Bi-tone Techniques and Notation in Contemporary Guitar Music Composition

Christopher Sainsbury

A thesis component for the degree of Master of Music Composition

Composition Faculty

NSW Conservatorium of Music

2001 – 2002
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Abstract

This study of bitone concepts and techniques explores the thesis that bitones are a natural extension of the timbral palette of the guitar, and that the execution, notation, associated terminology and performance directions of bitones need a comprehensive approach. In addition, bitones serve as a source of harmonic and melodic material that is ‘guitar specific’, being derived from the physics of guitar string length and fret position, and extending pertinent harmelodic language options for composers of guitar music.

Chapter One delves into definitions of bi-tones and their characteristics. In this light it is relevant to clarify some of the common misunderstandings about bi-tones. Charting the parameters of the characteristics of bi-tones gives a clear insight into this seldom used guitar technique. A variety of current performance practices and their respective notations feature using examples from repertoire. Such practices and notations whilst extending the language of the guitar are accompanied by discrepancy and leave a broad margin for interpretation. This in turn has required the amplified importance of performance directions, effectively redressing inadequacies of notation. Owing to such discrepancies the conclusion is presented that the two tones of the bi-tone interval must be clearly represented in the notation.

In Chapter Two, a case study of four Australian composers highlights further individuality pertaining to the use of bi-tones in guitar music. Such individual approaches are at times complementary one to another, and at other times are not. Through analysis
and comparisons of material it is proven that context of the work becomes a key factor in the notation of bi-tones.

Chapters Three and Four present a new comprehensive and concise option for the notation of bi-tones. It is functional, based both on existing guitar techniques and on those current notations of bi-tones that clearly represent the two tones of the bi-tone interval. Concepts of ‘primary bi-tones’ are explored, as are ‘pure bi-tones’, ‘bi-tone embellishments’, as well as melodic and harmonic bi-tones. Some fifty ‘bi-tone techniques’ are presented, most of them the result of original research, and each has its’ own execution, notation, proposed terminology and performance directions. It is proposed that the notation of these ‘figures’ encapsulates much that has hitherto been left to performance direction.

Chapter Five explores the ‘natural bi-tone mode’ as a source of harmonic and melodic material. In order to demonstrate some of the potential applications of this material, detailed reference is made to the author’s recent composition, *Concerto for Guitar – ‘The Luthier’*. The postulation is presented that the bi-tone is an effective premise for a new code of hierarchal relations between intervals. Where two sides of a string each side of a stopped tone are sounded simultaneously, the stopped tone effectively produces two progenitors. The second tone of the bi-tone is not a generation removed. In contrast, the first overtone of the Pythagorean model of tonal relations is a second-generation tone. This new hierarchy of tonal relations permeates all aspects of working with bi-tones. In addition, several other bi-tone scales are presented along with their suggested
applications. Essentially, this is intended as a provocation to composers and guitarists to further explore bi-tones.
List of ‘Bi-tone Techniques’

Chapter Three – Bi-tones of the First Order

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11. The Artificial Bi-tone

12. The Bi-tone Cascade (or 'Bi-tone Glissando 3')

In addition, several other bitone figures are possible through combining some of the above bi-tone techniques (or 'figures'). e.g; The 'Interrupted Reverse Ligado/Pizzicato Bi-tone' or the Backbone Prefix/T2. In all, more than fifty are readily accommodated.

Each bi-tone technique is accompanied by:

1) Notated examples;

2) Performance Directions; and a

3) Table outlining Mode of Execution and Characteristics.
CHAPTER ONE

Bi-tones in Contemporary Guitar Music

1.1 The Origin of the Term ‘Bi-tone’

The infamous Italian Futurist Luigi Russolo is credited with devising the term ‘bi-tone’ in 1926, to describe the technique of:

“...the simultaneous and independent vibration of two segments of the same string, thus producing a bi-tonal combination of two complementary sounds.”

However, it was not until the 1960’s that such techniques began to be adopted by a few composers of guitar music. Among these were the Cuban composer/guitarist Leo Brouwer and the Japanese composer Yuji Takahashi (see Section 1.5).

1.2 Redefinitions of the Term ‘Bi-tone’

The above description by Russolo is recast in the following three redefinitions of the term ‘bi-tone’.

1) A bi-tone is the tone available on the other side of the string (from the finger to the nut) sounding together with the fingered note.

As there are some misconceptions about bi-tones, it is important to clarify exactly what is a bi-tone, and what is not a bi-tone. They are at times incorrectly called harmonics or overtones, and with the changing of position may also be mistaken for a certain squeaking string noise or whistling. They are neither of these. However, they may be

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considered a string noise in as much as they are often an unwanted parameter of a stopped tone. Such softer ‘ghosted’ tones that form the ‘upper part’ of the bi-tone are frequently sounded in performance by guitarists.

2) They are simply the upper side of the string sounding unencumbered along with the ‘main tone’ (stopped tone).

3) A bi-tone is the sounding of the two fundamentals of any stopped tone.

In regard to this third description, an overtone series arises on both the ‘main’ side of the string and also on the upper side of the string. This demonstrates that a bi-tone is not a harmonic. It further qualifies the presence and relevance of pitch in bi-tones as opposed to the so-called string noise aspect.

1.3 The Characteristic Sound of Bitones

Through many years of practical exploration of bi-tones by the author, it is concluded herein that a bi-tone sounds as an interval between the main progenitor tone and its resultant ‘backtone’ (that tone from the finger to the nut). This interval is characterised by timbral diversity between the two tones of the interval, and microtonal nuance.

1.3.1 Timbral Diversity of the Bitone Interval

Timbral diversity allows the listener to readily hear the dimensions of the bi-tone as an interval in itself. There is an element of defined space within a bi-tone that other intervals
(fretted normally on the guitar) do not so easily convey to the listener. This is due to the upper portion of the string sounding with a peculiar clarity and distinction, owing to the tautness of this usually shorter string length and the usual articulation of this section of string close to the stopped finger, resulting in more of a 'sul ponticello' type sound. On this same side of the string and still pertaining to this half of the interval, the sound of the treble strings is bell-like and the bass strings sound more nasal (pseudo muted brass). The character of these upper-string sounds (the backtones), combined with the foundation of a tone played 'normale' are the key to this distinction and clarity of the interval of the bi-tone.

1.3.2 Microtonal Nuance of Bitones

The microtonal nuance of the bi-tone is evocative of many 'ethnic string' sounds. These microtones are not necessarily uniform from guitar to guitar. Scale length of string comes into play. A guitar with a scale length of 664mm will sound bi-tones slightly more flat than an instrument with a scale length of 650mm. Even from string to string on the same instrument the bi-tone interval common to the same fret may vary slightly. In both instances the variations are commonly a quarter-tone, and sometimes as much as a semitone. Also, many lower quality instruments fail to sound bi-tones altogether. Figure 1.1 demonstrates the microtonal variability of bi-tones apparent in comparing two different guitars owned by the author.

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2 Ethnic Strings. A term being used for particular string sounds in electronic music contexts. Taken from the *Gem Equinox* (Synthesizer). General Music, Italy, 2000.
Figure 1.1: Microtonal Variability in Comparing the Bi-tones of Different Guitars

The notation indicated below is discussed in detail in Section 1.5.

Guitar with scale length 656mm

\[\text{\includegraphics[width=0.2\textwidth]{guitar1.png}}\]

Guitar with scale length 650mm

\[\text{\includegraphics[width=0.2\textwidth]{guitar2.png}}\]

Further to this, bi-tones vary slightly in pitch when finger pressure pulls the string lengthwise. Instances of this may occur when stretching fingers from a particular position to the new stopped note. Even the positioning of the finger in the fret can lead to significant variation in bi-tones arising through intensity of finger pressure. This may account for some of the discrepancies of the notation of bi-tones from composer to composer.

John Schneider has created a bi-tone chart, as shown in Figure 1.2.  

\[\text{\includegraphics[width=0.8\textwidth]{bi-tone-chart.png}}\]

Figure 1.2 Schneider’s Bi-tone Chart

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\(^3\) J. Schneider, *op. cit.*, p. 126.
In his chart Schneider notates microtonal nuance in detail. There appears however, to be two significant flaws in the microtonal parameters notated by Schneider. In the first place, with reference to scale length of string, there is no consideration of the characteristically individual performance of bi-tones from instrument to instrument. In the second place he does not consider finger pressure. It may well be argued that microtones are a characteristic nuance of many bi-tone intervals. As the performance (or even the presence) of such microtones will vary, it is not necessary to include microtones in the notation of bi-tones.

1.3.3 Bi-tones - A Timbral Extension

The bi-tone and its many possible articulations extend the timbral palette of the guitar. It is tone that Manuel de Falla refers to in his praise of the guitar accompanist of the ‘Cante Jondo’ (a song style of Andalusia):^4

“The harmonic effects which our guitarists produce unconsciously represent one of the marvels of natural art”.

For the guitarist, tone is the pinnacle of technique. One would expect that if bi-tones actually do extend the timbral possibilities of the instrument, then composers and performers of guitar music might use bi-tones more frequently than is currently the case. They are at once intimate, delicate and evocative, and can be percussive and quirky. However, to counter such claims of tonal diversity (which would normally be embraced by the guitarist) two further characteristics of bi-tones have stood in the way of their

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widespread adoption. The first of these is volume or ‘tonal dynamics’ (see Section 1.3.4), and the other is playability (see Section 1.3.5).

1.3.4 Volume/ ‘Tonal Dynamics’

‘Tonal Dynamics’ is an original term. It is defined as the capacity for subtle and extensive tonal variation within a reserved dynamic range. Bi-tones sound from a dynamic of pianississimo (or even niente) to mezzo-forte only. Indeed, some would argue that they only sound up to a dynamic of mezzo-piano. This could limit their use in much ensemble music, further restricted by the fact that electric-acoustic instruments do not pick-up the bi-tone interval. The rectification of this deficit may necessitate the use of a pick-up or resonating chamber at the headstock to fully sound the bi-tones.

Electric instrument makers often use logarithmic volume controls as opposed to linear controls. In relation to such controls (or ‘pots’) Sydney Luthier Frank Grubisa highlights the principle of:

“the increased body of tone towards the top of the volume arc”\(^5\)

Here Grubisa alludes to volume and tone being inseparable from one another. If one considers volume to be a dimension of tone, then limitations of volume may impinge on the guitarist's ultimate technique, being tonal control. Bi-tones simply do not have creditable volume, nor do they sustain well. In any case, the guitar is not known to be an instrument that sustains. It is partly this aspect of limited sustain that influenced the exclusion of the guitar from a range of musical contexts until the second half of the

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twentieth century. Yet the instrument has been misunderstood. Its worthiness lies in percussion, harmony, a particular capacity for contrapuntal music, and most importantly in 'subtlety of tone'. Pertaining to such tone and inherent within it, is the art of orchestration within the peculiar confines of the dynamics of the guitar: an orchestration that encompasses such confines as an attribute with which one should work, rather than as an obstacle to work around. The guitarist is capable of a uniqueness of expression and control within these confines, and the employment of bi-tones both acknowledges this capability and in particular focuses it towards the *mezzo-forte* to *ppp* or *niente* end of the dynamic spectrum. It is not volume and body of tone that are the distinguishing characteristics of bi-tones, but rather 'tonal dynamics'.

