

Exploration of Selected Extended Clarinet Techniques:  
A Portfolio of Recorded Performances and Exegesis.

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## Abstract

This submission for the degree of Master of Philosophy in Music Performance at the Elder Conservatorium of Music, University of Adelaide, investigates through performance, two extended clarinet techniques: multiphonics and portamenti, as they pertain to the Boehm system soprano clarinet.

The submission consists of a portfolio of recorded performances presented on four CDs, supported by an explanatory, 5000 word exegesis. The exegesis explains the application of these techniques in selected contemporary clarinet repertoire and the associated challenges they have for performance. The exegesis documents and evaluates the performer's approach in addressing those intrinsic challenges.

The works presented are: *Ship Jang Saeng I* by Bong-Ho Kim; *Fantasie* by Jörg Widmann; *Double Life* by Eric Mandat; *Preludes Book 1* by Eric Mandat; *Seeking The Path That Leads Home* by Nicholas Denison; *Rondo* by Nicholas Denison; *Czernowitzer Skizzen* by Alexander Kukelka; *Moments musicaux* by Pēteris Vasks and *Perspectives* by Callie Wood.

## **Declaration**

This work contains no material that has been accepted for the award of any degree or diploma in any university or other tertiary institution, and to the best of my knowledge and belief contains no material previous published or written by another person, except where due reference has been made in the text of the thesis.

I give my consent to this copy of my thesis, when deposited in the University Library, being made available for photocopying and loan, subject to the provisions of the Copyright Act 1968, except for the four compact discs which may not be duplicated and must be listened to in the Elder Music Library only and the compact disc containing the scores of the works, which must be removed after examination.

I also give permission for the digital version of the exegesis only to be made available on the web, via the University's digital research repository, the library catalogue, the Australian Digital Theses Program (ADTP) and also through the web search engines unless permission has been granted by the University to restrict access for a period of time.

Amanda Lovelock

28 April 2013

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Thanks to Silver Moon for assistance in producing the recital recordings.

A big thank you to my family for your constant love and support.

## Terminology

The following system of notation is used:

Notes below middle C: B, A, etc.

Notes from middle C to the next ascending octave: C<sup>1</sup>, D<sup>1</sup>, E<sup>1</sup>, etc.

Notes from the next octave up: C<sup>2</sup>, D<sup>2</sup>, E<sup>2</sup>, etc.

Notes from the final octave up: C<sup>3</sup>, D<sup>3</sup>, E<sup>3</sup>, etc.

### List of Symbols

<b>T</b>	Thumb hole key
<b>R</b>	Register key
<b>-</b>	Tone hole not covered
<b>G#/D#</b>	Key with right hand little finger to open tone hole
<b>C#/G#</b>	Key with left hand little finger to open tone hole
<b>B/C</b>	Key with left hand little finger to close tone holes

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## Introduction

The clarinet is capable of producing a substantial number of extended playing techniques, which reflect progression and exploration in music. This research investigates through performance two of these extended techniques; multiphonics and portamenti as they pertain to the Boehm system soprano clarinet. The chosen techniques require clarinettists to use the instrument in ways that are not always part of standard training. The performer's personal endeavour to expand her technical resources on the instrument was a primary attraction of this research. This endeavour provided opportunity to explore repertoire that represented varied application and expression of the chosen techniques to further understand the possibilities they afford.

As Matthew Burtner states, the two techniques exist at the threshold of instrumental playing and while they are controllable, the aspects of control may differ for each performer.<sup>1</sup> This research identifies the challenges these techniques present for performance and offers performance solutions and practice suggestions. It is hoped the information may be useful for future clarinettists seeking to tackle the extended techniques and the associated repertoire.

Through the recital recordings and explanatory exegesis, the aim has been to investigate the following research questions:

1. How are multiphonics applied in the selected repertoire?
2. How are portamenti applied in the selected repertoire?
3. What are the challenges faced by clarinettists in executing these techniques in the selected repertoire?
4. How can the challenges be addressed through performance?

A cyclic tripartite method was used to address the research questions. The method is as follows:

1. Visual examination of the notation, dynamics, rhythm and textural features of the selected techniques within the score.
2. Interpretation, practice and performance of the selected techniques.
3. Aural feedback and evaluation following the outcomes of phase two.

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<sup>1</sup> Matthew Burtner. "Making Noise: Extended Techniques After Experimentalism" *NEWMUSICBOX*. March 2005 <<http://www.newmusicbox.org/articles/Making-Noise-Extended-Techniques-after-Experimentalism>> (20 February 2013)



Addressing research questions one and two was carried out using the first phase of the tripartite method. The application of the techniques within the score were the sole focus of the examinations in this phase. The performance preparation of the repertoire in phase two further elucidated the application of the techniques.

The challenges identified in research question three were pre-empted during phase one. However, they were substantially manifested in phase two. The technical and interpretive challenges noted reflect a personal account of the performer's experience in interpreting, practicing and performing the selected works.

The final research question aims to document the performer's approach in addressing the identified challenges. The documented approach was developed during phase three through assessing of the outcomes of the previous phase. These assessments made by the performer often prompted a return to phase one and a restart of the process with the additional information. This demonstrates the cyclic nature of the tripartite method employed.

An assortment of literary sources including theses, articles, text books and web resources provided preliminary information on the techniques. Particularly helpful were the texts: *New Directions for Clarinet*<sup>2</sup> by Phillip Rehfeldt, *Multiphonics and Other Contemporary Clarinet Techniques*<sup>3</sup> by Gerald Farmer and Michael Richard's *The Clarinet of the Twenty-First Century*.<sup>4</sup> These texts offered explanations of the numerous extended techniques, performance advice, fingering charts and some brief historical perspective which informed the performer's approach. In situations where ambiguities in the score required further clarification, recordings and live performances of the selected composer's music were sought. In addition, any comments or information recorded by the composers or performers of the selected works also aided the interpretation.

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<sup>2</sup> Phillip Rehfeldt. *New Directions for Clarinet*. (2<sup>nd</sup> ed. Berkeley: University of California Press, 1994)

<sup>3</sup> Gerald Farmer. *Multiphonics and Other Contemporary Clarinet Techniques*. (Rochester, New York: Shallumo Publications, 1982)

<sup>4</sup> Michael E. Richards. *The Clarinet of the Twenty-First Century*.

<<http://userpages.umbc.edu/~emrich/clarinet21.html>> (11 November, 2010)

The repertoire was compiled to ensure the pieces represented a varied application and expression of the techniques and that various challenges were presented to the performer both technically and interpretatively. As a result, the repertoire is intentionally broad and includes a wide range of styles and aesthetic approaches. The details of the recordings are as follows:

#### CD 1

- *Ship Jang Saeng I* for Solo Clarinet by Bong-Ho Kim (2000)
- *Fantasie* for Solo Clarinet by Jörg Widmann (1993)
- *Double Life* for Solo Clarinet by Eric Mandat (2007)
- *Preludes Book 1* for Solo Clarinet by Eric Mandat (1994)
- *Seeking The Path That Leads Home* for Clarinet Trio by Nicholas Denison (2011)

#### CD 2

- *Freebirds* for Two Solo Clarinets and Wind Orchestra by Scott McAllister (2009)

#### CD 3

- *Rondo* for Clarinet Trio by Nicholas Denison (2011)
- *Czernowitzer Skizzen* for Clarinet Quartet by Alexander Kukelka (2004)

#### CD 4

- *Moments musicaux* for Solo Clarinet by Pēteris Vasks (1977)
- *Perspectives* for Solo Clarinet by Callie Wood (2012)

Included in the repertoire are three commissioned works which incorporated the selected techniques: *Seeking The Path That Leads Home* and *Rondo* by Nicholas Denison and *Perspectives* by Callie Wood. Commissioning new works as part of this project was inspired by the performer's interest in new music and to encourage Australian composers to explore these techniques in their compositions.

Nicholas Denison is a postgraduate research student completing his composition based PhD at the Elder Conservatorium of Music, University of Adelaide. Similarly, Callie Wood studied her PhD in composition at the Elder Conservatorium of Music, University of Adelaide graduating in 2013. Both composers are known by the performer through previous musical collaborations. Prior knowledge of their contrasting compositional styles and performances of their works informed the performer's decision to work with them again. The collaborative effort enabled clarification of any issues in order to realise the full intentions of these compositions. The new works make an invaluable contribution, expanding the repertoire for the clarinet.

