ter- ra ae - ter-nam. nam.

A. *pp*  
Ter-ra ae-ter-nam ter- ra ae - ter-nam. nam.

T. *pp*  
Ter-ra ae-ter-nam ter- ra ae - ter-nam. nam.

B. *pp*  
Ter-ra ae-ter-nam ter- ra ae - ter-nam. nam.

**a tempo**  $\text{♩} = 176$   $\text{♩} = 132$

Vln. 1 *ff* *pp*

Vln. 2 *ff* *p* *pp*

Vla. *pp*

Vc. *p* PIZZ

Db. *p*

♩ = 176

♩ = 132

1648

Fl. *mp* *mf*

Ob. *mp* *mf*

Cl. *mp* *mf*

Bsn. *mp* *mf*

Yng. Aiden YOUNG AIDEN *ff*

Zane's hurt. *mp* *mf* Zane is

S. *mp* *mf*  
E - ter-nal-ly flesh e - ter-nal-ly trapped in this life.

A. *mp* *mf*  
E - ter-nal-ly flesh e - ter-nal-ly trapped in this life.

T. *mp* *mf*  
E - ter-nal-ly flesh e - ter-nal-ly trapped in this life.

B. *mp* *mf*  
E - ter-nal-ly flesh e - ter-nal-ly trapped in this life.

Vln. 1 *ff* *pp*

Vln. 2 *ff* *p* *pp*

Vla. *pp* *PIZZ*

Vc. *p*

Db. *p*

♩ = 176

♩ = 132

♩ = 176

1656

Fl. *f* *mf*

Ob. *f* *mf*

Cl. *mf*

Bsn. *f* *mf*

Hn. *f* *mf* *mf*

C Tpt. *mf* *mf*

Yng. Aiden  
hurt, he's hurt, real bad!

S. *mp*  
Ter - ra

A. *mp*  
Ter - ra

T. *mp*  
Ter - ra

B. *mp*  
Ter - ra

♩ = 176

Vln. 1 *f*

Vln. 2 *f* *mf* *mf*

Vla. *mf* *mf*

Vc. *f* ARCO

Db. *f* ARCO

FL. *ff*

Ob. *ff*

Cl. *ff*

Bsn. *ff*

Hn. *f*

C Tpt. *f*

S. *ff*  
ae - ter - nam, ter - ra ae - ter - nam, ter - ra ter - ra ae - ter - nam!

A. *ff*  
ae - ter nam, ter - ra ae - ter - nam, ter - ra ter - ra ae - ter - nam!

T. *ff*  
ae - ter - nam, ter - ra ae - ter - nam, ter - ra ter - ra ae - ter - nam!

B. *ff*  
ae - ter - nam, ter - ra ae - ter - nam, ter - ra ter - ra ae - ter - nam!

Vln. 1 *f*

Vln. 2 *f*

Vla. *f*

Vc. *f*

Db. *f* *gliss.*

♩ = 84

8A

I Have Waited

1672

FL.

Ob.

Cl.

Bsn.

Hn.

C Tpt.

B. D.

Aiden

S.

A.

T.

B.

8A

♩ = 84

Vln. 1

Vln. 2

Vla.

Vc.

Db.

1679

Bsn. *mf*

Aiden  
I see the years the time the flame \_\_\_\_\_ still\_burns. It's his-tory play - ing

Vln. 1 *f p f p f p f p f p*

Vln. 2 *f p f p f p f p f p*

Vla. *f p f p f p f p f p*

Vc.

Db.



1684

Bsn. *mf*

Lor. So this is the spot?

Aiden  
o - ver, o - ver a - gain. \_\_\_\_\_ It's why she won't come,

Vln. 1 *f p f p f p mp*

Vln. 2 *f p f p f p mp*

Vla. *f p f p mp*

Vc. *ARCO mp*

Db. *mp*

1689

Bsn. *f*

Hn. *f* *p*

Aiden  
some-thing ben-eath the soil.

Vln. 1

Vln. 2

Vla.

Vc.



8B

1695

Cl. *mf*

Bsn.

Hn.