1.3.5 Playability

The second characteristic of bi-tones that has stood in the way of their being widely accepted, is playability. Arguably, the modes of execution to date have been clumsy, with the right hand crossing over to play behind the stopped note, sometimes further complicated by the simultaneous hammering of the stopped tone. Such techniques tend to lead to instability, with the right hand losing its natural sense of position in relation to the string. Therefore, it is not an application to which most classical guitarists aspire. It is most unlike the graceful crossing of hands by a pianist. Nevertheless, a series of original developments in the execution of bi-tones are outlined herein in Chapters Three and Four. Many of these developments are simple and derive from classical technique, and are already gaining credibility with leading guitarists in Australia and overseas, including Greg Pikler (Senior Head of Guitar at the NSW Conservatorium of Music), Adrian Walter (Festival Director for the Darwin International Guitar Festival), Geoffrey Morris
(Melbourne-based contemporary guitar virtuoso), and Jose Maria Gallardo del Rey
(leading Spanish concert guitarist). It is anticipated that such new techniques will
counteract the previous playability problems.

The use of bi-tones extends the range of the guitar in any position (or region). This is an
aspect of bi-tones that is seldom utilised for its own sake. Simply, two tones are possible
with any stopped note, with the lower positions offering wider intervals than are normally
possible on the guitar. This attribute of bi-tones augments the playability of the
instrument.

1.4 Performance Practice of Bi-tones

1.4.1 Harmonic and Melodic Bi-tones

Like any interval, the bi-tone may be played either harmonically or melodically. A small
survey of available existing works using bi-tones, implies that some composers and
performers may not be aware of these possibilities. Those using bi-tones are using the
harmonic context alone. Schneider confirms this in his own citations. This curious
paradigm is largely due to the mode of execution of bi-tones that dominate current
performance practice. (See Section 1.4.2 Current Performance Practice of Bi-tones).

The melodic performance of the bi-tone is an original development. When playing the bi-
tone melodically, one side of the string is played followed by the other. When performing
the melodic version, one must ensure the bi-tone is sounded in its entirety. Therefore, it is
best not to leave too long a period between the sounding of the two parts of the interval.
The notations in Figure 1.3 pre-empt the section on notation (see Section 1.5 Current Notation of Bi-tones). They are introduced at this point, to demonstrate the intervallic possibilities of the bi-tone.

**Figure 1.3: Distinguishing Between the Harmonic Bi-tone and the Melodic Bi-tone**

The Harmonic Bi-tone

\[
\begin{array}{c}
\text{The Melodic Bi-tone (recommended notation)}
\end{array}
\]

The use of the melodic bi-tone further makes possible the insertion of other tones between the stopped tone and its resultant backtone. This is also an original development. (See Chapter Three, the Interrupted Reverse Ligado).

1.4.2 Current Performance Practice of Bi-tones

As mentioned earlier (see Section 1.3.5, Playability) standard practice in the execution of bi-tones involves the crossing over of the right hand. This involves the ‘splitting’ of the bi-tone to sound the ‘backtone’ alone (the note behind the stopped finger). In as much as such backtones derive from the bi-tone (the two tones sounding), they have frequently been referred to as bi-tones in themselves. Schneider refers to these as the “upper bi-tone.”\(^6\) (see Figure 1.4). This is a liberal terminology of a generic nature. The upper bi-tone has been used successfully in sequence to form melodic passages (see Section 1.5 Current Notation of Bitones). As claimed earlier however, the sounding of the full bi-tone

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\(^6\) J. Schneider, *loc. cit.*
melodically is an original development, quite different from a melodic sequence of upper bi-tones.

A common method of performing a bi-tone is simply to hammer onto the fretboard, thus causing the stopped tone and its inherent backtone to sound together as a bi-tone. Figure 1.4 compares the bi-tone and the upper bi-tone (backtone). Apart from the brackets encircling the stopped tone of the backtone, performance directions are usually given at the introduction to a work employing bi-tones, and therefore, are not included here.

**Figure 1.4 The Bi-tone and the Upper Bi-tone**

![The Bi-tone (standard)](image)

![The upper bi-tone (backtone only)](image)

The ‘hammered bi-tone’ has the added dimension of a percussive snap of the finger against the wood of the fretboard. It alludes to volume, in that the main tone can sound as *forte* or even *fortissimo* with such a manoeuvre, yet still the backtone part of the bi-tone interval sounds only up to *mezzo-forte* at the most. Some guitarists have referred to this as the ‘left-hand pizzicato’. However, this technique is not in keeping with the nature of a true guitar pizzicato, which incorporates a dampening of the strings to effect a very short muted sound similar to pizzicato strings. Therefore the term ‘left hand pizzicato’ is misleading.
A further and less popular current practice for the performance of bi-tones involves the rapid hammering of the fingers of either the \( lh \), or of both hands onto the fretboard, resulting in a ‘flutter-finger’ effect. This technique is not unlike typing.

All bi-tones in contemporary performance practice need both clear and accurate performance directions. However, confusion still exists in the notation and interpretation of bi-tones for the following reasons:

1) Lack of a truly uniform approach to notation and performance directions by composers using bi-tones;

2) Lack of familiarity due to the rarity of performance of existing works that use bi-tones; and

3) Scarcity of new repertoire that incorporates bi-tones.

1.5 The Representative Notation of Bi-tones in Repertoire – 1960’s and 1970’s

Schneider makes the following claim:

“The best notation for bi-tones is the wedge-shaped notehead, and the clearest notation for the upper bi-tone only is to indicate both the fingered and sounding notes”.

Figure 1.5: The Wedge-shaped Notation Cited by Schneider

G. Kroll, *Estampida* (1968)

\[ \text{Presto} \]

\[ \text{md} \]

\[ \text{ms} \]

\[ \text{f} \text{ poss} \]

---

\[ J. \text{ Schneider, loc. cit.} \]
Using the wedge-shaped notehead does not give an indication of the two parts that make up the interval of the bi-tone. The ‘primary fundamental’ (or stopped tone) is notated whilst the backtone (or upper bi-tone) is inherently assumed. Furthermore, from this particular notation, those musicians who are new to bi-tones cannot gauge the nature of the interval between the two tones of the bi-tone. For composers this is especially problematic in terms of compositional ‘material’. For conductors and performers it is problematic in that other, that is, extra and different pitches, are emanating from any particular notated sequence.

There appears to be no problems however, in Schneider’s interpretation of the upper bi-tone, as is depicted in Figure 1.6.

*Figure 1.6: Schneider's Recommended Notation for the Upper Bi-tone*

G. Biberian, *Sonata* (1975)

* play between the nut and the *lh*. The black note is stopped but not played.

With the Biberian example, the two tones of the bi-tone are indicated clearly. In addition, the accompanying performance direction clarifies the manner of execution of the bi-tone.
It is this notation which in the past decade is gaining favour among guitarists and composers as the standard notation for both the bi-tone and the upper bi-tone alone.

There are two reasons for this:

1) the accuracy of the notation of the bi-tone
2) the simple clarity of performance direction.

This notation also allows for variation and development more readily than most (see Chapter Three, Bi-tones - Original Developments). One can only conclude that Schneider's claim regarding the notation of the bi-tone (as indicated in Figure 1.5) is pertinent to his research of bi-tone excursions in the 1960's and 1970's. Indeed, all his citations are from this period, and as such are a valuable resource for contemporary guitar music of the time.

In his work 'La Espiral Eterna' (1971), the Cuban composer and guitarist Leo Brouwer has used a cross-shaped notehead for the bi-tone. Like the Kroll example above there is no indication of the two tones of the bi-tone. The Brouwer work is also cited in Schneider.

Figure 1.7: L. Brouwer, La Espiral Eterna (1971)
In his work *Metatheses 2* (1968), the Japanese composer Yuji Takahashi uses two varieties of brackets to accurately discern between the two tones of the bitone. The rounded bracket ( ) is used for the stopped tone and the square bracket [ ] for the resultant backtone. It is the later ‘upper bi-tone’ which he designates to be sounded alone.

**Figure 1.8: Y. Takahashi, *Metatheses 2* (1968)**

1.6 **Bi-tones in Contemporary Guitar Music: Conclusions**

In this chapter, bi-tones have been defined as the upper portion of the string sounding unencumbered along with the ‘main tone’ (stopped tone). In addition, the various misconceptions concerning bi-tones have been set straight. It has been established that they are not overtones or string noise. The parameters of bi-tones have been postulated and elaborately expounded upon. These include timbral diversity within the bi-tone interval itself, microtonal nuance, the capacity for timbral extension that bi-tones enable, tonal dynamics, and lastly, playability.

Relatively few composers have used bi-tones, and problems and inconsistencies continue to exist in the performance and notation of bi-tones. However, all of the bi-tone notations indicated in the above examples are valuable in that they represent creditable steps in the extension of the timbral palette of the classical guitar and the development of its notation.
Such problems and inconsistencies have been identified and addressed. It is clear that performance directions have been over-indulged due to an inefficiency of notation. Often the stopped tone is notated, but the upper bi-tone (or backtone) is assumed inherent (as in the Kroll example of Figure 1.5). Furthermore, this may lead to confusion for composers, conductors and performers. Finally, that which is gaining credibility as the accepted notation is the Biberian ‘upper bi-tone’ example (of Figure 1.6). This has already been adopted as the usual notation for both the bi-tone and the backtone alone. Indeed, Biberian himself may have adopted this notation from another source.

Owing to the previously mentioned discrepancies, one can emphatically conclude that in the notation of bi-tones, the two tones of the interval of which the bi-tone consists must be represented clearly. This is true even in instances where the backtone is to be sounded alone, and it is especially important in the notation of the melodic bi-tone (see The Prepared Bi-tone’ in Chapter Four).
CHAPTER TWO

BI-TONES – AUSTRALIAN CASE STUDIES

A small number of Australian composers have used bi-tones in their compositions in recent years. These few instances demonstrate a welcome development in the musical language of the contemporary guitar in Australia. Among these composers are David Young, Lindsay Vickery, Ingrid Guymer and Michael Whiticker. Each employs bi-tones in their own way, presenting a variety of simple bi-tone contexts.