In addition to the recital recordings, the commissioned works have received a number of notable performances. *Seeking The Path That Leads Home* and *Rondo* received their first public performance on 18<sup>th</sup> June, 2012 as part of the COMA, Creative Original Music Adelaide Concert Series. Further South Australian performances include those at the Pilgrim Church 2012 Lunchtime Concert Series and the Flinders University 2012 Lunchtime Concert Series. *Seeking The Path That Leads Home* was also featured in the inaugural Earin New Music Festival 27<sup>th</sup> November, 2012 at the ABC Studios in Collinswood, South Australia. It is hoped that in drawing attention to all of the recital works, they may receive more performances and exposure.

This submission is structured into two parts: Part A and Part B. Part A details the live recorded performances presented on four CDs and Part B forms the accompanying explanatory exegesis. The recording details are presented first as they constitute the primary part of this submission, followed by the explanatory exegesis which contextualises the recordings. Part B is divided into two sections: B1 addresses the multiphonics and B2 explores the portamenti. Each section presents background information on the production of the technique, a discussion on the application of the technique in the selected repertoire and the challenges the techniques presented for performance.

**PART A**  
**Sound Recordings**

**CD 1**

29<sup>th</sup> June, 2012.

Hartley Concert Room, University of Adelaide

Clarinet: Amanda Lovelock, Clarinet: Anna Coleman, Clarinet: Charise Altmann

**Bong-Ho Kim** - *Ship Jang Saeng I*, for Solo Clarinet (2000)

Track 1	9:50
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**Jörg Widmann** - *Fantasie*, for Solo Clarinet (1993)

Track 2	10:30
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**Eric Mandat** - *Double Life*, for Solo Clarinet (2007)

Track 3 - I Double Life	3:04
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Track 4 - II Deep Thoughts	4:40
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Track 5 - III To Be Continued	2:58
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**Eric Mandat** - *Preludes Book 1*, for Solo Clarinet (1994)

Track 6 - I Illinois Central	1:16
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Track 7 - II The Looking Glass	1:52
--------------------------------	------

Track 8 - III Hommage to P.J.	1:43
-------------------------------	------

Track 9 - IV Spin Moves	1:56
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Track 10 - V In Bill's Back Room	2:23
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**Nicholas Denison** - *Seeking The Path That Leads Home*, for Clarinet Trio (2011)

Track 11	5:57
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## CD 2

1<sup>st</sup> March, 2013.

Concordia College Chapel

Clarinet: Amanda Lovelock, Clarinet: Charise Altmann, Adelaide Wind Orchestra

**Scott McAllister** - *Freebirds*, for Two Solo Clarinets and Wind Orchestra (2009)

Track 1 *\*\*Australian Premiere\*\**

13:36

## CD 3

6<sup>th</sup> March, 2013.

Schultz Building, University of Adelaide

Clarinet: Amanda Lovelock, Clarinet: Anna Coleman, Clarinet: Charise Altmann,

Basset Horn: Peter Handsworth, Bass Clarinet: Nicole Bates

**Nicholas Denison** - *Rondo*, for Clarinet Trio (2011)

Track 1

6:42

**Alexander Kukelka** - *Czernowitzer Skizzen*, Clarinet Quartet (2004)

Track 2 - Movement 1

Track 3 - Movement 2

Track 4 - Movement 3

Track 5 - Movement 4

Track 6 - Movement 5

Track 7 - Movement 6

Track 8 - Movement 7

Track 9 - Movement 8

Track 10 - Movement 9

Track 11 - Movement 10

Track 12 - Movement 11

Track 13 - Movements 12

43:02

## CD 4

14<sup>th</sup> May, 2013.

Hartley Concert Room, University of Adelaide

Clarinet: Amanda Lovelock

### **Pēteris Vasks** - *Moments musicaux*, for Solo Clarinet (1977)

Track 1 - I Cantilena I	1:17
Track 2 - II Con vivezza	1:30
Track 3 - III Misterioso	2:34
Track 4 - IV Con espressione	2:18
Track 5 - V Cantilena II	1:56

### **Callie Wood** - *Perspectives*, for Solo Clarinet (2012)

Track 6 - 1: La tour Sud	3:43
Track 7 - 2: Galerie des Chimères	1:55
Track 8 - 3: Parvis Notre Dame – place Jean Paul-II	2:05

**Music CDs are included with the print copy  
held in the University of Adelaide Library.**

**PART B**  
**B1 Multiphonics**  
**1.1 Production of Multiphonics**

As described by Murray Campbell, multiphonics are ‘sounds generated by a normally monophonic instrument in which two or more pitches can be heard simultaneously.’<sup>5</sup> This phenomenon is perhaps one of the most fascinating and acoustically intriguing clarinet sound resources.

There are three main ways of achieving multiphonics with the clarinet. One method is to combine conventional clarinet tone production with vocal tones produced simultaneously by the performer. This particular method was pioneered on the didgeridoo.<sup>6</sup> The other two methods do not lie in introducing another source generator, but through altering the resonance of the air column inside the instrument. This is done either through using a conventional fingering accompanied with a distorted tone production or by using an unconventional fingering so that two or more tones are rendered rather than just one. These latter two types of production are often considered the genuine multiphonics.<sup>7</sup>

The use of conventional single tone fingerings with distorted tone production is the most frequently employed type of multiphonic.<sup>8</sup> This is because it does not require learning any special fingerings, making it more accessible to performers. However, this method of production is usually more difficult, as it relies solely on tone production adjustments.

Generally the most easily produced, most dependable and most manageable multiphonics for the clarinet are those produced by means of unconventional fingering configurations that support the peculiar balance of resonances in the air column that result in more than one audible tone.<sup>9</sup> Multiphonics produced with special fingerings usually requires less deviation from normal playing technique, depending on how efficiently the fingering patterns affect the air column.

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<sup>5</sup> Murray Campbell. “Multiphonics” *Grove Music Online*. Oxford Music Online. Oxford University Press. Accessed 10 September, 2010. <<http://www.oxfordmusiconline.com/subscriber/article/grove/music/43536>>

<sup>6</sup> Amy Schumaker. *A Short History of Multiphonics*. <<http://www.suite101.com/content/a-short-history-of-multiphonics-a206873>> (10 March, 2011).

<sup>7</sup> Ronald L. Caravan. *Preliminary Exercises & Etudes in Contemporary Techniques for Clarinet*. (Oswego, New York: Ethos Publications, 1979), 18.

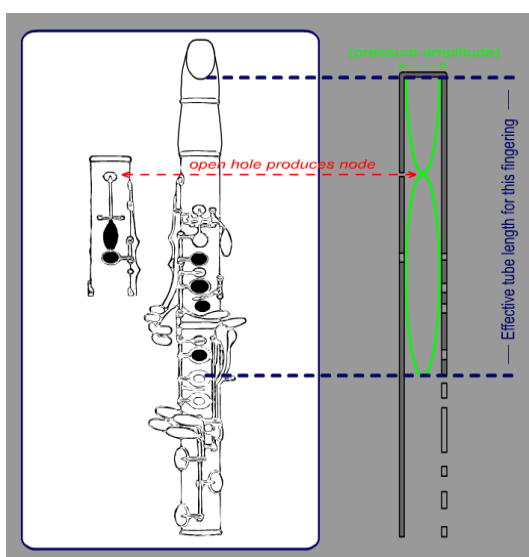
<sup>8</sup> *ibid*, 19.

<sup>9</sup> *ibid*, 22.



The possibility of these multiphonics on the clarinet is a result of all fundamental pitches having the capability of producing partials according to the standard overtone series. In the case of the clarinet, which acts as a closed pipe, the odd-numbered partials are predominantly available.<sup>10</sup> To understand further from an acoustical standpoint what is happening in the production of multiphonics, it is important to grasp the concepts of acoustical nodes and the practice of cross fingerings.

Nodes produce changes to the harmonic frequency, by opening a hole in the clarinet tube length. An example of a node is the register key hole as demonstrated below (see Example 1). Opening the register hole produces a node which nullifies the fundamental pitch and jumps to the third harmonic as a result of the node.

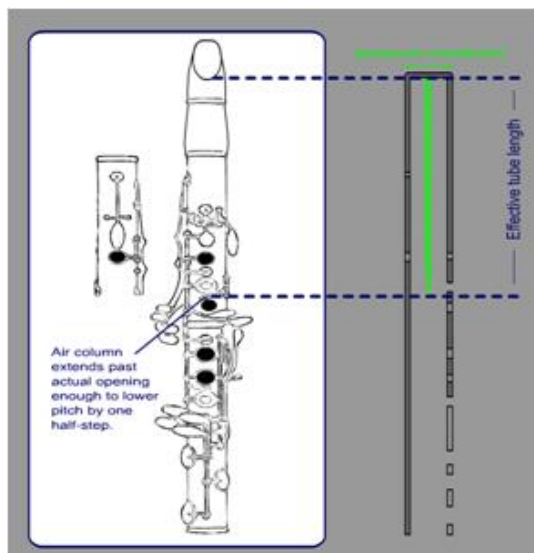


Example 1 Nicolas del Grazia, *Clarinet Multiphonics*. Clarinet node diagram.