Sel. *mf*  
When the earth sighs, whis-p'ring sec-rets, Heav-ing its in-ner-most life. It

8B

Vln. 1 *mf*

Vln. 2 *mf*

Vla. *mf*

Vc. *mf*

1701

Fl. *mf* *f*

Ob. *mf* *f*

Cl. *f*

Hn.

Lor. *mf*

Sel. *f* *mf*

Vln. 1 *gliss.*

Vln. 2 *gliss.*

Vla. *gliss.*

Vc. *f* PIZZ

Db. *f* PIZZ

The wind set free, for - e - ver waft ing

wills the wind, wak-ens souls, e - ter-nal - ly stir-ring up strife. The wind set free, for - e - ver waft ing

1707

Lor. soft - ly strokes your skin, will touch your heart and feed your lust then tear a hole with-in,

Sel. soft - ly strokes your skin, will touch your heart and feed your lust then tear a hole with-in,

Vln. 1

Vln. 2

Vla.

Vc.

Db.

1712

8C

Fl.

Ob.

Cl.

Bsn.

Lor.

Sel.

with -

with - in.

8C

Vln. 1

Vln. 2

Vla.

Vc.

Db.

ARCO

PIZZ

*f*

*p*

*mf*

1718

When the Wind Blows

Cl.

Bsn.

Lor.

Sel.

Vln. 1

Vln. 2

Vla.

Vc.

When the wind blows, the world waits, when the wind whirls it tempts the fates.

When the wind blows, the world waits, when the wind whirls it tempts the fates.

1723

Fl.

Bsn.

Lor.

Sel.

When the wind gusts, it's far too late, — to es-

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*f* *p* *f* *p* *f* *p* *f* *p* *f* *p*

PIZZ

1728

Fl. *f*

Ob. *f*

Cl. *ff* *f*

Bsn. *f*

Hn. *ff* *f*

C Tpt. *f* *f*

Lor. *f*  
 cape the howls— the howls of hate! The wind is back I have re-

Sel. *f*  
 cape the howls— the howls of hate!—

Vln. 1 *f* *p* *f* *p* *f* *p* *f*

Vln. 2 *f* *p* *f* *p* *f* *p* *f*

Vla. *f* *p* *f* *p* *f* *p* *f*

Vc. *f* **ARCO**

Db.

8D

1733

Fl.

Ob.

Cl.

Bsn.

Hn.

C Tpt.

*ff*

*f*

*f*

*ff*

*f*

stopped

Lor.

turned the wind will win the wind will burn!

8D

Vln. 1

Vln. 2

Vla.

Vc.

Db.

*f*

*p*

*f*

*p*

*f*

*f*

PIZZ

PIZZ

*f*



1741

Ob.

Cl.

Sel.

Aiden

Old Aiden

Vln. 1

Vln. 2

Vla.

Vc.

Db.

mem - ber this? You've been here be- fore! Re-

He ap- pears in the shad- ows cold - er dark - er!

He ap- pears in the shad- ows cold - er dark - er!

*f* *p* *f* *p* *f* *p* *f* *p* *f*

ARCO

1746

Ob.

Sel.

Vln. 1

Vln. 2

Vla.

Vc.

*p*

Recitativo.

*mf*

mem-ber this re- mem- ber Lott? There is blood spilt on this spot! The soil is red the air is dank des- pite the time since you were

*p*

ARCO

*p*

1755 **8E**

Fl. *f* *mf* *mf*

Ob. *mf*

Cl. *mf*

Bsn. *mf*

Lor. *mf* *f* *f*  
 I was lost I was lost. I was

Sel. *f*  
 here!

Aiden *f*  
 I grieve for my bro-ther! I am griev-ing, for my mo-ther's son.

Old Aiden *f* (that)  
 I grieve for the bro-ther for the life you took!

Vln. 1 *f* *mp* *mf* *p* *mf* *p* *mf* *p* *mf* *p* *mf* *p*

Vln. 2 *f* *mp* *mf* *p* *mf* *p* *mf* *p* *mf* *p* *mf* *p*

Vla. *f* *mp* *mf* *p* *mf* *p* *mf* *p* *mf* *p* *mf* *p*

Vc. PIZZ *f* ARCO *mf* *p* *mf* *3*

Db. *f* ARCO

arabesque  
1761

Fl.