2.1 David Young: *Jasmine* (1991)

*Jasmine* by David Young is a work that uses several contemporary techniques for the guitar, essentially showcasing the timbral diversity of the instrument. Such techniques include microtonal scordatura (a unique variation to the standard tuning of the instrument), bi-tones, string whistle (a noise achieved by a swift sideways slide of the nail along the string, used as a prefix to the execution of a tone) and various percussive effects. Young effectively creates a highly individual language that is ‘instrument specific’, and this sets him apart from his peers in composition for the contemporary guitar. While others may be writing well for the instrument, they are not necessarily using a language that is designed for the guitar alone. This is Young’s forte. He takes new developments in the language of the guitar and blends them into an expressive and exciting new music. Angular melodic figures, sudden extremes of dynamic and percussive ‘spikes’ contrast with short moments of delicate sensibility in which Young sustains a complex sense of meandering of which academic Richard Toop states:
“Just as jasmine winds up around a wooden trellis which both encourages and restricts it, so too Young’s piece is woven around the mainly wooden structure of the guitar, with the player’s fingers twisting up and down the fingerboard in all kinds of involved configurations”. 8

Yet even considering such configurations, the overall impression is one of lightness, perhaps synonymous with a waft of jasmine. Young has an enviable ease of expression of his subject.

The inclusion of bi-tones in *Jasmine* is for two reasons. The first is simply that they add contortions to the performance, which is relevant in conveying the composer’s intentions regarding the subject. The second is that they offer microtonal nuance and timbral extension, which are essentially inherent characteristics of bi-tones, and these complement the material.

However, it is only in the final one-third of the work that Young uses bi-tones (from bar 50 of 75 bars). One likely explanation for the use of bi-tones at this point, is that they confirm the physicality of the music by heightening the previously mentioned sense of “involved configuration” towards the final stages of the work, again, synonymous with the subject. Yet Young only uses one type of bi-tone, being the ‘backtone’ (or upper bi-tone), thus stopping short of using the wider range of available bi-tones that may have further contributed meandering complexity and dizzying aroma.

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Figure 2.1: The Bi-tone that Young Employs

David Young, *Jasmine* (1991)

The backtone of bar 50, illustrated in Figure 2.1, is simple and effective. Yet the backtone sounds only one half of the full interval that makes up the bi-tone. In the next bar (bar 51), an opportunity exists to execute a full bi-tone comfortably, at the major 7th interval. This is illustrated in Figure 2.2.

Figure 2.2: Comparison of Young’s bar 51 with an Alternative Bi-tone Version of bar 51

Young’s bar 51:  

The bi-tone version (bar 51):

The lh fingering is the same, and although the technique to sound both sides of the string simultaneously is different, it is still relatively simple and could be well accommodated in this context. Further to this, it would appear to support the direction of the work at this stage (bars 50 – 75).
In bars 59 and 62 Young uses a bitone (backtone) based on the 5th string, 10th fret, as shown in Figure 2.3.

**Figure 2.3: Young’s Backtone of bar 59 and 62**

![Diagram of a guitar fretboard with a bitone based on the 5th string, 10th fret.]

In bar 70 Young uses a bitone based on the 4th string, 10th fret, as shown in Figure 2.4.

**Figure 2.4: Young’s backtone of bar 70**

![Diagram of a guitar fretboard with a bitone based on the 4th string, 10th fret.]

Young is most emphatic about the notation of microtones in this work, yet his understanding of the microtonal nuance of the bi-tones of the 10th fret seems not to support this emphasis. Even when considering scordatura, there is a discrepancy in the above examples. According to Schneider, here more than in any other position on the guitar, bi-tones tend towards being a quarter-tone sharp. (In his chart, Schneider shows strings two to five as being a quarter-tone sharp at the 10th fret). ⁹ Again, it is sufficient to say that there is a curious discrepancy regarding the exact notation of bi-tones from guitar to guitar, and this is more evident in some regions of the fretboard than others - the 10th

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⁹ J. Schneider, *op. cit.*, p 126.
fret being one of them. According to Schneider’s measurements the bi-tones at bar 59 and 62 would be written as they are in Figure 2.5 which follows.

Figure 2.5: Young’s bars 59 and 62, using the Schneider Measurements From his Bi-tone Chart

Therefore, being based on a 5\textsuperscript{th} string scordatura of a quarter-tone sharp (Young’s tuning), according to Schneider the same bi-tone should now be written with the ‘c#$’ being ‘c#’, as is shown in Figure 2.6.

Figure 2.6: Young’s Scordatura and Schneider’s Chart Determining bars 59 and 62

Young however notates a ‘c$’ in the context of an interval smaller than a 4\textsuperscript{th}, effectively a semi-tone in error. This is depicted in Figure 2.7 below.

Figure 2.7: Young’s Notation of bars 59 and 62
On many guitars, the bi-tone of the 10th fret on the 4th string sounds closer to the interval of a perfect 4th than it does a fourth a quarter-tone raised. Young’s bar 70 bi-tone figure contrasts so significantly with his bar 59 bi-tone figure that one can conclude either that he worked with a particular instrument when writing bi-tones in this work, or that he is unaware of variability in microtonal nuance of bi-tones on the classical guitar. (See chapter one, 1.3.2 Microtonal Nuance of Bi-tones). Nevertheless, bi-tones form a part of the unique language which Young uses in a convincing expression of his subject, Jasmine.

2.2 Lindsay Vickery: Oubliette (1998)

Oubliette by Lindsay Vickery is a work that features subtlety of dynamics, melodic fragmentation, the capacity for tonal variation in different positions, bi-tones and the employment of a series of sustained arpeggio figures that are among the hallmarks of guitar music composition. In the area of dynamics, the particular ‘tonal dynamic’ parameters of bi-tones (see Chapter One, 1.3.4 Volume/Tonal Dynamics) have been well accommodated by Vickery, with most of the thirty bars of the work marked between ppp and mp. In other words, the whole piece is scheduled around a dynamic spectrum pertinent to bi-tones. In this way, Vickery has ensured that bi-tones are an integral component of the work, and not a random excursion into contemporary guitar technique. It is apparent therefore, that Vickery has a mature approach to composing for the guitar.
Bi-tones first appear in *Oubliette* in a cadential context (at bars 6 – 7) wherein Vickery relies upon their unique timbral definition to complement the close or semi-closure intended. This is illustrated in Figure 2.8

**Figure 2.8: The Bi-tone in the Cadence of bars 6 – 7**


In bars 15 – 21, Vickery oscillates between sustained arpeggio figures and bi-tone interpolations. The arpeggio figures are generally long (between eight and twenty sustained tones). The first of the bi-tone figures consists of only one repeated bi-tone, and the correlation can be drawn between this and the initial bi-tone figure at bar 7. When Figures 2.8 and 2.9 are compared, it can be seen that each subsequent ‘bi-tone phrase’ uses an extra bi-tone, thus increasing in length until the final bi-tone phrase is relatively long.

**Figure 2.9: The Bi-tone Phrases of bars 15 - 21**

L. Vickery, *Oubliette*. 
Complementary to his acquaintance with the so-called ‘tonal dynamic’ parameters of bi-tones, Vickery employs bi-tones in another reserved context. In the example in Figure 2.9, beginning with the first bi-tone figure at bar 16, Vickery simply descends chromatically along the string with each subsequent figure in total ranging from the 11th fret to the 4th fret (along the 5th string). If one extracts the bi-tones from the bi-tone figures and the fluctuating arpeggios, the following chromatic scale shown in Figure 2.10 becomes clear with a series of upper bi-tones above.

Figure 2.10: L. Vickery, Bitones arranged in sequence, bars 16 – 21.

The interest is not in the chromatic lower tones of the bi-tones, but in the series of upper-bi-tones resulting above, beginning stepwise from the 11th fret and expanding to a series of thirds as one chromatically approaches the 4th fret. Here, Vickery has outlined the near complete ‘natural bi-tone mode’ (See Figure 5.1).
2.3 Comparisons and Contrasts in Approach – Young and Vickery

Unlike David Young, Vickery chooses to avoid the notation of microtonal nuance. Owing to the microtonal scordatura in the Young piece it was essential to the context to accurately notate the microtonal dimensions of bi-tones in *Jasmine*. In Vickery’s *Oubliette* it is not. Microtones are not an integral element of the language of the work. Further to this, in *Oubliette* Vickery indicates the bi-tone at the 10th fret as a tritone, and the bi-tone at the 5th fret he indicates as a major 7th. The notation of the same bi-tone (at the 10th fret) by both Young and Vickery is shown in Figure 2.11.

**Figure 2.11: The 10th Fret Bi-tone. Comparisons of Notation Between Young and Vickery**

Young’s 10th fret bitone

\[ \text{\textsc{\footnotesize 5}} \]

Vickery’s 10th fret bitone

\[ \text{\textsc{\footnotesize 5}} \]

Again, there is discrepancy in the notation of the bi-tone. Furthermore, the bi-tone of the 5th fret sounds more closely to a flattened 7th than it does to a major 7th. Schneider indicates a further option of a flattened 7th a quarter-tone raised. Vickery simply provides further confirmation of the previously mentioned discrepancies in the accurate notation of bi-tones.
Whilst Young uses the backtone only, Vickery sounds the full bi-tone. In the general performance notes to Australian Guitar Miniatures in which the piece appears, it states:

“Bi-tones are achieved by hammering the black note with the left-hand while simultaneously plucking the string on the ‘wrong’ side”\(^\text{10}\)

The particular use of bi-tones in *Oubliette*, and how they bear upon the whole work and effectively set the ‘tonal dynamics’ of the piece, proves Vickery to have an intimate knowledge of the guitar and proves him to be a mature composer of serious guitar music.

### 2.4 Ingrid Guymet: *Scintillation* (1997)

With any hammering of notes on the guitar, there stands the opportunity to simultaneously sound both sides of the same string, that is, the portion of string either side of the stopped note. In *Scintillation* by Ingrid Guymet, the first 52 bars are bound by the performance direction ‘left hand only’. The guitarist hammers the tones of each phrase, with each individual note being separately articulated, and without the use of ligado (slurring). (There is one example of a ligado in bar 40, however, which serves to qualify the separate articulations intended in the main). Much of the opening material is in the lower positions on the guitar, which when hammered do not easily concede the presence of bi-tones, especially at a tempo of \(\text{\textbf{\(\frac{\text{d}}{\text{\textbf{138}}\)}}}\). The ‘main tone’ is simply too strong for the extremely high ‘backtone’ to sound in lower positions. The opening bars illustrated in Figure 2.12 demonstrate the nature of the material.

Figure 2. 12: I. Guymer, Opening bars, Scintillation (1997)

The passage beginning at bar 15 can be played either in the lower (first) position or beginning in the 7th position. The 7th position option is shown below in Figure 2.13.

Figure 2.13: Bar 15 in the 7th Position

While the first position option does not effectively sound the bi-tones, they sound clearly when using the 7th position option.

Although Guymer does not notate bi-tones in Scintillation, bi-tones serve to compliment the desired “shimmering effect”\textsuperscript{11} of which she speaks. Yet, even considering their effect in the work, it is not necessary to notate them. It would only complicate matters for the performer and steer away from her intentions, which the material suggests to be rapidly unfolding phrases ‘spiked’ by irregular leaps and harmonic interpolations, creating the desired shimmering effect with “glistening sparks”. \textsuperscript{12} In addition, owing to the choice of positions pertinent to some sections of the work, and subsequently assuming that some

\textsuperscript{11} “Biographical and Composers’ Notes”. In G. Morris, \textit{op. cit.}, p. 53.