<<http://www.clarinetmultiphonics.org/clarinetmultiphonics.html>> (24 January, 2011)

<sup>10</sup> Rehfeldt, op.cit., 41.

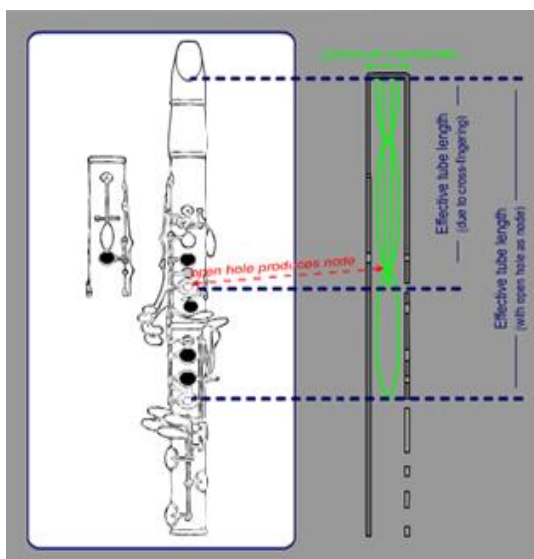
Cross fingerings are performed by closing tone holes below the end of the effective tube length (see Example 2). In example 2, the fingering for chalumeau E<sup>1</sup> on the first line of the staff is shown with extra tone holes covered below the effective tube. The addition of these extra tones holes below the effective tube length cause the pitch of the E<sup>1</sup> to flatten.



Example 2 Nicolas del Grazia, *Clarinet Multiphonics*. Clarinet cross fingering diagram.

<<http://www.clarinetmultiphonics.org/clarinetmultiphonics.html>> (24 January, 2011)

Multiphonics are often produced when special fingerings are used containing open holes which function as both node inducing holes and end of tube holes. In example 3 there are two effective tube lengths working simultaneously to create the multiphonic, E<sup>1</sup> is the fundamental and C#<sup>3</sup> in the first altissimo register (see Example 3).



Example 3 Nicolas del Grazia, *Clarinet Multiphonics*. Node inducing and end tube tone hole fingering.

<<http://www.clarinetmultiphonics.org/clarinetmultiphonics.html>> (24 January, 2011)

The open hole (second finger) in example 3 behaves as a terminating hole of the shorter tube length. The right hand fingers control the length of the longer tube. Thus, the terminating hole of the shorter tube (open hole in the left hand fingering) also functions as a register opening hole or vent for the longer tube. From spectrum analysis conducted by Ronald Caravan, he labelled this open hole or node producing hole the 'register-terminator hole,'<sup>11</sup> as it performs the two simultaneous functions; terminating the shorter tube and acts as a register opening for the longer tube.<sup>12</sup> This finding works similarly when a performer distorts the tone production to produce a multiphonic. For example, if the clarinettist is playing a note in the clarion register and distorts the tone production affecting the resonances inside the clarinet tube length in such a manner that the open register key acts as a tube length determinant, causing the fundamental-register undertone at the same time that it acts as a register vent.

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<sup>11</sup> Caravan, *op.cit.*, 22.

<sup>12</sup> Rehfeldt, *op.cit.*, 42.

## 1.2 Multiphonics Application

This chapter presents the performer's perspective on the application of the multiphonics in the selected works. The application is discussed in terms of how the composer applied the technique, examining the multiphonics' notation, dynamic, rhythm and textural features.

Eric Mandat's *Preludes Book 1* presented a dense and varied application of multiphonics. The multiphonics heard in this work were largely produced using an unconventional fingering supplied by the composer (refer CD 1 - Tracks 6, 9, 10). However, the multiphonics in the second movement were produced using the standard fingering of the upper note with a distorted tone production (refer CD 1 - Track 7). Similarly, using the standard fingering, but of the lower note with a distorted tone production, the multiphonics in the third movement were formed (refer CD 1 - Track 8). Mandat's creative use of multiphonics in interaction with other compositional elements created the drama and expression in this music. Short, punctuated staccato multiphonics heard in movement one reflected the Illinois Central train station (refer CD 1 - Track 6). These were immediately contrasted with slurred, legato sequences of multiphonics moving in contrary motion in movement two (refer CD 1 - Track 7). The distinct lower pitch in these multiphonic sequences created a steely quality to the sound. The application of multiphonics in the third movement was scattered, with preceding arpeggiated notes which often outlined the harmony of the multiphonic. The multiphonics in movement five contained an independent moving line heard both above and below a sustained pitch which was produced simultaneously. A 'cool breeze' like atmosphere was created with the multiphonic's accompanying repeated diminuendo dynamic. (refer CD 1 - Tracks 10). Mandat's notation was very clear and informative and his intentions obvious throughout the score. The challenges in this work centred on the intrinsic technical difficulty such dense application of multiphonics presents to the performer.

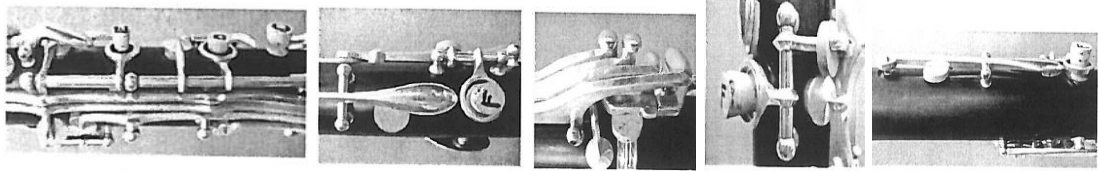
In contrast to *Preludes Book 1*, the piece *Fantasie* by Jörg Widmann, used a sparse application of multiphonics. The multiphonics occurred only four times throughout the piece (refer CD 1 - Track 1, 0:01, 1:58, 7:10 and 9:45) and were notated with a box symbol on the stave with 'multiphonics' written above. The pitches of the first multiphonic were specified in parentheses next to the box symbol. Although not specified in the score, it was assumed by the performer and confirmed through a number of recordings, that the same multiphonic was to be repeated throughout the piece. The repeated multiphonic served as more than an effect, playing an important function of reinforcing the harmonic centre. In addition, Widmann's use

and positioning of the same multiphonic each time, added continuity to what was otherwise a mixed piece containing many short phrases with abrupt changes in character.

Bong-Ho Kim's work, *Ship Jang Saeng I*, incorporated the combination of conventional clarinet tone production with vocal tones produced simultaneously by the performer. The work was included in the recital repertoire because Kim's application of this multiphonic technique was unique in that she requested the performer to produce the same pitch simultaneously. Although the technique suggested this was a type of multiphonic, the aural outcome was not. It created an interesting tone colour and timbre, however the production of two or more simultaneous pitches was not the outcome. She introduced this technique mid way through the piece with a single sustained pitch (refer CD 1 - Track 1, 3:49) and developed this idea towards the end of the piece using it with two longer legato phrases (refer CD 1 - Track 1, 7:33 to 8:04).

Callie Wood's piece *Perspectives* dispersed multiphonics throughout each movement. Wood notated the multiphonics by placing the fundamental pitch on the stave and indicating which harmonic above was to be produced simultaneously. These fundamental pitches included quarter tones. Accordingly, each multiphonic was executed using the standard fingering for the fundamental pitch with a distorted tone production to support the upper pitch. The multiphonics in the opening of the third movement were produced using conventional clarinet tone production with vocal tones produced simultaneously. Similar to those heard in *Ship Jang Saeng I*, the performer was required to sing and play the same pitch simultaneously, however deliberately singing slightly out of tune creating a beating effect to produce the multiphonic (refer CD 4 - Track 8, 0:05 to 0:14). The work draws inspiration from Wood's visit to the Notre Dame Cathedral in Paris. The rough multiphonics in the second movement reflecting loud bells from the Galerie des Chimères (refer CD 4 - Track 7, 1:20 to 1:30) and the final movement reminiscent of the busy street noises (refer CD 4 - Track 8).