Ob.

Bsn.

Lor.

Aiden

Old Aiden

Vln. 1

Vln. 2

Vla.

Vc.

lost. Lost. Lost! Lost! Lost!

His soul is seeth-ing from what you've done. what you've done. His soul is stir - ring,

His soul is seeth-ing from what you've done. what you've done. He ap-

*mf* *p* *mf* *p* *mf* *p* *mf* *p* *mf* *p*

*f* *f* *f* *f* *f*

*f* *f* *f* *f* *f*

1766

Fl.

Ob.

Cl.

Bsn.

B. D.

Aiden

Old Aiden

Vln. 1

Vln. 2

Vla.

Vc.

8F

No More

1771 ♩ = 132

Fl. *f* 3 3 3

Ob. *f* 3 3 3

Cl. *f* 3

B. D. *f* *mf* < *f* *mp* < *f*

♩ = 132

8F

Vln. 1 *ff* 3 3 3 *f* 3 3 3 3 3 3 3

Vln. 2 *ff* 3 3 3 *f* 3 3 3 3 3 3 3

Vla. *ff* *f* 3 3 3 3

Vc. *ff* *f* 3 3 3 3

Db. ARCO *ff*





1808

Fl. *f*

Ob. *f*

Cl. *f*

Hn. *f*

B. D. *mp < f*

Lor. *ff*  
 You'll trap my soul! in the west-er-ly wind.

Sel. leash the pain.

Vln. 1 *f*

Vln. 2 *f*

Vla. *f*

Vc. *ff* *f*

8H

1815

Fl. *mf*

Ob.

Hn. *f*

Sel. *ff* *f* *mf*

Cold wind. Harsh wind. You chose to bleed, to love my Zane. Bo-dy and blood be - com - ing one

*rall.*  $\text{♩} = 96$

Tenderly (reflecting on a beautiful moment)

8H

Vln. 1 *f* *p* *mf* *p* *mp* *p*

Vln. 2 *f* *p* *mf* *p* *mp* *p*

Vla.

Vc.

*rall.*  $\text{♩} = 96$

1825

**tempo rubato**

Fl. *mp*

Lor. *mf*

Sel. *mp*

I was lost! I was lost (No longer tender!)

You walked right here! You could have died af-ter liv-ing a long and fruit-ful life. In your greed and

**tempo rubato**

Vln. 1 *p*

Vln. 2

Vla. *p*

Vc.

1834

Fl. *mf*

Lor.

That is hu - man-i - ty.

Sel.

self-ish- ness! You've felt love. Now feel the burn-ing pain— of hu - man-i - ty!

Vln. 1 *fp* *mf*

Vln. 2 *fp* *mf*

Vla. *fp* *mf*

Vc. *fp* *mf*

Db. *fp* *mf*

ARCO

8I

a tempo

♩ = 132

1842

Fl. *f* 3

Ob. *f*

Cl. *f*

Lor. *f*

The wind will win, the wind will burn! A

Sel. *f* 3

You made your choice! to be - come flesh to burn! A

♩ = 132 a tempo

8I

Vln. 1 *ff* 3 *f* 3 3 3 3 3 3 3 3

Vln. 2 *ff* 3 *f* 3 3 3 3 3 3 3 3

Vla. *ff* *f* 3 3

Vc. *ff*

Db. ARCO *ff*

1848

rall ... **8J**  $\text{♩} = 96$  Denouement

Fl.

Ob.

Cl.

Hn.

C Tpt.

B. D.

Lor.

Sel.

S.

A.

T.

B.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

burn - ing flame will tor-ment our souls \_\_\_\_\_ flesh can burn

burn - ing flame will tor-ment our souls \_\_\_\_\_ and flesh can burn

Fes - ters

rall ... **8J**  $\text{♩} = 96$

Fl. *ff*

Ob.

Cl.