\textsuperscript{12} “Biographical and Composers’ Notes”. In G. Morris, \textit{ibid.}
players will play all the material in the lower positions, the notation of bi-tones in *Scintillation* becomes irrelevant.

Ingrid Guymes’s work *Scintillation* serves to provide an example of a work where bi-tones are a by-product of another technique (in this case ‘Hammering’), and as such do not require undue attention in regards to notation. Furthermore, in not designating positions and in avoiding bi-tonal notation, Guymes allows the performer a certain license to vary the work from one performance to the next.

**2.5 Michael Whiticker: *Tulku* (1982)**

In *Tulku*, Michael Whiticker introduces us to a plethora of contemporary guitar devices through which he communicates a unique voice. The abundance with which we are confronted, includes the use of scordatura, various harmonics, a variety of tambora (a percussive striking of the instrument), the use of slide (a metal or glass cylinder applied to the strings effecting a ‘near-vocal’ quality and capable of true glissando), a range of hammers including *rh* tapping, bi-tones, playing behind the nut, unique one-finger tremolos, fingernail scratching and fingernail glissando along the string. One could wrongly assume that this piece is steeped in complex density with an overindulgence of random device. A detailed examination of the piece, however, confirms that Whiticker exercises mature reserve to effect what is essentially a delicate work of compact proportions.
Although Whiticker does not refer to bi-tones in the detailed performance notes to *Tulku*, it is clear that their presence is both intended and accounted for in what are some of the most concise and simple examples of the notation of bi-tones among all the ‘bi-tone repertoire’. This seems to indicate that Whiticker ranked the effective notation of the larger musical figure at hand to be more consequential to the performer, than the representation of the parts or devices of which it either consists or bears. This is illustrated by the following examples from *Tulku*.

At system number 6, he uses an indeterminate notehead, tremolo and an extended beam accompanied by the performance direction “LH: run fingers randomly over strings” (See Figure 2.14). 13 This is synonymous with the ‘flutter-finger’ effect (see Chapter One, 1.4.2 Current Performance Practice of Bi-tones).

**Figure 2.14: Whiticker’s Performance Directions for System No 6**


LH: run fingers randomly over strings. Begin at nut and end at sound hole.

As the fingers tap rapidly across the designated region, soft random bi-tones result, the sounding of each side of the string of the temporarily stopped notes. Owing to the relative lightness of touch required by this technique, many of the notes in such a ‘run’ are not

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actually 'stopped' at all, with the result that the bi-tones are fewer than the total number of finger movements, and will of course be different with each subsequent 'run'.

At system number 14, the same notation is accompanied by a different performance direction, as shown in Figure 2.15.

**Figure 2.15: Whiticker’s Performance Direction for System No 14**

LH: Hammer fingers randomly across strings between 12th and 18th frets

When compared with the light 'run' of fingers across the strings at system number 6, the required hammering at system number 14 is more determined. Each hammered note is stopped, resulting in a bi-tone with every hammer. The discerning between these two variations of 'random fingering' and their notation (inclusive of performance directions) is a development unique to Whiticker and is one which highlights his exacting approach.

At systems 18 through 25 (Figure 2.16), there are a series of single executions where the rh nail is used to 'stop' notes. This again results in a bi-tone, yet with a particular degree of 'nail tone' which is percussive and dominated by 'tops' (borrowing the term from sound engineers).
Figure 2.16: Whiticker’s *rh* nail bi-tones:

System 18

```
\begin{center}
\begin{tabular}{c}
\textbf{RH nail} \\
\includegraphics[width=0.5\textwidth]{image1}
\end{tabular}
\end{center}
```

System 21

```
\begin{center}
\begin{tabular}{c}
\textbf{RH nail} \\
\includegraphics[width=0.5\textwidth]{image2}
\end{tabular}
\end{center}
```

Another device that gives rise to a bitone is the ‘one fingered tremolo’, a rapid hammering-type repetition of a single note by one finger. Figure 2.17 demonstrates Whiticker’s use of this device, in systems 21 through 24.

Figure 2.17: Whiticker’s One-fingered Tremolo

```
\begin{center}
\begin{tabular}{c}
\textbf{RH one finger tremolo} \\
\includegraphics[width=0.5\textwidth]{image3}
\end{tabular}
\end{center}
```

Similarly to the previous examples, Whiticker’s ‘one fingered tremolo’ demonstrates his concern more with a simple notation of the full figure than with the parts or resulting parts.

In systems 22 and 23 (Figure 2.18), Whiticker uses the same technique as Guymer in effecting a series of bi-tones that arise as a result of LH hammering. Like Guymer, he does not notate the backtone, instead showing only the various ‘stopped notes’. Whiticker
does not even indicate to hammer, although it is inherent in his simple indication ‘LH’ as in Figure 2.18.

![Figure 2.18: Whiticker’s ‘Hammered Bi-tone’, Inherent in the Term ‘LH’](image)

_Tulku_ is a work that demonstrates Whiticker’s intimate acquaintance with the guitar. Whilst he does not notate the bi-tones inherent in the work, he does accommodate them in the context of the larger musical figure of which they are a part. The work demonstrates an integrated use of extended techniques for the guitar.

### 2.6 Bi-tones - Australian Case Studies: Conclusions

Australian composers David Young, Lindsay Vickery, Ingrid Guymer and Michael Whiticker are among the relative few composers worldwide who incorporate bi-tones into their musical language. They have contributed to a welcome development in the musical language of the contemporary guitar in Australia: a language both written and sounding.

The Young and Vickery works demonstrate what has become a preferred notation for bi-tones. In contrast, Guymer and Whiticker make no effort to notate the bi-tones that are inherent within the broader context of the techniques and the languages they employ. The
four have distinctly different approaches to the performance of bi-tones and their notation. This implies that context is a prime consideration in the inclusion of the notation of bi-tones.

It is a sad fact that these works for guitar (Jasmine, Oubliette, Scintillation and Tulku) are rarely heard in performance. The contemporary guitar is still young in this country, however, and the directors of the major Australian guitar festivals in Newcastle and Darwin are making efforts to redress this by raising the profile of the contemporary guitar among performers, other composers, programmers and the public. It is expected that as the profile of the contemporary guitar increases in Australia, the use of bi-tones may come to gain more favour as a valid extension of the its language.
CHAPTER THREE

Bitones – Original Developments in Execution and Notation - I

3.1 The Most Common Notation of the Bi-tone

The bi-tone notation that most readily accommodates further development is a notation which clearly represents the two tones of the bi-tone interval, with a minimum of clutter from accompanying performance directions. The foundation upon which this is based, along with supporting arguments, is highlighted by the notation employed by Biberian, illustrated in Figure 1.6. Simply stated, in recent current practice, the most common notation for the bi-tone is the ‘stopped tone’ below, with the ‘backtone’ above. This is illustrated in Figure 3.1.

![Figure 3.1: The Most Common Notation of the Bi-tone](image)

Not only is the above notation the most common notation of the bi-tone, but it is arguably the best in that it easily accommodates variation. The following developments are advanced by the author, as logical extensions of the accepted notation above. These ‘bi-tone figures’ (or techniques), proposed notations and terminologies, and their accompanying performance directions, are original. Such techniques stem from extensive original research, involving years of improvisation and composition which explore the diversity of bi-tones possible on the guitar, and are underpinned by an intention to redress the relatively limited context of bi-tones to date.
3.2 Functionality

One of the primary attributes of any new development of instrumental technique is functionality for the performer. Any such new development needs, therefore, to be able to provide appropriate responses to the following questions:

1) Does the technique serve a musical goal?
2) Is the musical goal hindered in any way by overly difficult technical demand?

In the latter regard, most performers of contemporary music have at some stage expressed frustration at the seemingly overly difficult technical demands of some pieces. For example, the Sydney-based composer/mandolinist, Stephen Lalor has made the following wry comment on the imbalance of time spent acquiring specific techniques for a particular work.

"Life is too short to make it seem so arduously long".\(^{14}\)

Lalor clarifies that functionality for the performer is very much a part of the equation in contemporary instrumental technique. He discerns that the musical language can often become an obstacle to the music.

The original developments outlined in this chapter are considered by the author to be capable of ready assimilation into contemporary guitar technique. In keeping the techniques relatively simple they do not obscure the music-making. Many of the techniques are simply developments of existing classical guitar techniques. In addition, such techniques are transferable across a range of styles of guitar music (inclusive of

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contemporary popular styles – folk, blues, rock and jazz, as well as classical and contemporary classical styles). This is important because most composers and guitarists are either not acquainted with bi-tones or do not have a thorough understanding of their nature and musical potential. The author is, therefore, seeking to redress this current shortfall in contemporary guitar technique, by developing a more comprehensive system for the execution and notation of bi-tones, inclusive of terminology and performance directions.

Within the body of the following two chapters, each development and its relationship to existing guitar techniques is discussed in turn. Two orders of bi-tones are elaborated, the First Order in this chapter, and the Second Order in Chapter Four.

3.2 Bi-tones of the First Order

Two levels of bi-tones are contained within bi-tones of the First Order. At Level One these include the ‘primary bitones’, being those bi-tones that require a reasonably simple technique, are relatively common, and serve as a base upon which further development is able to be accommodated. At Level Two a range of simple bi-tone techniques are presented which are derived from the primary bi-tones. As a reference for the performer, the bi-tones have been graded in regards to difficulty ranging from low difficulty (being easy to perform), to moderate difficulty (being relatively easy to perform but new in concept) and to high difficulty (necessitating some practice). The details of the bi-tones of each level are explained hereafter.
3.3.1 Level One

This level concerns those reasonably simple and relatively common bi-tone techniques used in contemporary guitar performance. For this reason the term 'primary bi-tones' seemed relevant. There are only two of these. The first, sounds the two tones of the bidental interval, and the second sounds only the backtone. They are not new developments. However, the accompanying terminologies and performance directions for both the bi-tones of the First Order and bi-tones of the Second Order (in Chapter Four), are original and are recommended. Such recommendations are for two reasons:

1. The various methods for the execution of bi-tones vary from composer to composer and guitarist to guitarist, and are also subject to interpretation. These recommendations eliminate a large degree of the interpretative margin.

2. They are simple to read, integrating closely and concisely both the notation and the performance direction.

All bi-tones presented here include notated examples, a section on performance directions, and a table outlining the mode of execution and characteristics of the various bi-tones.