The first movement of Eric Mandat's piece *Double Life* applied multiphonic principles and challenged the present definition of a multiphonic. Mandat extended the performer by having the clarinetist play both the A and Bb clarinet at the same time, creating the simultaneous production of two pitches from a single performer. This was facilitated by placing conical corks in specific tone holes and wedging additional cork under the leavers to seal the upper joint of the A clarinet, which would normally be covered by the fingers (see Example 4).



Example 4 Eric Mandat, *Double Life*. Cirrus Music, 2007. Photographic score instructions.

Unlike the other recital pieces, the multiple sonority phrases in this movement contained more independent lines. The top voice played on the Bb clarinet often featured the moving line, with an accompanying lower voice containing more sustained pitches played on the A clarinet (see Example 5 and refer CD 1 - Track 3, 0:44 to 1:00).



Example 5 Eric Mandat, *Double Life*. Cirrus Music, 2007. (movement 1. *Double Life*, page 1)

The question arose as to whether these were a type of multiphonic. On one hand it could be argued that they are not multiphonics because there are two clarinets at work to generate the two pitches. However, these two clarinets would be soundless without the performer, of which there was only one. It could be further disputed that the method of using vocal tones with conventional tone production similarly draws upon two source generators by the one performer to produce the multiphonic and is recognised as a type of multiphonic. So how is the performer playing two clarinets at once any different? Nowhere does the definition say a multiphonic has to be produced from a single monophonic instrument. Although Mandat draws upon multiphonic ideas in this movement, the performer feels they were not genuine multiphonics but challenged the current definition. Despite the addition of a PVC pipe clarinet extension for the second movement, Mandat employed multiphonics using more conventional methods.

The commissioned work, *Seeking The Path That Leads Home* by Nicholas Denison presented clarinet multiphonics in a chamber setting. The piece written for three soprano clarinets reflected an arch like structure, beginning and concluding with a generous application of multiphonics. The type of multiphonics Denison used worked best at soft dynamic levels and predominantly emerged from niente to a piano dynamic. This created a gentle and eerie quality. The multiphonics were passed between the players to create a flow of mysterious sonorities through which a single voice emerged. The pitches in the multiphonics were often reinforced by another player executing one of the pitches an octave apart. In bar 4 (see Example 6), the D<sup>1</sup> present in the multiphonic of clarinet three is also heard the octave above in clarinet one. Similarly, in bar 6, the altissimo Db<sup>3</sup> in the multiphonic in clarinet one is reinforced by both players two and three. These multiphonics have a soft and fragile quality so this technique in Denison's writing added depth and security to the sound.

The image displays a musical score for three soprano clarinets, labeled (1), (2), and (3), in 4/4 time. The score is divided into two systems, with the first system starting at bar 4 and the second system starting at bar 6. The notation includes various dynamic markings such as *espress. p*, *mf*, *pp*, *mp*, *n* (niente), and *p* (piano). There are also articulation marks like accents and slurs, and fingerings indicated by numbers 3 and 5. Below the staves, there are two diagrams of a soprano clarinet. The first diagram shows fingerings for notes in the first system, and the second diagram shows fingerings for notes in the second system. The score is written in treble clef with a key signature of one flat (Bb).

Example 6 Nicholas Denison, *Seeking The Path That Leads Home*. (bars 4-7)

### 1.3 Multiphonics Performance Challenges

Five tables located at the end of this chapter have been compiled by the performer and contain a sample of the multiphonic challenges encountered in the repertoire. Each multiphonic example is numbered and includes what piece the multiphonic occurred in, a copy of the multiphonic as notated in the score, what challenge the multiphonic presented for performance and how the performer approached the challenge. These tables of examples will be referred to throughout this chapter.

Multiphonics are intrinsically difficult to produce due to their sensitive nature. Examples in the tables highlight the difficulty getting pitches to speak, sustaining pitches and balancing pitches. Each multiphonic functioned and responded differently to even the slightest adjustments made and thus required a significant amount of practice to develop these subtle adjustments. Their success for performance greatly depended on how flexible the performer could be on the instrument. As emphasized in the tables, it was critical that the performer knew in advance how each multiphonic behaved. A number of approaches have been suggested by various scholars: 'Bartolozzi's approach involves embouchure flexibility, lip pressure, air pressure and reed position. William O. Smith's approach involves a combination of embouchure and throat flexibility. Phillip Rhedfeldt's approach involves only adjustments to jaw pressure.'<sup>13</sup> Just as there are many different approaches to standard playing, equally there are different approaches to playing multiphonics. Each of these approaches can be helpful for clarinetists. As highlighted in the tables, from the performer's experience, flexibility and experimentation with air speed, lower lip pressure and mouth cavity shapes were the most successful methods.

Examining a few examples from the tables, Table 1, example 1.1 was taken from the first movement of *Preludes Book 1*. This multiphonic occurred on the fourth beat in bars 1 and 2 of the opening phrase (refer CD 1 - Track 6). The difficulty with stabilising this multiphonic was addressed by suddenly lessening the lower lip pressure and reducing the air speed. This multiphonic had a quieter characteristic than the preceding multiphonics and yet Mandat requested it to be accented and sustained with the additional tenuto marking. This contrast in articulation was achieved by sustaining the multiphonic for the full crotchet length as best as possible to imply the accent.

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<sup>13</sup> Holly Ann Haddad. The History and Comparison of Three Diverse Systems of Producing Multiphonics on the B-Flat Boehm System Clarinet. (Ph. D. Thesis. School of Music, Arizona University, 2006), 87-88.



Table 1, examples 1.2 and 1.3 were taken from bar 4 of the same phrase. These multiphonics were even more difficult. The challenge was getting all the pitches to speak in both multiphonics. The clarion B<sup>1</sup>, present in these multiphonics came out quite strongly, which was to be expected with the predominantly B<sup>1</sup> based fingering. The addition of the A<sup>1</sup> and G<sup>#1</sup> vent keys to this B<sup>1</sup> fingering helped facilitate the multiphonics. In both of these, a delicate control of an extremely slow air speed and loose lower lip pressure was required. Mandat further challenged the performer by requesting multiphonic 1.3 be sustained with the notated fermata.

The performer found the multiphonics in Table 2, examples 2.2, 2.3, 2.4 and 2.5 from the third movement of Mandat's *Preludes Book 1*, to be among the most difficult. It was not easy to execute the upper pitch, particularly in examples 2.2 and 2.3. These were resistant as they spanned small intervals of a sixth and were clarion register notes with long fingerings, meaning that most of the tone holes were covered. The performer experimented with adding vents and alternative fingerings but these produced unwanted nodes below the clarion pitch. Consequently, the standard long fingerings in the multiphonics were used. The piece contained other multiphonics spanning smaller intervals of a third, fourth and even a semitone, however these were all supported with an accompanying special fingering. With practice, it became evident that using a slow initial air speed, with a modest application of lower lip pressure to sound the lower clarion note of the multiphonic was the first step. Subtly increasing the air pressure and narrowing the cavity inside the mouth creating an EEE shape to support the upper pitch, these multiphonics could emerge. The change in resistance could be felt as hints of the upper harmonic emerged. It was a delicate balance. As reflected in the recording, the performer struggled to sustain these multiphonics for the required duration of three crotchet beats and also had difficulties ensuring both pitches within the multiphonic sounded at the same time (refer CD 1 - Track 8). The American Record Guide review of clarinetist Sean Osborn's recording of this work on his CD called American Spirit exemplifies the difficulty of multiphonics with the review stating '...multiphonics and bent notes make the instrument seem unnatural...though it is an amazing feat to be able to pull off such a work, the clarinet seems to be breaking under the strain, and the tonal quality of the instrument suffers greatly in the process.'<sup>14</sup> Ultimately, the difficulty is making these adjustments become second nature, just like in standard playing.

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<sup>14</sup> Steven Ritter. *American Record Guide*. May/June 2004. <<http://www.osbornmusic.com/reviews.html>> (29 June, 2011).

Table 4, example 4.2 from Widmann's *Fantasie* was a tuning difficulty. The suggested fingering for the multiphonic sat comfortably on the instrument, however the Eb<sup>3</sup> was quite sharp, sounding more an E<sup>3</sup>. This out of tune fingering was a result of Widmann approaching the composition from the German clarinet system of playing. As a result, the indicated fingering functioned differently on the French clarinet system, revealed with the out of tune Eb<sup>3</sup>. This situation highlighted how multiphonic fingerings on the German system of clarinet do not translate the same on the French system. It also raised the importance to check the tuning of the multiphonics, as the indicated fingerings do not necessarily achieve the desired result for every player. Alternative fingering combinations were experimented with, however these alternatives began affecting the other pitches in the multiphonic. The lowest pitch in the multiphonic, the F<sup>1</sup>, rested reasonably in tune using the suggested fingering and the performer felt it was important this pitch be in tune as it was the starting note of the following scale figure that emerged from the multiphonic. Therefore, the performer decided to use the indicated fingering and make do with the slightly out of tune upper note for the sake of keeping the lowest pitch in tune. Adjustments with the embouchure to push the pitch down of the upper note were made to assist as best as possible.