Bsn. *ff*

Hn.

C Tpt.

B. D.

Lor.

Sel. *Burn!*

S.  
slith - ers neath the soil. Creep - ing groan - ing farm - ers toil.

A.  
slith - ers neath the soil. Creep - ing groan - ing farm - ers toil.

T.  
slith - ers neath the soil. Creep - ing groan - ing farm - ers toil.

B.  
slith - ers neath the soil. Creep - ing groan - ing farm - ers toil.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

Fl.

Ob.

Cl.

Bsn.

Hn.

C Tpt.

B. D.

S.

A.

T.

B.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

Til - ling tens - ing vip - er's coil. Stir - ring spit - ting ven - om. Work - ing

Til - ling tens - ing vip - er's coil. Stir - ring spit - ting ven - om. Work - ing

Til - ling tens - ing vip - er's coil. Stir - ring spit - ting ven - om. Work - ing

Til - ling tens - ing vip - er's coil. Stir - ring spit - ting ven - om. Work - ing

8K

1862

Fl.

Ob.

Cl.

Bsn.

Hn.

C Tpt.

B. D.

Lor.

S.

A.

T.

B.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

I will re- turn!

plough - ing til - ling turn - ing. Groan - ing sweat - ing chip - ping churn - ing.

plough - ing til - ling turn - ing. Groan - ing sweat - ing chip - ping churn - ing.

plough - ing til - ling turn - ing. Groan - ing sweat - ing chip - ping churn - ing.

plough - ing til - ling turn - ing. Groan - ing sweat - ing chip - ping churn - ing.

1865

Fl.

Ob.

Cl.

Bsn.

Hn.

C Tpt.

B. D.

Lor.

Sel.

S.

A.

T.

B.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

I will re- turn! each sea - son. I vow to see you a - gain!

Each sea - son. I vow to see you a - gain!

Scrap - ing steal - ing long - ing yearn - ing. Wrench - ing howl - ing nev - er learn - ing.

Scrap - ing steal - ing long - ing yearn - ing. Wrench - ing howl - ing nev - er learn - ing.

Scrap - ing steal - ing long - ing yearn - ing. Wrench - ing howl - ing nev - er learn - ing.

Scrap - ing steal - ing long - ing yearn - ing. Wrench - ing howl - ing nev - er learn - ing.

8L

1869

Fl.

Ob.

Cl.

Bsn.

Hn.

C Tpt.

B. D.

Lor.

Sel.

S.

A.

T.

B.

I vow to blow with the wind! I will re- turn!

I vow to blow with the wind!

Grasp - ing griev - ing souls are seeth - ing. Blow - ing wind the earth is breath - ing.

Grasp - ing griev - ing souls are seeth - ing. Blow - ing wind the earth is breath - ing.

Grasp - ing griev - ing souls are seeth - ing. Blow - ing wind the earth is breath - ing.

Grasp - ing griev - ing souls are seeth - ing. Blow - ing wind the earth is breath - ing.

8L

Vln. 1

Vln. 2

Vla.

Vc.

Db.



1876 (8)

Fl. *ff* 5

Ob. *ff*

Cl. *ff*

Bsn. *ff* 3

Hn. *ff*

C Tpt. *ff*

B. D. *ff* 3 *fff* *mf* Large Tam-tam

Lor.

Sel. *ff* Fire fu - ry. Fire fu - ry. Fu - ry Fu - ry Fu - ry Fire! Burn!

Aiden *ff* Fire fu - ry. Fire fu - ry.

Old Aiden *ff* Fu - ry Fu - ry Fu - ry

S. *ff* Fire fu - ry. Fire fu - ry. Fire!

A. *ff* Fu - ry Fu - ry Fu - ry Fire!

T. *ff* Fire fu - ry. Fire fu - ry. Fire!

B. *ff* Fu - ry Fu - ry Fu - ry Fire!

Vln. 1 *ff* 5

Vln. 2 *ff* 3

Vla. *ff* 5

Vc. *ff* 3

Db. *ff*

1882 8N ♩ = 72

Fl. *mp* *p*

Cl. *p*

Bsn. *p*

T-t. *fff* L.V.