Bi-tones of the First Order are as follows:

- The Bi-tone Type One (T1) - Level One (a Primary Bi-tone)
- The Backtone (upper bi-tone) - Level One (a Primary Bi-tone)
- The Bi-tone Type Two (T2) - Level Two
- The Pizzicato Bi-tone - Level Two
- The Bi-tone Glissando I - Level Two
- The Backtone Glissando - Level Two
- The Pizzicato Bi-tone Gliss - Level Two

Figure 3.2: The Bi-tone Type 1

- Notation

```
\begin{align*}
\text{H} \\
\text{3}
\end{align*}
```

or as a double stop

```
\begin{align*}
\text{H} \\
\text{3.2}
\end{align*}
```

- Performance Directions

In performance of the bi-tone type 1 (T1), the \textit{lh} hammers on the main tone effecting the complete bi-tone, that is, both tones sound with the hammer. The letter ‘H’ should sit above the bi-tone, indicating the hammer, and the appropriate string should be indicated below. There is no \textit{rh} execution.
Table 3a: Bi-tone Type 1

- Execution and Characteristics

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bi-tone Type 1 (T1), or Hammered Bi-tone. (Sometimes referred to as the left-hand pizzicato).</td>
<td>• Hammer the ( lh ) finger onto the fretboard resulting in the main tone and the tone behind the finger sounding together. • No ( rh ) execution.</td>
<td>• Percussive. • Pinched sound dominates on bass strings, not unlike a mute on brass. • Bell-like sound dominates on treble strings. • Again, as string length of main tone increases a bell-like quality behind finger is prominent. • The main tone is usually slightly louder than the backtone. • An ‘ethnic string’ quality in terms of tuning and timbral nuance.</td>
<td>• Slight ‘woody’ snap of the hammered finger against the fingerboard. • Consistency of tone between the two notes making up the bi-tone interval is not complimentary, but creates an interval with a ‘distinctive nasal edge’ towards the backtone (usually the higher of the two). • The bi-tone T1 works very well as a double-stop.</td>
</tr>
</tbody>
</table>

This is the first of the ‘pure’ bi-tones, that is, a bi-tone that sounds both tones of the bi-tonal interval. It is also the first of the ‘primary bi-tones’. The reference to this bi-tone as the left-hand pizzicato is confusing in that it is not a true guitar pizzicato (see Chapter One, Figure 1.4). This bi-tone is sounded in Scintillation by Guymer, and in Tulku by Whiticker (see Chapter Two, Australian Case Studies). Whilst it is not a new bi-tone, the terms ‘bitone type 1’ and ‘hammered bi-tone’ are original, as is the use of the bi-tone as a double-stop. In addition the terms ‘main tone’, ‘backtone’, ‘pure bi-tone’ and ‘primary bi-tone’ are original. Michael Whiticker’s ‘\( rh \) fingernail bi-tone’ is a creative variation on this bi-tone (see Chapter Two, Figure 2.16). This bi-tone has foundations in the existing guitar technique of hammering.
Grade = Low Difficulty

Figure 3.3: The Backtone

- *Notation*

\[
\begin{align*}
\text{rh x} & \quad \begin{array}{c}
\text{\#} \\
(\bullet) \\
\text{5}
\end{array} \\
\text{or} \\
\text{\#} \\
(\bullet) \\
\text{5}
\end{align*}
\]

- *Performance Directions*

In performance of the ‘backtone’ the bracketed ‘main tone’ (stopped tone) is fingered securely without sounding. The brackets indicate a silent tone. The *rh* crosses over to play the ‘backtone’ alone, indicated by the ‘*rh x*’. Figure 3.3 also demonstrates an alternative execution, where the \( \bullet \) indicates a complete dampening of the strings by the *rh*, and the ‘*H*’ indicates a hammering onto the fretboard by the *lh*. 
Table 3b: Backtone

- *Execution and Characteristics*

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Main Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
</table>
| Backtone (also called the upper bi-tone) | • The tone behind the *lh* finger played alone using *rh* crossover (‘p’ or ‘i’). | • Percussive.  
• Pinched sound dominates on bass strings, not unlike a mute on brass.  
• Bell-like sound dominates on treble strings.  
• As string length of main tone increases a bell-like tone behind finger is prominent. | • An alternate execution is to dampen strings at the soundhole with *rh*, and hammer *lh* fingers onto the fretboard. The result is the backtone sounding alone along with a slight woody snap of the finger against the fretboard. |

This is not a new bi-tone. It has sometimes been referred to as the ‘upper bi-tone’ as it rises on the upper side of the fingered tone, and as mentioned previously (in Chapter One) it has been referred to liberally as a bi-tone. It is quite common among repertoire using bi-tones. It is the second of the ‘primary bi-tones’. This bi-tone is found in Young’s work *Jasmine* (see Chapter Two, Australian Case Studies). This bi-tone does not borrow from existing guitar techniques.

Grade = Moderate Difficulty

3.3.2 Level Two

This level demonstrates embellishments of the above typical uses of the bi-tone (if the word ‘typical’ applies at all). These developments simply utilise other existing techniques with which the guitarist is already familiar.
Figure 3.4: The Bi-tone Type 2

- Notation

\[ \text{H} \]
\[ rh \ x \]

or when in sequence

\[ \text{H} \]
\[ rh \ x \]

- Performance Directions

In performance of the bi-tone type 2 (T2) the left hand (lh) hammers the ‘main tone’ (stopped note). This is indicated in Figure 3.2 by the letter ‘H’ above the stave. The ‘\( rh \ x \)’ indicates that the right hand simultaneously crosses over to play the backtone behind the stopped note. Each figure of this type should be accompanied by the necessary string indication below the stave.
### Table 3c: Bi-tone Type 2

**- Execution and Characteristics**

<table>
<thead>
<tr>
<th><strong>Term</strong></th>
<th><strong>Mode of Execution</strong></th>
<th><strong>Main Characteristics</strong></th>
<th><strong>Helpful Hints</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bi-tone Type 2 (T2)</td>
<td>• Crossover and pluck note behind <em>lh</em> finger with <em>rh</em> finger <code>p</code> or <code>i</code>&lt;sup&gt;`)&lt;/sup&gt;.&lt;br&gt;• Simultaneously hammer on main (stopped) tone.</td>
<td>• Percussive.&lt;br&gt;• Pinched sound dominates on bass strings, not unlike a mute on brass.&lt;br&gt;• Bell-like sound dominates on treble strings.&lt;br&gt;• As string length of main tone increases a bell-like quality behind finger is prominent.&lt;br&gt;• An ‘ethnic string’ quality in terms of tuning and timbral nuance.</td>
<td>• Slight ‘woody’ snap of the hammered finger against the fingerboard.&lt;br&gt;• Consistency of tone between the two notes making up the bi-tone interval is not complimentary, but creates an interval with a ‘distinctive rasal edge’ towards the backtone (usually the higher of the two).&lt;br&gt;• In sequence an effective and natural counterpoint results between the main tones and the backtones.</td>
</tr>
</tbody>
</table>

This is the second of the ‘pure’ bi-tones, that is, a bi-tone that sounds both tones of the bi-tonal interval. This bi-tone is found in Vickery’s *Oubliette* (see Chapter Two, Australian Case Studies). Although this is an existing bi-tone the term ‘bi-tone type 2’ is original.

The bi-tone type 2 borrows from the guitar technique of hammering.

Grade = Moderate Difficulty
Figure 3.5: The Pizzicato Bi-tone

- Notation

- Performance Directions

The pizzicato bi-tone is the same as the bi-tone type I (the ‘hammered bi-tone’ or T1), with the added performance direction of ‘pizz’, indicating a rh dampening of the strings at the bridge. As with any pizzicato used in guitar repertoire, it is cancelled by the word normale.

Table 3d: Pizzicato Bi-tone

- Execution and Characteristics

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pizzicato Bi-tone</td>
<td>• Hammer on lh resulting in the main tone and the tone behind the finger sounding</td>
<td>• Percussive.</td>
<td>• The backtone sounds as per normal with the pizz only affecting the main.</td>
</tr>
<tr>
<td></td>
<td>together, combined with the edge of the rh palm held flat across strings at bridge,</td>
<td>• Sounds similar to plucked strings (pizzicato).</td>
<td>• Treble strings are a little more difficult to control than bass strings.</td>
</tr>
<tr>
<td></td>
<td>effecting a pizzicato bi-tone.</td>
<td>• Both notes in the bi-tone are of equal volume.</td>
<td></td>
</tr>
</tbody>
</table>
Both the technique and the term 'pizzicato bi-tone' are original. The pizzicato bi-tone has foundations in the guitar techniques of pizzicato and of hammering.

Grade = Low Difficulty

Figure 3.6: The Bitone Glissando 1

- Notation

\[
\begin{align*}
\text{H} \\
\text{rh x}
\end{align*}
\]

or

\[
\begin{align*}
\text{H} & & \text{H} \\
\text{6} & & \text{6}
\end{align*}
\]

- Performance Directions

This is a simple glissando between two bi-tones (either the T1 or T2). As with any gliss it is indicated by a line between the two main tones. The point of interest here, however, is that a further line must be indicated between the two backtones because of the glissando in two directions concurrently. As with any glissando, a slur usually connects the uppermost noteheads. If not using the slurred option, then a further 'H' indication (type 1), or a further 'rh x' indication (type 2) will be required to execute the destination tone.
**Table 3e: Bi-tone Gliss 1**

*Execution and Characteristics*

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bi-tone Glissando 1</td>
<td>• Execute as for bi-tone T1 or T2, then simply slide along the string (as any standard gliss).&lt;br&gt;• One may re-execute the destination tone for a more articulate rounding-off.</td>
<td>• A glissando in two directions.&lt;br&gt;• Other general characteristics are as for the T1 or for the T2 bi-tones respectively.&lt;br&gt;• A natural loss of volume towards the destination tone of the gliss unless re-executed.</td>
<td>• Very effective.&lt;br&gt;• Short glissandi somewhere between the 12&lt;sup&gt;th&lt;/sup&gt; and the 4&lt;sup&gt;th&lt;/sup&gt; fret are best (or visa-versa), with more convincing effect in the higher fret regions (7&lt;sup&gt;th&lt;/sup&gt; to 12&lt;sup&gt;th&lt;/sup&gt;). The shorter the gliss the better it seems.&lt;br&gt;• Works better on the bass strings.</td>
</tr>
</tbody>
</table>

The 'bi-tone glissando' is both an original technique and an original term. It borrows from the existing guitar techniques of glissando.

Grade = Low/Moderate Difficulty

**Figure 3.7: The Backtone Glissando**

*Notation*

![Glissando Notation](image)
- **Performance Directions**

Performance involves an execution as for the backtone and gliss to the next backtone.

Again the gliss symbol is required between the four notes, and a slur should accompany the figure unless re-executed.

**Table 3f: Backtone Gliss**

- **Execution and Characteristics**

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
</table>
| Backtone Glissando | • Execute as for backtone, then simply gliss in any direction.  
• Re-execute the destination tone if desired. | • General characteristics as for the backtone.  
• A very glassy sounding glissando.  
• A natural loss of volume towards the destination tone of the gliss unless re-executed. | • Very effective, although curiously works better with an ascending gliss.  
• Short glissandi somewhere between the 12th and the 4th fret are best (or visa- versa), with more convincing effect in the higher fret regions (7th to 12th). The shorter the gliss the better it seems.  
• Works better on the bass strings.  
• There is a little 'spill' from the main tone which may be a problem. |

The 'backtone glissando' is both an original technique and an original term. This borrows from the existing guitar technique of glissando.