The multiphonics in examples 5.3, 5.4 and 5.5 from Table 5, presented ensemble challenges. It was tricky to create a seamless pass over of the same multiphonic in example 5.3 due to ensemble tuning difficulties (refer CD 1 - Track 11, 0:00 to 0:21). As clarinet one increased in dynamic level, the natural tendency was for the pitches in the multiphonic to flatten slightly. Clarinet two would then enter from *niente* using the same multiphonic, which was characteristically sharp due to the soft dynamic. This could only be resolved with prior awareness of these tendencies, tuning before the performance and adjusting as best as possible while supporting both pitches of the multiphonic.

Incorporating dynamics added to the complexity of the multiphonics. 'If you try to project them, they're even more difficult,'<sup>15</sup> confirms William O. Smith. Some multiphonics were naturally more flexible than others such as those in the second movement of *Preludes Book 1* (refer CD 1 - Track 7), Vasks' *Moments musicaux* (refer CD 4 - Track 4, 1:12 to 1:42) and in the second movement of Wood's *Perspectives* (refer CD 4 - Track 7). Catalogue systems have organised them according to their versatility and include those by Rehdelt, Farmer, Richards, Bartolozzi and more recently Holly Ann Haddad. As a generalisation, the performer found opting for a slightly softer than normal reed allowed for greater dynamic variation. The performer did

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<sup>15</sup> Rehfeldt, op.cit., 43.

consider using a microphone for the recitals to help convey the dynamic changes without forcefully trying to exaggerate them. However, a microphone would inhibit the amount of naturally occurring performance movement, which the performer disliked. In the end, smaller and more intimate performance spaces were opted for to accommodate this.

Making a start was another challenge in the preliminary stages. Complex scores and initial difficulties can cause performers to choose music which is easier to understand and execute. However, a part of this music's integral meaning comes from the struggle. '...a layer of excitement is added by the need of the performer to wrestle inward and struggle to produce something slightly beyond his or her reach.'<sup>16</sup> 'The battle and required athleticism of the performer helps create energy to the music, a heightened raw energy.'<sup>17</sup> *Preludes Book 1* and *Double Life* were particularly confronting and difficult to find a way into the music. *Preludes Book 1* with the successive multiphonics requiring the performer learn a large number of unconventional fingerings and *Double Life* demanding the performer play two clarinets at the same time, along with co-ordination of a PVC pipe extension to further complicate things. Isolating problematic multiphonics and practicing separately before placing in context with the other music material coupled with a positive mental attitude was crucial. In addition, the performer found it beneficial to concentrate on communicating the drama and characters contained in the music, rather than allowing the technical challenges to overwhelm.

Difficulty with the multiphonics also encouraged the performer to experiment with equipment. The performer was fortunate to borrow a large variety of mouthpieces from her supervisor to experiment with. The pairing of reed and mouthpiece is a more critical factor in producing multiphonics rather than the instrument itself as this is the epicentre for tone production. It was a tricky process testing the various mouthpieces, as they were not always suited to the type of reed that the performer normally uses. Bringing in a second variable further complicated this process of elimination. Be that as it may, the performer discovered a Japanese mouthpiece, Nagamatsu 5-20. This mouthpiece played similarly to the performer's original Zinner D2 mouthpiece with its 1.09mm tip opening and 18mm facing. As is often the case, the most successful equipment is that which the performer is most accustomed to playing. The Nagamatsu 5-20 had a medium tip opening of 1.15mm and a longer facing length of 20mm. The Nagamatsu mouthpiece was paired with the performer's usual set-up of Vandoren V12 reeds held in place with a BG Revelation ligature. A minuscule difference in flexibility was felt,

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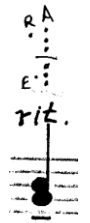
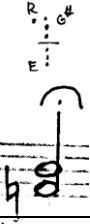
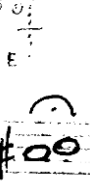
<sup>16</sup> Lisa M. Cella. *A Resource Manual for the Solo Flute Repertoire of the Twentieth Century*. (DMA Dissertation, University of California, San Diego, 2001), 71.

<sup>17</sup> *ibid*, 30.

prompting the change to the Nagamatsu mouthpiece for the recital recordings. The slightly longer facing and complimenting wider tip opening provided excellent low tonal qualities and a slightly slower response. The slower response allowed more time for the performer to ease into the multiphonic and respond to the delicate adjustments required. The most considerable difference between mouthpieces was the bore shape. Nagamatsu mouthpieces have a uniquely W Cut bore and fulcrum construction. Opposed to the popular H bore design of the Zinner mouthpiece. The Nagamatsu W Cut and fulcrum construction enables the player to make a dark balanced tone as favoured by the performer. Still maintaining the paralleled side walls of the H bore design providing a centred and controlled sound.

All things considered, the differences between mouthpieces to assist with the multiphonics were slight. Success with the multiphonics largely depended on how flexible the performer could be on the instrument to accommodate the subtle changes.

Table 1

Repertoire	Multiphonic	Production	Challenge	Why	Approach
<b>1.1</b> Preludes Book 1, Movement 1		Unconventional Fingering	Stability Accent Tenuto	Requires quick & significant change in embouchure shape from previous multiphonic	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Rapid lessening of lower lip pressure</li> <li>- Rapid lessening of air speed</li> </ul>
<b>1.2</b> Preludes Book 1, Movement 1		Unconventional Fingering	Balancing pitches Getting G to speak	Long clarion B based fingering	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Extremely slow air speed</li> <li>- Extremely loose lower lip pressure</li> </ul>
<b>1.3</b> Preludes Book 1, Movement 1		Unconventional Fingering	Balancing pitches Getting F to speak	Long clarion B based fingering	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Extremely slow air speed</li> <li>- Extremely loose lower lip pressure</li> </ul>
<b>1.4</b> Preludes Book 1, Movement 1		Unconventional Fingering	Balancing pitches	Long clarion B based fingering Close interval	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Extremely slow air speed</li> <li>- Extremely loose lower lip pressure</li> </ul>

**Table 2**

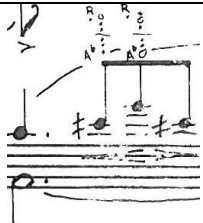




<b>Repertoire</b>	<b>Multiphonic</b>	<b>Production</b>	<b>Challenge</b>	<b>Why</b>	<b>Approach</b>
<b>2.1</b> Preludes Book 1, Movement 2		Unconventional Fingering	Independent movement	Pitches C# & G require different mouth shapes than the F undertone	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Increase air speed</li> <li>- Narrow cavity inside the mouth using EEE shape to support upper pitches</li> </ul>
<b>2.2</b> Preludes Book 1, Movement 3		Standard Fingering for Lower Pitch	Executing upper pitch	Long clarion fingering Close interval	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Slowly increase air pressure</li> <li>- Narrow cavity inside the mouth using EEE shape to support upper pitches</li> </ul>
<b>2.3</b> Preludes Book 1, Movement 3		Standard Fingering for Lower Pitch	Executing upper pitch	Long clarion fingering, close interval	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Slowly increase air pressure</li> <li>- Narrow cavity inside the mouth using EEE shape to support upper pitches</li> </ul>
<b>2.4</b> Preludes Book 1, Movement 3		Standard Fingering for Lower Pitch	Stability	Fingering	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Standard fingering for upper pitch plus covering top tone hole</li> </ul>
<b>2.5</b> Preludes Book 1, Movement 3		Standard Fingering for Lower Pitch	Stability	Fingering	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Standard fingering for upper pitch plus covering top tone hole</li> </ul>

Table 3


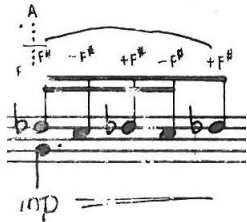
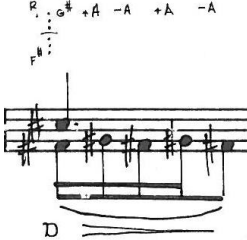