S. *p sempre*

Float - ing fall - ing rest - ing Fall - ing.

A. *p sempre*

Float - - - - - ing. Float -

T. *p sempre*

Fal - ling, sea -

B. *p sempre*

Fal - ling, sea -

8N ♩ = 72

Vln. 1 MUTED *p* *pp*

Vln. 2 MUTED *p* *pp*

Vla. MUTED

Vc. MUTED

Fl. *p*

Ob. *p*

Cl. *p*

Bsn. *p mp p*

S. Float - ing, float - - - ing.

A. - ing. Float - - ing, ing.

T. sons turn - ing turn - ing Fal - ling,

B. sons turn - ing turn - ing Fal - ling,

Vln. 1

Vln. 2

Vla. *p*

Vc. *p*

Fl. *p* *mp* 5 *p*

Ob. *p*

Cl. *p*

Bsn. *p*

S. Float - ing, float - - ing, float - - -

A. Float - ing. Float - - -

T. sea - sons turn - ing turn - ing

B. sea - sons turn - ing turn - ing

Vln. 1

Vln. 2

Vla. *p*

Vc. *p*

1922

Fl.

Ob.

Cl.

Bsn.

S.

A.

ing, float.

ing, float.

Vln. 1

Vln. 2

Vla.

Vc.

1937 G.P. **9A** EACH CUT

Fl. *mf*

Old Aiden **OLDER AIDEN** *mp*

Each cut mor-tal-i-ty. Pain. Life. and mem-o-ry.

G.P. **9A**

Vln. 1 *mp*

Vln. 2 *mf* *mp*

Vla. *mp*

Vc. *mf* *mp*

Db. *mf* *mp* PIZZ

1943 **9B**

Fl. *mf*

Old Aiden *mp* *mf*

Each cut new sea-son. Change. Wind. His-to-ry. Each cut re-

**9B**

Vln. 1 *mp*

Vln. 2 *mp*

Vla.

Vc. *mf*

Db.

1949

Fl.

Old Aiden

leas - ing, my lot, life for - get - ting Each cut crush - ing Blood Fear

*sub mf* *f* *mf* *mf*

Vln. 1

Vln. 2

Vla.

Vc.

Db.

9C

1955

Fl.

Cl.

Old Aiden

Let - ting. Each cut. each scar, re - leas - es our pain, then

*p* *mf* *f* *3:2*

9C

Vln. 1

Vln. 2

Vla.

Vc.

Db.

1960

Cl.

Old Aiden

starts it all, — the same, the same, the same a-gain...

Vln. 1

Vln. 2

Vla.

Vc.

Db.

The musical score is arranged in a system with seven staves. The top staff is for Clarinet (Cl.) in G major, featuring a melodic line with a triplet of eighth notes. The second staff is for Old Aiden, with lyrics: "starts it all, — the same, the same, the same a-gain...". The vocal line includes a triplet of eighth notes and a 3:2 ratio marking. The third staff is for Violin 1 (Vln. 1), the fourth for Violin 2 (Vln. 2), the fifth for Viola (Vla.), the sixth for Violoncello (Vc.), and the seventh for Double Bass (Db.). The string parts provide harmonic support with various rhythmic patterns and slurs. The score concludes with a double bar line and repeat dots.

## Appendix C (ctd)

### Bunyip Endeavour

Clarinet in B-flat

Cello

Piano

and

pre-recorded electroacoustic music

duration 26 mins

first performed by

Endeavour Trio

Paul Dean, Trish O'Brien, Stephen Emmerson

with electroacoustic sounds prepared and presented by the composer

animated graphics prepared and presented by Sally Molloy

Ian Hanger Recital Hall QCGU, Brisbane 7 March, 2018

# Appendix C (ctd)

## Bunyip Endeavour

Peter Rankine  
2018

A bit scary; a bit pretty ...  
dark and early light at the waterhole

$\text{♩} = 52$

May be performed on Bass Clar *ad libitum*  
until figure "C" or "D" - same reading pitch