Grade = Low/Moderate Difficulty
Figure 3.8: The Pizzicato Bi-tone Glissando

- Notation

- Performance Directions

This technique is executed in the same way as the pizzicato bi-tone, with an added glissando. The gliss is indicated normally between the four notes, again considering the slurred or non-slurred (re-executed) option for the destination tone of the gliss. With the pizz bi-tone gliss, it is recommended to re-execute the destination tone in keeping with the percussive nature of the prefix to the technique.

Table 3g: Pizzicato Bi-tone Gliss

- Execution and Characteristics

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pizzicato Bi-tone Gliss</td>
<td>Execute as for the pizz bi-tone, then glissando in any direction.</td>
<td>• Percussive.</td>
<td>• Similar to the bi-tone glissando though with the pizz prefix colouring the shift in position.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sounds similar to plucked strings (pizzicato).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Both notes in the bi-tone are of equal volume.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A unique lengthening of the pizzicato effect.</td>
<td></td>
</tr>
</tbody>
</table>

Again, the ‘pizzicato bi-tone gliss’ is original. This technique has foundations in existing guitar techniques that include hammering, guitar pizzicato and glissando.

Grade = Low Difficulty
3.3 Bi-tones of the First Order: Conclusions

If the notation coupled with the performance directions for a work are clear, then it is not necessary for players and composers to become familiar with such terms as ‘bi-tone type 1’, the ‘hammered bi-tone’ or ‘pizzicato bi-tone gliss’. The notation recommended here is based on the G. Biberian example (see Figure 1.6), and as closely as possible, the mode of execution stems from existing guitar techniques. In addition, much effort has been made to encapsulate in the notation that which has previously been left to performance directions. Finally, a simple grading system measuring difficulty has been proposed to assist the performer of such techniques.

For the serious player of contemporary guitar music and for the composer working in this field, these developments and terminologies are not unlike the many bow strokes documented in copious volumes for string players and composers of string music. Thus, there are musical precedents for the levels of detail elaborated herein. It is apparent, in fact, that guitarists are seldom required to engage new or unusual techniques when compared with their colleagues playing bowed strings. The proposed bi-tone techniques, notations, performance directions and terminologies of bi-tones of the First Order (including the so-called ‘common’ primary bi-tones and simple embellishments of them) both clarify and simplify the existing use of bi-tones in repertoire. Such excursions into largely unexplored and under-resourced regions of guitar music address, in part, the imbalance of contemporary technique compared to the classical technique with which the
guitarist is usually familiar. Furthermore, it constitutes a presentation of some of the many possibilities that composers and performers may yet embrace.
CHAPTER FOUR

Bi-tones - Original Developments in Execution and Notation - II

4.1 Bitones of the Second Order

Bi-tones of the Second Order are more complex than their cousins of the First Order in that they depart from simple extensions of the primary bi-tones. Nevertheless, many bi-tones of the Second Order are more readily assimilated into performance. Again, for the most part they incorporate other existing guitar techniques, including ligado, auxiliary tones, suspension and pizzicato among others.

Bi-tones of the Second Order are as follows:

- The Prepared Bi-tone (Reverse Ligado)
- The lh Backtone
- The Interrupted Reverse Ligado
- The Synchronised Bi-tone (T3)
- The Pizzicato Prepared Bi-tone
- The Bi-tone Auxiliary (Backtone Prefix)
- The Bi-tone Trill/Tremolo
- The Responsive Bi-tone Auxiliary
- The Synchronised Bi-tone Glissando (Bi-tone Gliss 2)
- The Synchronised Bi-tone Trill
- The Artificial Bi-tone
- The Bi-tone Cascade (Bi-tone Gliss 3)

**Figure 4.1: The Prepared Bi-tone**

- **Notation**

![Notation Image]

or when in sequence

- **Performance Directions**

This bi-tone is only performed melodically. The 'main tone' is played normally (using fingers three or four). This prepares the 'backtone' part of the bi-tone which is played using fingers one or two of the *lh*. Simply stated, the performance of the prepared bi-tone necessitates the playing of one side of the string with the *rh* and then the other side with the *lh*. A dotted slur from notehead-to-notehead indicates the integral relationship between the two string sections played in sequence. The performance direction ‘*lh’ is not necessary for the second tone of the figure when the dotted slur is present. Standard guitar string indications should be clearly displayed below both tones of the manoeuvre,
joined by a dotted line (as above) as an indication of the integral relationship between the
two sections of the same string. The recommended fingering is crucial in the execution of
the prepared bi-tone.

Table 4a: Prepared Bi-tone

- Execution and Characteristics

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
</table>
| Prepared Bi-tone (or Reverse Ligado) | • Main tone is played normally (and held firm using 3rd or 4th finger of the lh), then the backtone is executed by the 1st finger of the lh, (sometimes the 2nd finger performs this function).<br>• The main tone is a preparation for the backtone. It is in effect a descending ligado that uses the fingers in reverse roles. | • A bi-tone sounded in melodic sequence.  
• Similar string characteristics as for the primary bi-tones (of the first order).  
• The timbre of the reverse ligadi casts their effect over the whole melodic phrase even when only one or two such figures are used in a phrase. | • Great when used in melodic patterns.  
• Enables a significant degree of dexterity where many other bi-tones are more clumsy.  
• Broad pitch extensions are possible in one position (or region).  
• One needs to think of the lh in two finger groupings (3rd and 4th for main tone used as prep’, and 1st and 2nd for backtone). |

This is a ‘pure bi-tone’. On account of the ‘preparation tone’ leading to the backtone this is the easiest of bi-tones to read and to assimilate into one’s playing. Effectively, a performer does not even have to read the second tone of the figure. It is a true melodic bi-tone as distinct from a series of backtones of the First Order in sequence (see Biberian, Chapter One, Figure 1.6). The first and second tones of the figure should be sounded in relatively quick sequence in order to sound the full bi-tone. With any lh execution, the
performer may leave the nail of the first finger of the lh ever so slightly longer than normal to effect more edge in the attack.

The figure is original, as are the terms ‘prepared bi-tone’, ‘reverse ligado’ and ‘preparation tone’. Associated existing guitar techniques including ligado and preparation tones are incorporated into this bi-tone technique.

Grade = Low Difficulty

Figure 4.2: The lh Backtone

- Notation

lh

- Performance Directions

Like the backtone of the First Order the bracketed main tone is silent. The difference is that the rh does not crossover to play the backtone, rather, the lh (1st or 2nd finger) executes the backtone, with the 3rd or 4th fingers holding the silent main tone (indicated by the brackets). The performance direction ‘lh’ should sit above this type of bi-tone, and the appropriate string should be indicated below.
Table 4b: lh Backtone

- Execution and Characteristics

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
<tbody>
<tr>
<td>lh backtone</td>
<td>• Main tone is silent (fingered by 3rd or 4th finger) and the backtone is played by the 1st or 2nd fingers of the lh.</td>
<td>• (As for the backtone of the First Order) i.e; Percussive.</td>
<td>• When finger ing the lh backtone remember to think of the lh in two finger groupings.</td>
</tr>
<tr>
<td></td>
<td>• There is no rh crossover.</td>
<td>• Pinched sound dominates on bass strings, not unlike a mute on brass.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bell-like sound dominates on treble strings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• As string length of main tone increases a bell-like tone behind finger is</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>prominent.</td>
<td></td>
</tr>
</tbody>
</table>

The ‘lh backtone’ is an original technique and term. It is essentially an upper-bi-tone played by the lh. It is not necessarily derived from any existing guitar technique.

Grade = Low Difficulty

Figure 4.3: The Interrupted Reverse Ligado

- Notation
- Performance Directions

This figure is very much like the prepared bi-tone and is also only performed melodically. Again, the ‘main tone’ is played normally using fingers three or four, which prepares the ‘backtone’ part of the bi-tone, played using fingers one or two of the lh. The difference is that other notes are sounded between the preparation tone and the backtone. A dotted slur from notehead to notehead indicates the integral relationship between the two string sections played in sequence. The performance direction ‘lh’ is not necessary for the second tone of the figure when the dotted slur is present. Standard guitar string indications should be clearly displayed below both tones of this bi-tone technique, joined by a dotted line (as above), as an indication of the integral relationship between the two sections of the same string. The recommended fingering is crucial in the execution of the prepared bitone.
Table 4c: Interrupted Reverse Ligado

- Execution and Characteristics

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interrupted</td>
<td>Main tone (preparation) is played normally (and held firm using 3rd or 4th finger of the 1st finger of the 1st finger of the 1st)</td>
<td>Bell-like.</td>
<td>Easily used for melodic cells, arpeggios and longer phrases.</td>
</tr>
<tr>
<td>Reverse Ligado</td>
<td>(and held firm using 3rd or 4th finger of the 1st)</td>
<td>Liquid.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Then another note or notes are played (perhaps open strings or harmonics) before the backtone is executed by the 1st finger of the 1st.</td>
<td>The resonant qualities of such figures give rise to one of the best examples of timbral diversity that bi-tones afford us.</td>
<td>The notes in between the main tone and the backtone can be either open strings (which work brilliantly) or notes that can be fretted in the same region without necessitating the letting go of the main tone before the backtone is sounded.</td>
</tr>
</tbody>
</table>

Like the 'prepared bi-tone' from which it derives, the 'interrupted reverse ligado' is a true melodic bi-tone. It is an original technique and an original term. Associated existing guitar techniques including ligado and the use of preparation tones are incorporated here.

Grade = Low/Moderate Difficulty

Among classical guitarists it is uncommon to use a half-barre of any finger other than the first. With bi-tones of the Second Order, and when considering the mental division of the left hand into finger groups 1 – 2, and 3 – 4, it may at times be necessary to use the 3rd
and 4th fingers to form a half-barre. Particular applications might arise with the Prepared Bi-tone and the The Interrupted Reverse Ligado.

**Figure 4.4: The Synchronised Bi-tone**

- **Notation**

- Performance Directions

Both the fingers of the lh and the rh simultaneously execute respective lengths of the same string, hence the term 'synchronised bi-tone'. To indicate the clear and simultaneous production of both tones, a tenuto mark should accompany both noteheads in this bi-tone, and stems should be separate for both the main tone and the backtone. Also, lh should sit above the backtone, indicating the lh execution of this portion of the string. Appropriate string indications should also be given below.
Table 4d: Synchronised Bi-tone

- Execution and Characteristics

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronised Bi-tone</td>
<td>• Main tone is played normally (and held firm using 3rd or 4th finger of the ( lh )), and the backtone is executed simultaneously by the 1st finger of the ( lh ).</td>
<td>• Pinched sound dominates on bass strings, not unlike a mute on brass.</td>
<td>• Consistency of tone between the two notes making up the bi-tone is not complimentary, but creates an interval with a ‘distinctive nasal edge’ towards the backtone.</td>
</tr>
<tr>
<td>(Bi-tone Type 3 or T3)</td>
<td></td>
<td>• Bell-like sound dominates on treble strings.</td>
<td>• A great ‘pointillistic’ effect that isn’t possible with the bitone T1 and T2 of the first order.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• As string length of main (unsounded) tone increases a bell-like quality behind finger is prominent. An ‘ethnic string’ quality in terms of tuning and timbral nuance.</td>
<td></td>
</tr>
</tbody>
</table>

This is a pure bi-tone (again, where both tones of the bi-tone interval sound simultaneously) and is strongly related to the bi-tone Types 1 and 2 of the First Order.