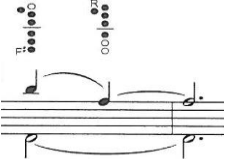
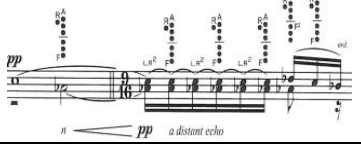
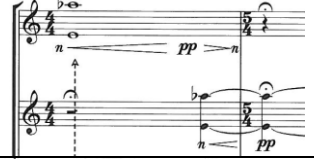


Repertoire	Multiphonic	Production	Challenge	Why	Approach
<b>3.1</b> Preludes Book 1, Movement 3		Standard Fingering for Lower Pitch	Executing upper pitch Tuning	Quick & significant change in embouchure shape from previous multiphonic	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Increase air pressure</li> <li>- Narrow cavity inside the mouth using EEE shape to support upper pitches while balancing lower G pitch</li> <li>- Addition of bottom 2 right hand side keys</li> </ul>
<b>3.2</b> Preludes Book 1, Movement 5		Unconventional Fingering	Executing the Db within the sequence	The F# vent	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Narrow cavity inside the mouth using EEE shape to support Db</li> <li>- Aim for upper pitch rather than lower sustained pitch</li> </ul>
<b>3.3</b> Preludes Book 1, Movement 5		Unconventional Fingering	Fingering	Physically awkward	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Different fingering - vent the second from bottom right hand side key to facilitate moving line</li> </ul>
<b>3.4</b> Preludes Book 1, Movement 5		Standard Fingering for Lower Pitch	Sustaining lower note	Long fingering Close interval	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Open mouth shape cavity shape when over-blowing</li> <li>- Slowly increase air speed as pitches feel supported</li> </ul>

Table 4

Repertoire	Multiphonic	Production	Challenge	Why	Approach
<b>4.1</b> Preludes Book 1, Movement 5		Standard Fingering for Lower Pitch	Getting the Ab to speak	Quick and significant change in embouchure shape from pervious multiphonic	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Quick reduction of lower lip pressure</li> <li>- Quick reduction of air speed until lower pitch speaks</li> </ul>
<b>4.2</b> Fantasie		Unconventional Fingering	Tuning the Eb in the multiphonics	Fingering provided designed for German clarinet system	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Use existing unconventional fingering</li> <li>- Open mouth cavity shape to lower pitch of the sharp Eb</li> <li>- Reduction of lower lip pressure to lower pitch of the sharp Eb</li> </ul>
<b>4.3</b> Ship Jang Saeng I		Singing while playing	Balancing clarinet and voice Singing in tune	Clarinet louder than voice Singing through the instrument flattens the pitch	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Establish the clarinet pitch first, then add the voice, rather than actuating at the same time</li> </ul>
<b>4.4</b> Double Life, Movement 1		Unconventional Fingering	Multiphonic tremolo to occur only in lower voice	Large interval Tricky to maintain tremolo while executing the higher pitch as different mouth shapes required	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Establish tremolo first</li> <li>- Narrow cavity inside the mouth using EEE shape to support upper pitches</li> </ul>
<b>4.5</b> Double Life, Movement 2		Unconventional Fingering	Sustained lower note drops out	Change of fingering and subsequent change in resonant balance	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Rapid lessening of lower lip pressure</li> <li>- Rapid lessening of air speed</li> </ul>



Table 5

Repertoire	Multiphonic	Production	Challenge	Why	Approach
5.1 Double Life, Movement 2		Unconventional Fingering	Sustained lower note drops out	Change in resonant balance with the changing pitch	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Lessening of lower lip pressure</li> <li>- Widen cavity inside mouth using AHH shape and dropping the tongue</li> </ul>
5.2 Double Life, Movement 2		Unconventional Fingering	Co-ordination	Sequence achieved through co- ordinating the legs with the PVC pipe	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Keep legs close to the PVC tone holes</li> <li>- Slow practice with a metronome</li> </ul>
5.3 Seeking the Path that Leads Home		Standard Fingering for Upper Pitch	Ensemble tuning Blending	Multiphonics execute differently between players	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Tuning ensemble before playing</li> <li>- Learning the other players tendencies</li> <li>- Pitch matching exercises</li> </ul>
5.4 Seeking the Path that Leads Home		Unconventional Fingering	Tuning octave	D naturally a sharp note for player 1	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Player 1 to flatten their pitch to accommodate player 3</li> </ul>
5.5 Seeking the Path that Leads Home		Unconventional Fingering	Stability Dynamics Ensemble tuning	Player 2 multiphonic spans wide interval Upper pitch characteristically loud	<ul style="list-style-type: none"> <li>- Prior awareness of multiphonic characteristics</li> <li>- Reduce length of the fermata</li> <li>- Raise dynamic levels</li> </ul>

## B2 Portamenti

### 2.1 Production of Portamenti

Portamento is the smooth connection between two tones, passing through all of the possible pitches or frequencies between the two tones without interruption. The continuous movement of a trombone slide or a string player's finger slide along a single string yields similar effects.<sup>18</sup>

According to Edward Brombach, the studies by Carl Seashore report that portamento originates in early vocal music when an uninterrupted flow of tone or vowel sound connects two or more notes of differing pitches.<sup>19</sup> This portamento is an intrinsic part of the vocal technique and requires no special notational sign as the desired effect naturally occurs. Unlike vocal technique though, clarinet portamento is not an intrinsic part of normal playing technique. It requires clarinetists to draw upon an extended set of skills and for this reason portamento for the clarinet is referred to as an extended technique. This is reflected in multiple clarinet resources labelling it an extended technique, contemporary technique,<sup>20</sup> special effect,<sup>21</sup> avant-garde technique<sup>22</sup> or modern technique.<sup>23</sup>

A number of explanations and methods have been suggested for the production of portamento. All of them involve lip pressure, oral cavity shape, throat opening, tongue position, air pressure, and fingers, although in different hierarchical positions of importance.<sup>24</sup> In spite of these variations, each acknowledges that, by skilfully coordinating the fingers smoothly to uncover the clarinet finger holes whilst simultaneously adjusting the oral cavity shape and lip pressure a smooth portamento can be facilitated.

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<sup>18</sup> Richards, op.cit.

<sup>19</sup> Edward William Brombach. *Portamento: The Audible Position Change used for Expressive Purposes*. (Ph.D. Thesis, Eastman School of Music of the University of Rochester, 1969), 13.

<sup>20</sup> Farmer, op.cit., 1.

<sup>21</sup> Rehfeldt, op.cit.

<sup>22</sup> Mary Alice Druhan. *A performer's Guide to Multimedia Composition for Clarinet and Visuals: A Tutorial Focusing on works by Joel Chadabe, Merrill Ellis, William O. Smith, and Reynold Weidenaar*. (Ph.D. Thesis, Louisiana State University, 2003), 1.

<sup>23</sup> *ibid*, 1.

<sup>24</sup> Richards, op.cit.

Physicists Joe Wolfe, Jer-Ming Chen and John Smith from the University of New South Wales School of Physics, have thoroughly studied this technique and offer a great explanation on the principles behind production. Their research has focussed on the roles that a player's vocal tract and partial covering of the tone holes can play in portamento by measuring the acoustic impedance spectra of the clarinet bore and inside the player's mouth. Their studies have confirmed that:

For normal clarinet playing, resonances in the clarinet bore, (determined by the fingering used) dominate to drive the reed to oscillate at a frequency very close to that of the bore and reed in parallel. However, if the upstream resonance in the player's vocal tract is adjusted to have a sufficiently high impedance peak at the appropriate frequency, the vocal tract resonance competes with or dominates the clarinet resonance to determine the reed's sounding frequency. By skilfully coordinating the fingers to smoothly uncover the clarinet finger holes and simultaneously tuning strong vocal tract resonances to the continuously changing pitch, expert players are able to facilitate a smooth trombone-like glissando.<sup>25</sup>

There is also agreement in the literature that pitches can be altered somewhat without changing fingerings. This produces a shorter type of portamento and is commonly referred to as lip or pitch bending, as it is purely achieved through adjustments of the embouchure. Likewise, there is consensus that portamento can be produced by just sliding the fingers. This sliding allows the sounding pitch to increase smoothly by gradually raising the bore resonance, instead of moving in distinct steps as in a normal musical scale.<sup>26</sup>

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<sup>25</sup> J.M. Chen, J. Smith and J. Wolfe. 'Pitch bending and glissandi on the clarinet: roles of the vocal tract and partial tone hole closure.' *J. Acoust. Soc. America*, 126 (3) 2009 : 1511-1520.