Clarinet in B $\flat$

Violoncello

Pianoforte

$\text{♩} = 52$

5

*mp* *p* *pp* *mp* 3:2

8

3:2 *pp* *p* *mp* *p* *pp*





30

*mp* *f* *mf* *p*

*as harmonic ad libitum*

35

Clarinet in B $\flat$  **B**

*p* *f* *p* *ppp*

(as harmonic ad libitum)

*port.*

**B**

*pp* *pp* *p* 3

41

6

5:4 5:4 5:4 5:4 5:4 5:4

5:4 5:4 5:4 5:4 5:4

45

character pedal

5:4 5:4 5:4 5:4 5:4

5:4 5:4 5:4 5:4 5:4

5:4 5:4 5:4 5:4

49

5:4 5:4 5:4 5:4

5:4 5:4 5:4 5:4

53

57

61

Optional change instrument here

C

67

73

**D** ♩ = 108

*pp* *L-3*

*p* *mf*

79

*mf* *p*

5:6

82

86

(Change to)  
Clarinet in B-flat

89

*mp*

*mp*

(4)

92 E Jaunty!

E

96

100

103

106 **F** PIZZ

(opt)

Musical score for measures 106-110. The system includes a bass line with a 'PIZZ' instruction, a grand staff with a treble clef, and a bass line with a 'p' dynamic marking. Measure numbers 106, 110, and 115 are indicated.

111

Musical score for measures 111-115. The system includes a bass line, a grand staff with a treble clef, and a bass line. Measure numbers 111, 115, and 119 are indicated.

116

**G**

Musical score for measures 116-119. The system includes a grand staff with a treble clef, a grand staff with a bass clef, and a bass line. Measure numbers 116, 119, and 123 are indicated. A 'G' chord marking is present above the grand staff with a bass clef.

120

**H**

Musical score for measures 120-125. The system includes a grand staff with a treble clef, a grand staff with a bass clef, and a bass line. Measure numbers 120, 124, and 128 are indicated. A 'H' chord marking is present above the grand staff with a treble clef.

126

cello

Musical score for measures 126-130. The system includes a grand staff with a treble clef, a grand staff with a bass clef, and a bass line. Measure numbers 126, 130, and 134 are indicated.

131

136

I

140

ARCO

144

150

*mf*

153

*f* *ff* *mf*

J

157

*f* *f* *mf*

ARCO

161

*p* *f* *mp* *f* *mp* *mf* *p*

PIZZ ARCO

164

*mf* *mf* *PIZZ* *l.v.* *mf* *p*

167

*f*

171

*mf > mp* *mf > mp* *sim* *f* *mf* *p*

175 Jaunty

*mf* *mf*

179 **K** clar. solo tempo ad libitum port. *mf*

184

188

191 **L** In Tempo *mp* *mf* *mf* *mp* *f* *pp*

196 **M**  $\text{♩} = 108$  Colour Trem *ad libitum* cello, pno Attaca!

201 **M**  $\text{♩} = 108$  Attaca!

201 *mp* *p* *f* *mf*

205

*mf*

gliss.

208

*ff*

gliss.

212

ARCO

*ff* *f*

gliss.

216

219

**N** (♩=108)

PIZZ ARCO

222

225

228

ff

8va

ff

ff

231

f

f

f

f

235

piano

piano

238  $\text{♩} = 54$

*mp* *p* PIZZ *pp* *mf* *ppp*

$\text{♩} = 54$

*p*

244  $\text{♩} = 54$  Bunyip's "fur" aria

*ppp* *f* *mf* *pp* *mf*

$\text{♩} = 54$  rich tone

*pp* *mf* *mf*

250 5:6

*(mf)* *p* *mf*

This Bun-yip fur up - on my arms, these bun - yip feath - ers on my knees, this fur - ry tail I  
*f* curl - ing toes with webs be - tween, these Bun - yip feath - ers on my knees, this Bun-yip fur up -

256 1.

can't quite see; oh these cud-dly bun-yip things are me, Sir please can you tell me tell me please!

261

These Are these love-ly Bun-yip things? Oh

265

sir, please tell me please! Mmmm ...