Therefore, it may be called a bi-tone Type 3 (T3). The figure is original, as are the terms ‘synchronised bi-tone’ and ‘bi-tone type 3’. The synchronised bi-tone is not derived from particular existing guitar techniques.

Grade = Low Difficulty

In double stopping the synchronised bi-tone, the main tones tend to be loud in comparison to the backtones. Also with double-stopping this bi-tone, allow some
preparation time to stretch the 1st and 2nd finger back a little way. This will assist in achieving a clear articulation from what could be an otherwise crowded positioning of the left hand attempting a clumsy plucking of a taut area of the string (that portion nearest the finger).

Figure 4.5: The Pizzicato Prepared Bi-tone

- Notation

- Performance Directions
This again is a melodic bi-tone. All indications are as for the prepared bi-tone. Simply, play the main tone with the rh and then the backtone with the lh. The only variation is the addition of the performance direction ‘pizz’ to the left of the figure, above the stave, indicating a rh dampening of the strings at the bridge.
Table 4c: Pizzicato Prepared Bi-tone

- **Execution and Characteristics**

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
</table>
| Pizzicato Prepared Bi-tone | • As for the prepared bi-tone but with the side of the \( rh \) palm dampening strings at the bridge.  
• The prep' tone is executed using only 'p' or 'i' owing to the flat position of the hand effecting the dampening. | • Again, a bi-tone in melodic sequence.  
• The pizzicato strings effect dominates the sound. | • The \( rh \) position makes it more difficult to execute than the prepared bi-tone (non-pizz), but it is still versatile.  
• Works very well as an 'interrupted reverse ligado — pizzicato' (adding notes between the prep' tone and the resolution to the backtone).  
• Treble strings are less effective than bass strings. |

The 'pizzicato prepared bi-tone' is an original bi-tone technique and term with foundations in the existing guitar techniques of pizzicato, preparation tones and ligado.

Grade = Moderate Difficulty

**Figure 4.6: The Bi-tone Auxiliary**

- **Notation**

```
\( rh \times \)
```

or with int' reverse ligado and T2 to finish

\( H \)

\( rh \times \)
- Performance Directions

This is an auxiliary type embellishment of the ‘backtone’ or ‘l/h backtone’. Thus, the performance directions of those techniques are relevant here.

The curious thing about the auxiliary note in this bi-tone figure, is that it is not necessarily a tone or a semitones distance from the original note, and it is not related to a harmony note in a tertiarian sense. It also varies from position to position (as in the above examples) as the ratios of the bi-tone auxiliary do not remain the same along the string. To confirm which fret to ‘back-hammer’ indicate with ‘−1’, or ‘−2’, or ‘−3’ accordingly, referring to minus one (back one), two or three frets respectively.
Table 4f: Bi-tone Auxiliary

- Execution and Characteristics

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
</table>
| Bi-tone Auxiliary     | • A true auxiliary note involving backtone, then auxiliary backtone returning to backtone.  
                        | • Play the backtone using lh backtone technique, then in quick succession 'back-hammer' either one or two frets behind this backtone using the same finger, and pull-off back to the original backtone.  
                        | • The whole figure is performed using the active 1st finger of the lh.            | • This technique can be used in context with any of the bitones i.e; bi-tone T1 and T2, backtone, pizzicato bi-tone, prepared bi-tone, lh backtone, interrupted reverse ligato, synchronised bi-tone, and pizz prepared bi-tone (and as a prefix to the gliss' options so far).  
                        |                      | • Percussive.                                                                    | • When played fast it acts as a type of prefix to other bi-tone figures.                                                                  | • Lh 2nd finger may also be used to perform the move.  
                        |                      | • Character is determined by the context of the auxiliary (see 'Helpful Hints' section at right for wide range of contexts). | • One may use the lh 1st finger to play the first backtone of the figure followed by the lh 2nd to hammer inside of the 1st (effecting a smaller interval) - see fingering for 2nd example above. |
| (or Backtone Prefix)  |                      |                                                                                |                                                                                                                                               |

The ‘bi-tone auxiliary’ is the first of a series of decorative embellishments that are possible on the other bi-tone types (see the emboldened options in the column ‘Helpful Hints’ above). It is in a sense a ‘backtone prefix’ used either on its own or to colour other
bi-tones. It is an original bi-tone, as are the terms 'bi-tone auxiliary', 'bi-tone prefix' and 'back-hammer'. It has some foundations in the auxiliary features of existing guitar technique, in hammering and in ligado.

Grade = Low Difficulty

Figure 4.7: The Bi-tone Trill

- Notation

- Performance Directions

This is best notated as a lh backtone with a trill, indicating that the trill is on the backtone portion of the bi-tone. It is functional in the wide variety of bi-tone applications and therefore their performance directions are pertinent case by case.
**Table 4g: Bi-tone Trill**

- **Execution and Characteristics**

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
</table>
| Bi-tone Trill/Tremolo | • Same fingering and execution as the bitone auxiliary, and simply extend the auxiliary i.e; to a trill.  
• Again, this technique is performed using the active 1st finger of the lh.  
• The bi-tone tremolo is the same yet spanning *three frets or more* in distance from the main tone. | • Character is determined by the context of the trill or tremolo (see ‘further comments’ section at right for wide range of contexts).  
• The bass strings give a much stronger response than the treble strings.  
• It can be used at an extremely soft dynamic, and one can diminuendo to nothing quite easily, especially on the treble strings. | • The trill or tremolo can be used in context with any of the bi-tone options with the exception of the glissandi.  
• The trill or tremolo can be extended beyond the duration of the main tone.  
• Tremolo can span up to five frets (some players six) but three or four is more comfortable, especially in lower positions.  
• The bi-tone tremolo can be a little clumsy, so give the player time to set up the manoeuvre. |

The ‘bi-tone trill’ is a decorative embellishment that may be used with the other bi-tone types (see column ‘Helpful Hints’ above). It is another original development. The bi-tone trill has foundations in existing guitar techniques of auxiliary tones, hammering and ligado.

Grade = Low Difficulty
Figure 4.8: The Responsive Bi-tone Auxiliary

- *Notation*

- *Performance Directions*

This is an auxiliary (or returning tone) not unlike the bi-tone auxiliary. The first half of the technique uses a standard auxiliary, and the second half is a back-hammer and return. The use of ‘−1’ and ‘−2’ applies indicating which fret to backhammer in the course of the figure. A slur defines the first half of the figure and a dotted slur defines the second half. It is recommended to make clear fingering indications.
## Table 4h: Responsive Bi-tone Auxiliary

*Execution and Characteristics*

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
</tr>
</thead>
</table>
| Responsive Bi-tone Auxiliary| - The full auxiliary in this instance is from the main tone on the standard side of the string.  
- Play the main tone using the 2nd finger of the lh and execute a full auxiliary move, then immediately respond by back-hammering a backtone with the 1st finger (either a fret or two behind), and pull-off back to the true backtone of the main tone.  
- All should be played quickly and evenly. | - A defined and delicate figure.  
- The backtone part of the complete figure is much softer than the full auxiliary (main tone) part.  
- The backtone part sounds as a response to the main auxiliary.  
- The pitch extremes between the two halves of the figure constitute its character.  
- The bass strings respond with more presence than the trebles. |

- Closely related to the prepared bi-tone.  
- The lack of volume in the backtone part of the figure may present a problem.  
- Can be used in context with the bi-tones T1 and T2, pizzicato bi-tone, bi-tone gliss 1, pizzicato bi-tone gliss and synchronised bi-tone.  
- The full auxiliary move from the main tone should use 2nd to 3rd finger and back (when spanning one fret), or 2nd to 4th finger and back (for two frets), but may be 3rd to 4th finger and back (for one fret).

The 'responsive bi-tone auxiliary' is an original technique and an original term. It is based on the melodic 'prepared bitone', and is technically derived from guitar music techniques including the auxiliary tone, the hammer and the ligado.

Grade = High Difficulty
Figure 4.9: The Synchronised Bi-tone Gliss

- Notation

![Notation Diagram]

- Performance Directions

In a similar manner to the synchronised bi-tone, a tenuto mark should accompany both noteheads in this bitone, to indicate the clear and simultaneous production of both tones, and \( lh \) should sit above the backtone. A gliss then follows with all the slurring and destination note options as for glissandi of the First Order.

Table 4i: Synchronised Bi-tone Gliss

- Execution and Characteristics

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronised Bi-tone Glissando (Bi-tone Gliss 2)</td>
<td>- Performed as a ‘synchronised bi-tone’ and then simply gliss in any direction.</td>
<td>- A unique gliss in two simultaneous directions.</td>
<td>- Similar fret considerations as for bi-tone gliss 1 (see Chapter Three).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- When allowed time and space to hear, it has a distilled nature.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Other characteristics as for bi-tone T1 or T2.</td>
<td></td>
</tr>
</tbody>
</table>
The 'synchronised bi-tone gliss' is an extension of the synchronised bi-tone, one of the so-called 'pure' bi-tones. It is an original development not dissimilar to the 'bi-tone gliss 1' of the First Order. With any of the gliss options, one should not gliss too slowly, as the effect will not sound. This technique is related to existing guitar techniques of glissando.

Grade = Low Difficulty

Figure 4.10: The synchronised Bi-tone Trill

- *Notation*

![Musical notation diagram]

- *Performance Directions*

The basis for this bi-tone is the synchronised bi-tone. This is followed by an upper bi-tone trill using the left hand, while the main tone trill is performed by ‘tapping’ with the right hand fingers ‘i’ or ‘m’.
Table 4j: Synchronised Bi-tone Trill

*Execution and Characteristics*

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
</table>
| Synchronised Bi-tone Trill | • This involves a synchronised bi-tone followed by an upper- bi-tone trill (on the nut side of the string), with a simultaneous tapped trill on the bridge side of the string.  
• The tapped trill utilises the ‘i’ or ‘m’ finger of the rh to hammer on and pull-off in quick succession a fret or two above the main tone. | • Murmuring. Sounds like a soft double trill. | • This can be condensed for the *synchronised bi-tone auxiliary* or also varied for the *synchronised bi-tone tremolo*.  
• There is a distinct tonal difference between the two simultaneous trills.  
• Best confined within the 4th to 12th frets. |

The ‘synchronised bi-tone trill’ is another of the decorative bi-tone figures. It derives from the ‘tapping’ technique of many rock guitarists, and from hammering and ligado. It is clumsy at first. It is an original bi-tone technique and term.