<sup>26</sup> *ibid*, 1511.

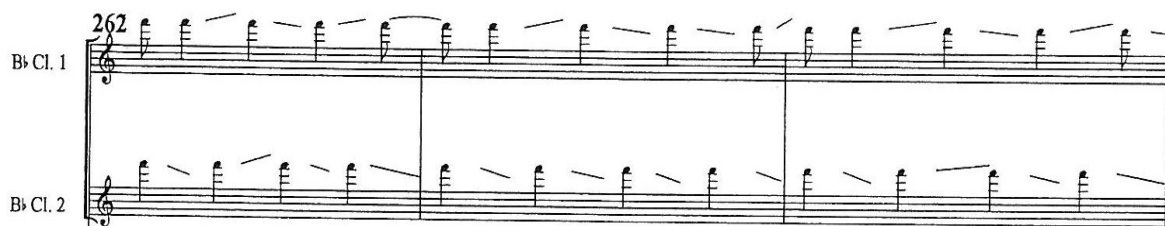
## 2.2 Portamenti Application

This chapter presents the performer's perspective on the application and expression of the portamenti in the selected works. The application is discussed in terms of how the composer applied the technique.

The portamenti in Jörg Widmann's *Fantasie* complemented the musical material adding humour and wit to this energetic piece. Widmann's knowledge of the instrument was evident through his placement of the portamenti in the clarion and lower altissimo registers where they were quite flexible. He called upon the performer to execute nine falling portamenti, nineteen rising portamenti and five sequences of connected portamenti. The sequences of connected portamenti stood out as feature moments and the scattered singular portamenti produced a relaxed, vocal quality easing into or falling away at the end of a phrase. Widmann's generous application of this extended technique highlighted a number of common notational challenges which are discussed in the following chapter.

*Freebirds* by Scott McAllister was selected for its striking portamenti expanding over the entire range of the instrument. These expansive portamenti are a feature of the piece (refer CD 2 Track 1, 1:05 to 1:19). In addition, numerous shorter rising and falling portamenti in both solo clarinet parts are heard throughout the work. The portamenti between the solo parts are often in succession of one another at varying intervals. The largest interval of time between the portamenti was a dotted crotchet apart. This gap between the portamenti was reduced to half a beat, until both clarinets are heard playing together (refer CD 2 - Track 1, 0:00 to 0:35). The variation of space between the solo clarinets resembled two birds in dialogue.

A particularly effective section was from bars 259 to 264, where both clarinets played repeated portamenti half a beat apart from each other (refer CD 2 - Track 1, 11:15 and see Example 7). The different entry points and contrary motion of the portamenti made this a climatic section in the piece.



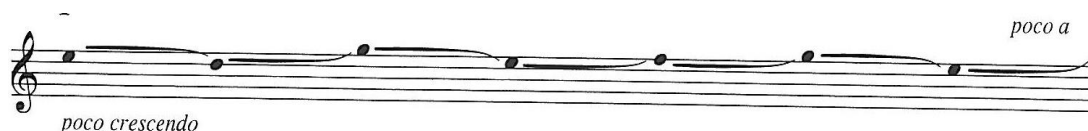
The image shows a musical score for two Bb Clarinets. The top staff is labeled 'Bb Cl. 1' and the bottom staff is labeled 'Bb Cl. 2'. The score is divided into three measures. The first measure starts at bar 262. Both instruments play a series of repeated portamenti (glissandi) that span the entire range of the instrument. The notation includes slurs and arrows indicating the direction of the glissandi. The first staff (Bb Cl. 1) starts at bar 262. The second staff (Bb Cl. 2) starts at bar 263. The notation is written in a standard musical notation style with a treble clef and a key signature of one flat (Bb).

Example 7 Scott McAllister, *Freebirds*. Lydmusic, 2009. (bars 262-264)

Example 7 displays McAllister's liner symbol he used to indicate the portamenti. On occasions, the gradient and length of this symbol varied slightly indicating to the performer that a corresponding change of rate and length of the portamenti was required. The conversational portamenti between the two solo clarinets were interspersed with duelling virtuosic moments. The composition is influenced by Lynyrd Skynyrd's iconic rock anthem *Freebird* with motives taken directly from this popular rock tune.<sup>27</sup>

In contrast to *Freebirds*, Bong-Ho Kim Kim's *Ship Jang Saeng I* contained significantly shorter portamenti spanning intervals of either a tone or semitone. These shorter portamenti were executed in a slower tempo and in the chalumeau register of the instrument. Portamenti moving across small distances are sometimes referred to as pitch or lip bends, as the pitch can be altered without changing fingerings when placed in flexible registers. However, in this piece, the portamenti were in the lower register of the instrument and carried out by sliding the fingers to adjust the bore resonance. This is unlike the other recital works, which have all required additional support from the vocal tract and embouchure. *Ship Jang Saeng I* was also selected because of its prominent notated lip vibrato. This deliberate lip vibrato engages portamento technique on a micro level, adding colour and embellishment to the fundamental pitch (refer CD 1 - Track 1, 1:47 to 3:45).

*Moments musicaux* by Pēteris Vasks, applied portamento principles using the mouthpiece only. Unlike the standard methods of production, the portamenti in this instance were regulated using the palm of the hands. A cylindrical shape with the right hand was used to surround the mouthpiece and slightly extend the length of the mouthpiece bore to reach the notated clarion pitches. The left hand was then coupled below to regulate the sliding portamenti which connected the pitches. Vasks' clearly specified the portamenti with a curved line and accompanying *gliss* indication (see Example 8). The sound quality of the portamenti executed on the mouthpiece alone encapsulated the eerie *Misterioso* title of this movement.



Example 8 Pēteris Vasks, *Moments musicaux*. Mainz: Schott, 1977. (movement III *Misterioso*)

<sup>27</sup> Lynyrd Skynyrd. "Free Bird" <<http://www.youtube.com/watch?v=wHx7vaa9Fwo>> (12 January, 2013).

The portamenti in the recital recording of *Czernowitzer Skizzen* by Alexander Kukelka were instinctively incorporated into the work by all players rather than deliberately notated by the composer. For example, in the second movement, additional subtle descending portamenti added by the first clarinet can be heard, particularly in bars 3 and 10 (refer CD 3 - Track 3, 0:00 to 0:33 and see Example 9).

Nr. 2

The image displays a musical score for a piece titled 'Nr. 2'. It is a four-staff score, likely for a string quartet, with a first clarinet part. The first system covers measures 1-4, and the second system covers measures 5-10. The music is in a key with one flat (B-flat) and a 3/4 time signature. Dynamics include *mp* (mezzo-piano) and *p* (piano). The tempo is marked 'Rubato'. The score includes various musical notations such as triplets, slurs, and portamenti (indicated by wavy lines). The second system includes a 'Gliss.' (glissando) marking. The score is for a recital recording of *Czernowitzer Skizzen* by Alexander Kukelka.

Example 9 Alexander Kukelka, *Czernowitzer Skizzen*. 2004. (movement 2. bars 1-10)

Similarly, the commissioned work *Rondo* by Nicholas Denison, which was loosely influenced by the Klezmer style, also contained many instinctively added portamenti (refer CD 3 - Track 1 1:58, 4:00 and 4:06). It is often the case with this style of music, influenced by Jewish folk or Klezmer music, that the performer will naturally add the idiomatic Klezmer inflections as a means of expression of emotion. The opportunity to liaise with the composer confirmed this liberty. The performers in both of these works relished in the freedom to place portamenti and other non-notated embellishments in response to one's personal engagement with the music at that time.

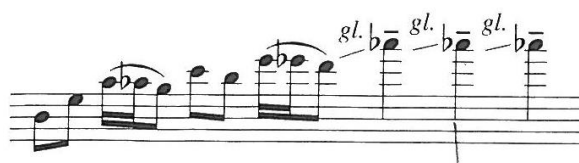
Such variation in the application of portamento accordingly provided variation in the range of challenges for the performer to address. The following section documents these challenges and evaluates the performer's approach to addressing these challenges.

## 2.3 Portamenti Performance Challenges

The notation of portamento is not always clear and is often used interchangeably with the term glissando. However, owing to the acoustical nature of the clarinet, it is important to distinguish between the two. Unlike portamento, glissando uses rapid chromatic or diatonic finger movement between two pitches. A common challenge encountered was whether the composer's were really requesting a portamento or rather glissando. It was interesting that Widmann as a clarinettist would confuse the two terms in his *Fantasie*. Widmann when indicating the portamenti used a linear symbol with the word *Gliss* alongside, when what he was really requesting was a portamento. Similarly, he indicated the glissandi using the same linear symbol, however with the written instruction *Chrom*, meaning rapid chromatic movement between the two pitches. Although Widmann still successfully made a clear differentiation between the two techniques, his use of the word *Gliss* could cause some confusion.