269

**P**

*p* *pp* *port.*

271

**P**

Musical score for measures 273-274. The system consists of two staves. The upper staff is in treble clef and the lower staff is in bass clef. Both staves are in 12/8 time. The key signature has one flat (B-flat). The music features a complex melodic line with many accidentals and a steady accompaniment. Brackets labeled '5:3' are placed above and below the notes in both staves. A dynamic marking '(p)' is present in the first measure of the upper staff.

Musical score for measures 274-275. The system consists of two staves. The upper staff is in treble clef and the lower staff is in bass clef. Both staves are in 12/8 time. The key signature has one flat. The music continues with complex melodic lines and accompaniment. Brackets labeled '5:3' are present. A dynamic marking '(p)' is in the first measure of the upper staff. A triplet of eighth notes is marked with a '3' in the final measure of the upper staff.

Musical score for measures 276-281. The system consists of two staves. The upper staff is in treble clef and the lower staff is in bass clef. Both staves are in 12/8 time. The key signature has one flat. The music features a complex melodic line with many accidentals and a steady accompaniment. Brackets labeled '5:3' are present. A dynamic marking '(p)' is in the first measure of the upper staff. A tempo marking 'Q = 54' is present above the upper staff. A dynamic marking 'mf' is present above the upper staff.

Musical score for measures 282-288. The system consists of two staves. The upper staff is in treble clef and the lower staff is in bass clef. Both staves are in 12/8 time. The key signature has one flat. The music features a complex melodic line with many accidentals and a steady accompaniment. Brackets labeled '3:5' are present. A dynamic marking 'f' is present in the final measure of the upper staff.

Musical score for measures 289-293. The system consists of two staves. The upper staff is in treble clef and the lower staff is in bass clef. Both staves are in 12/8 time. The key signature has one flat. The music features a complex melodic line with many accidentals and a steady accompaniment. Brackets labeled '3' are present. A dynamic marking 'f' is present in the first measure of the upper staff. A dynamic marking 'mf' is present in the second measure of the upper staff. A dynamic marking 'ff' is present in the first measure of the lower staff. A dynamic marking 'fmp' is present in the final measure of the lower staff.

Musical score for measures 294-299. The system consists of two staves. The upper staff is in treble clef and the lower staff is in bass clef. Both staves are in 12/8 time. The key signature has one flat. The music features a complex melodic line with many accidentals and a steady accompaniment. Brackets labeled '6' and '3' are present. A dynamic marking 'mf' is present in the first measure of the upper staff. A dynamic marking 'f' is present in the second measure of the upper staff. A dynamic marking 'mp' is present in the first measure of the lower staff.

296

296

299

299

303

303

307

307



324

cello

The image shows a musical score for a cello and piano. The top system consists of a cello staff and a piano accompaniment staff. The cello part begins with a rest, followed by a series of notes with triplets and quintuplets. The piano accompaniment provides harmonic support with chords and single notes. The bottom system shows a grand piano with four staves (treble and bass clefs). The piano part includes chords and melodic lines, with some notes marked with '5:4' ratios. The score is written in a key with one sharp (F#) and a 2/4 time signature.

Musical score for measures 327-329. The score is in 3/4 time. The first system shows a vocal line with triplets and dynamics *fp* and *mp*. The piano accompaniment features complex rhythmic patterns, including sixteenth-note runs with *5:4* markings and triplets. Dynamics include *pp* and *f*. The second system continues the piano accompaniment with dynamics *fp* and *f*.

Musical score for measures 330-332. The score continues with complex piano accompaniment. Dynamics include *fp*, *mp*, *f*, and *mf*. A *loco* marking is present in measure 331. The piano accompaniment features complex rhythmic patterns and triplets.

Musical score for measures 333-335. The score continues with complex piano accompaniment. Dynamics include *mp*, *p*, and *pp*. The piano accompaniment features complex rhythmic patterns and triplets.

335

*mp*

337

15ma  
*p* *gliss.* *gliss.* *mfp* *f*

340

*ff* *f (as possible)* *f*