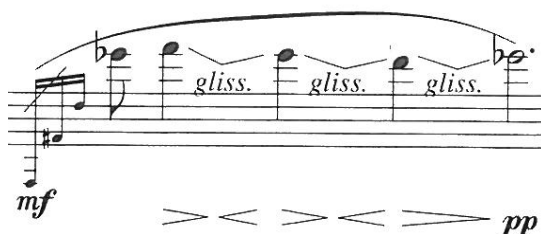
Another notational problem which arose in *Freebirds*, *Fantasie*, and *Double Life*, was determining what pitches the portamenti should extend to or begin on when the composer did not specify. *Fantasie* sometimes indicated the pitches the portamenti were to move between, however, occasionally this information was left out. In this situation, the performer selected pitches that were in keeping with the melodic character of the music and were technically feasible on the instrument.

In example 10 from *Fantasie*, two of the repeated portamenti have no starting pitch, the only indications were to rise to the altissimo Ab<sup>3</sup>. In this situation, the performer chose to rise to the Ab<sup>3</sup> from the semitone below. At this point in the piece, the tempo was marked *Schnell, brilliant*; consequently, there was limited time to execute a large portamenti. Furthermore, the piece used a lot of repeated semitone movement throughout and so the selection of this small distance was in keeping with the musical material. The semitone movement technically sat well on the clarinet here, allowing the performer to simply slide the bottom two fingers, of the left hand on the top joint of the instrument, whilst the right hand kept the two bottom side keys depressed. A number of recordings also executed these portamenti across a similar distance (refer CD 1 - Track 2, 5:28 and see Example 10).



Example 10 Jörg Widmann, *Fantasie*. Mainz: Schott, 1993. (page 5)

Similarly, in example 11 from *Fantasie*, the performer extended the portamenti across the distance of a tone and a half as the pitch descended, allowing it to comfortably rise a semitone to the following pitch. The last portamenti in the sequence being an exception. This rising semitone movement of the portamenti was often used in the piece and so this distance is in keeping with the context (refer CD 1 - Track 2, 0:44 and see Example 11).



Example 11. Jörg Widmann, *Fantasie*. Mainz: Schott, 1993. (page 3)

Notational challenges are partly a result of the fact that many extended techniques are still not completely standardized, despite the development of excellent resources. Cellist Siegfried Palm has pointed out that the 'danger lies in the fact that the same interpreters always tend to work with the same composers, busily preparing their works. This results in an exclusivity which is encouraged by the notation, thus misleading the outsider.'<sup>28</sup>

The deliberate lip vibrato featured in *Ship Jang Saeng I* engaged the portamento technique on a micro level, releasing the lower lip pressure to lower the bore resonance producing a repeated type of shorter portamenti. Kim indicated this vibrato to transition from *non vib.* to *molto vib.* and back to *non vib.* The performer questioned whether the *molto* referred to the vibrato's speed, depth or both. For maximum effect, the performer chose to increase both the depth and speed of the vibrato downwards towards the lower adjacent pitch (refer CD 1 - Track 1, 1:47 to 3:45). A recording of the work on the CD *Bridges*<sup>29</sup> applies changes to both also. It was difficult to control the shape and consistency of each wave. The performer found the most effective way to develop this technique was to practice using a metronome at a slow speed with crotchet beat vibrato waves, then quaver beat waves, triplets beats and semiquavers. Keeping the tempo steady and gradually increasing the speed once control and a consistent shape was achieved.

<sup>28</sup> Richards, op.cit.

<sup>29</sup> Andrew Schultz; Graham Hair; Sorin Lerescu; Bong-Ho Kim and others. *Bridges*. Peter Handsworth, clarinet; Fintan Murphy, violin; Tamara Smolyar, piano; Timothy Phillips, percussion. Compact disc. Move Records. MD3281, 2003. 6.



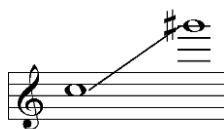
The expansive portamenti in *Freebirds* presented a daunting technical challenge. The difficulty surrounding the execution of the portamenti in *Freebirds* was very much felt. This challenge was approached by breaking the large portamenti into three manageable sections.

- Section 1



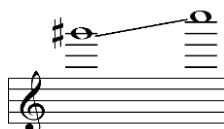
In this section the portamento was achieved by sliding the fingers gradually upwards to raise the bore resonance. This worked effectively until reaching the throat note G<sup>1</sup> where the performer must manoeuvre the portamento across the break. To achieve this, prior to reaching the throat note G<sup>1</sup> the player must reduce the lower lip pressure so that the bore resonance drops and begins competing with the upstream vocal tract resonance, at which point the performer can feel the vocal tract resonance dominating and determining the sounding frequency, overriding control of the reed's vibrations. Meanwhile, the fingers should still be sliding to uncover the clarinet finger holes until finally landing on C<sup>2</sup> in the clarion register.

- Section 2



The second section was carried out like the first section. However, maintaining a strong vocal tract resonance throughout to slide the pitch up with the finger movement acting as a support.

- Section 3



Secure execution of these altissimo notes must be attained first with simple chromatic practice of the notes contained in this final section. Using fast air pressure, a small mouth shape between the tongue and the roof of the mouth and more bottom lip pressure all assist with the extreme register notes. Once this was reliable, the portamento could be attempted. The final section of the portamento was largely achieved through sliding the fingers to raise the bore resonance using the following sequence of fingerings;

G#	to	A	to	Bb	to	C
<b>T R</b>		<b>T R</b>		<b>T R</b>		<b>T R</b>
-		-		<b>1</b>		<b>1</b>
-		<b>2</b>		<b>2</b>		-
-		<b>3</b>		<b>3C#/G#</b>		-
-		-		<b>4</b>		<b>4</b>
<b>5</b>		-		<b>5</b>		-
-		-		<b>6</b>		-
<b>G#/D#</b>		<b>G#/D#</b>		<b>B/C</b>		

G# to A: Slide the right hand middle finger off while simultaneously adding the left hand to fingers to reach A.

A to Bb: Immediately add the left hand C# key to the A fingering before quickly putting down all fingers down for the long fingering Bb.

Bb to C: Gradually slide off fingers in upward motion leaving the remaining fingers necessary for the C.

This final section was practiced very slowly to begin with, to develop control and the necessary co-ordination sliding from one fingering to the next. These transitions were gradually sped up once confidence was achieved. Similarly, joining all three sections into one seamless portamento was practiced slowly and gradually sped up. Fitting the portamenti smoothly within the designated space of time was difficult, regular practice with a metronome was crucial.

As reflected in the performance recording, there were occasions where both the soloists fell short of the top altissimo note in the portamenti. In addition, some of the portamenti lacked the smooth, seamless effect. Both soloists found it difficult to execute the portamenti consistently under the performance circumstances of this Australian premiere (refer to CD 2, Track 1, 1:05, 4:08 and 11:38).

## Conclusion

The selected repertoire has presented a varied application of the chosen techniques. The density of multiphonics in *Preludes Book 1* was starkly different to the sparse application in *Fantasie*. Expansive portamenti in *Freebirds* spanning the entire range of the instrument contrasted the far shorter portamenti in *Ship Jang Saeng I* and *Fantasie*. Instinctively incorporated portamenti were reflected in *Czernowitzer Skizzen* and *Rondo*, added by the performer as a means of expression. Extensions of the multiphonic technique were applied in *Double Life* and *Ship Jang Saeng I*, challenging multiphonic principles. The newly commissioned works in this study effectively synthesized the selected techniques and make a valuable contribution to the clarinet repertoire.

The challenges these techniques have for performance has been discussed and performance solutions have been offered. The multiphonic challenges centred on their fragility; getting pitches to speak, sustaining pitches, balancing pitches and tuning pitches. Success for performance greatly depended on how flexible the performer could be on the instrument, requiring a heightened awareness of the embouchure at all times. The portamenti challenges identified were predominantly notational and were resolved using information provided in the scores and recordings.

This research provided opportunity to expand upon personal technical and expressive capabilities on the clarinet. This ensures that as a performer we do not stagnate, but grow, develop and move forward. It is hoped the recital performances and supporting exegesis will provide a useful resource for future clarinettists seeking to tackle the extended techniques and the associated repertoire.

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