Grade = High Difficulty
Figure 4.11: The Artificial Bi-tone

- **Notation**

![Notation Image]

- **Performance Directions**

Performance directions depend on context (see column 'Helpful Hints' below). A dotted slur should also connect the second backtone to the original backtone it displaces. The use of ‘−1’ and ‘−2’ applies to indicate which fret to backhammer in the course of the figure.

**Table 4k: Artificial Bi-tones**

- **Execution and Characteristics**

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
</table>
| Artificial Bi-tones | • Sound any ‘pure bi-tone’ or backtone alone, and simply back-hammer any other reachable backtone (using the 1st or 2nd finger) and hold.  
• The true backtone of the main tone is displaced resulting in an artificial (or false) backtone. | • The character is that of any backtone. | • Artificial bi-tones can be used in context with most bi-tone options. |
The ‘artificial bi-tone’ further divides the string length of the upper portion of string from the stopped tone. It is effectively a backtone. Regarding the figure and its term, it is original. It has foundations in the ligado and hammering technique of the guitarist.

Grade = Low/Moderate Difficulty

Figure 4.12: The Bi-tone Cascade

- Notation

-Performance Directions

The performance directions attached to the bi-tone cascade are usually complex. Care must be taken with the bi-tone cascade to notate as accurately as possible the various characters that make it up, including other possible bi-tones, harmonics, artificial harmonics, main tones and the various performance directions (slurs, lh articulations, etc) that may accompany the cascade.
Table 4I: Bi-tone Cascade

- Execution and Characteristics

<table>
<thead>
<tr>
<th>Term</th>
<th>Mode of Execution</th>
<th>Characteristics</th>
<th>Helpful Hints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bi-tone Cascade (Bi-tone</td>
<td>• This is not a true glissando.</td>
<td>• The effect is a cascading combination of bi-tones, harmonics and standard</td>
<td>• A scalelike effect, although actual continuous stepwise movement is difficult.</td>
</tr>
<tr>
<td>Glissando 3)</td>
<td>• Any ascending or descending phrase that uses at least one of the available</td>
<td>tones and standard tones (fretted and open strings) in semitones, tones,</td>
<td>• Not unlike the Chet Atkins’ “harmonic glissando”</td>
</tr>
<tr>
<td></td>
<td>bitones (when gliss is only four notes in length) and at least two of the</td>
<td>minor thirds or even fourths.</td>
<td>• One of the best bi-tone options because it highlights timbral diversity,</td>
</tr>
<tr>
<td></td>
<td>available bitones (for longer phrases).</td>
<td>• The microtonal nuance inherent in the bi-tones adds to the effect.</td>
<td>yet in the context of a cohesive figure.</td>
</tr>
<tr>
<td></td>
<td>• The bi-tones are interspersed among other notes to effect the desired timbral</td>
<td></td>
<td>• Although the bi-tone cascade often necessitates a position change some</td>
</tr>
<tr>
<td></td>
<td>diversity.</td>
<td></td>
<td>great cascades are possible in any particular region.</td>
</tr>
<tr>
<td></td>
<td>• Usually necessitates change of position.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The ‘bi-tone cascade’ is an original technique. They may be difficult to read and are best learned as a figure in themselves. They are among the most complex and also the most immediately impressive sonorities of bi-tone figures. The bi-tone cascade has foundations in the Chet Atkins’ harmonic glissando as well as in the several other guitar techniques of which it may be comprised.

Grade = High Difficulty
4.2 Bi-tones of the Second Order: Conclusions

Although the bi-tones of the Second Order are derived from those of the First Order, they are not merely simple extensions of those, but comprise complex new techniques. New information that confronts the performers' traditions and methods may stand to polarise performers and composers using such developments from those who are not. Therefore, the developments and techniques outlined above are purposely linked as closely as possible with current performance technique of the guitarist. For example, the proposed 'reverse ligado' derives from the ligado, the 'back-hammer' derives from the hammer, and the 'bitone cascade' reflects the Chet Atkins' harmonic glissando.

Each technique has been assessed in regards to difficulty and subsequently graded for the performer. The proposed notations for the bi-tones of the Second Order are intended to be as simple as possible, not unlike the bi-tones of the First Order. The more complex techniques to read are the interrupted reverse ligado, the responsive bi-tone auxiliary and the bi-tone cascade.

Finally, many bi-tone combinations are outlined in the columns marked 'Helpful Hints'. These expand upon the bi-tone techniques that are presented in detail in both Chapters Three and Four, making more than fifty bi-tone techniques available to the composer and performer of contemporary guitar music.
CHAPTER FIVE

BI-TONES - HARMELODIC LANGUAGE OPTIONS

The production of bi-tones extends the language of the contemporary guitar inclusive of the various bi-tone techniques (outlined in the tables of Chapters Three and Four) and the accompanying principles of ‘timbral extension’ and ‘tonal dynamics’ (see Chapter One, Section 1.3: The Characteristic Sound of Bi-tones).

Bi-tones are a source of new harmonic and melodic material that is essentially ‘guitar specific’, in as much as such material is based on the physics of the guitar itself. String length, standard tuning of the guitar and the graded spacing of the frets all determine this ‘harmelodic’ material, which is derived from a ‘natural bi-tone mode’ inherent in the upper portion of the two string lengths of the bi-tone. (See 5.1: The Bi-tone Series).

The material covered in this chapter is original. It is anticipated that it offers further language options for composers and performers of guitar music.

5.1 Defining the Term ‘Harmelodic’

The term ‘harmelodic’ combines the words harmony and melody in a context where they are essentially interwoven (and even indistinguishable). It is especially relevant to the guitar being both a harmonic instrument and a melodic instrument. With the guitar, the division of melody and harmony is impossible because of firstly, the structure of the guitar (a multi-stringed instrument with a resonant chamber), and secondly, its tuning
(predominantly in fourths). There will always be an element of one inherent within the other. Indeed, this is the way the guitar repertoire has developed, no less so in contemporary music than in the standard repertoire. This is even more the case with the material derived from the natural bi-tone mode, for any bi-tone is essentially an interval defined by the two portions of the same string, whether sounded harmonically or melodically. The term ‘harmelodic’ is used by some music theorists. It has been adopted in the current context, because it so accurately describes the concepts and material contained herein.

5.2 The Bi-tone Series

The ‘natural bi-tone mode’ or ‘bi-tone series’ is a sequence of upper bi-tones (backtones) sounding between the 11th and the 3rd frets of the guitar. Within these parameters, as one chromatically descends along any string, an incremental shortening of the upper portion of the string results in the formation of this ascending bi-tone series.

**Figure 5.1 The Natural Bi-tone Mode**

The Bi-tone Series (or Natural Bi-tone Mode) is indicated by the open square noteheads.

The following series is based on the sixth string ‘E’.

![Musical notation for the natural bi-tone mode]
This series is essentially a ‘harmonic field’ characterised by:

1) a peculiar expansion of interval towards the top half of the series (frets 7 through 3);  
2) a lack of symmetry; and  
3) microtonal inflections.

5.2.1 The Structure of the Bi-tone Series

As the open string does not offer a backtone, it is not considered a progenitor tone pertinent to bi-tones. Progenitor tones 1 and 2 (being the 1st and 2nd frets respectively), as well as progenitors 12 through 19 (the 12th to the 19th frets) are not relevant to the series for the following reasons:

1) The upper bi-tone of progenitor 2 (fret two) yields a higher octave duplication of progenitor 3, and therefore offers nothing further to the series;  
2) The upper bi-tone of progenitor 1 (fret one) is essentially only a percussive string noise; and  
3) The upper bi-tones of progenitors 12 through 19 (frets 12 to 19 inclusive) result in a series of semitones or unisons. The semitone is already represented by the upper bi-tones of progenitors 11 to 10 (the interval between the 11th and 10th frets), and the unison is of no added benefit to the series. (As the chromatic scale already exists, the backtone chromaticism dominating the 12th through to the 19th progenitors serves no purpose).

In Oubliette, Lindsay Vickery inadvertently outlined the near complete bi-tone series (short only one note), and this stands testimony to his inherent understanding of the
guitar. (See Chapter Two, Figure 2.10). Whilst the following series differ from those of Vickery with regard to tuning (at the 10th fret and the 5th fret), the argument has already been established that such differences are primarily the result of instrumental variation affecting the performance of bi-tones, finger pressure and interpretation. Vickery confirms the direction taken in the formation of the following original bi-tone series. (Acknowledging that the series is actually a backtone mode, the term ‘bi-tone series’ or ‘natural bi-tone mode’ is used in a liberal context). Below, the figures mid-stave indicate the interval of the bi-tone, and the series is represented on the upper stave.

**Figure 5.2: The Bi-tone Series of Each Guitar String**

The 6th string ‘E’:

**Upper bi-tone**

Bi-tone Series 1 on F#

![Musical notation for the 6th string 'E']

**Progenitor**

b3 4 6 7 2 #4 b7 3 7

The 5th string ‘A’:

**Upper bi-tone**

Bi-tone Series 2 on B

![Musical notation for the 5th string 'A']

**Progenitor**

b3 4 6 7 2 #4 b7 3 7
The 4th string 'D':

Upper bi-tone
Bi-tone Series 3 on E:

Progenitor

b3 4 b6 7 2 #4 b7 3 7

The 3rd string 'G':

Upper bi-tone
Bi-tone Series 4 on A:

Progenitor

b3 4 b6 7 2 #4 b7 3 7

The 2nd string 'B':

Upper bi-tone
Bi-tone Series 5 on C#:

Progenitor

b3 4 b6 7 2 #4 b7 3 7
As illustrated in Figure 5.2, some of the series lie in high register and therefore must be transposed to an appropriate octave in order to make functional use of them. However, this is strictly a compounding octave transposition and therefore retains the inherent relationship of the two sides of the string.

5.2.2 Limited Transpositions of the Bi-tone Series

There are only five ‘limited transpositions’ of the series. These begin on the tones F#, B, E, A and C#. The relationship of 4ths between the series one to four, reflects the standard tuning for the open strings of the guitar. The 3rd between series four and five pertains also to the nature of the standard tuning of the instrument (between strings three and two). The series are numbered from the low ‘E’ string due to the uninterrupted regularity of 4ths unfolding from here. The high ‘E’ string simply repeats the low, so only five transpositions are possible. Any further transposition would depart from the natural physics of the guitar, the essential premise of the bi-tone. In consequence, it would be irrelevant to build the series based on any of ‘C’, ‘Ab’ or ‘F’, in the sense that the guitar is not tuned to such tones. However, considering scordatura (tunings other than standard tuning), all transpositions become possible. These would be ‘transpositions of the second generation’. This second generation is not recommended for the following reasons:

1) The five limited transpositions yield a wealth of harmonic and melodic configurations and fully demonstrate the author’s intentions. Individuals may wish to pursue other transpositions for their own purposes;

2) Other precedents are in place for modes of limited transposition; and
3) The five transpositions are ‘guitar specific’.

Regarding this third point, it is the creation of a harmelodic language born of the guitar that is the defining aspect of the bi-tone series. Random transpositions undermine this.

5.3 Harmelodic Possibilities of the Bi-tone Series:

5.3.1 Creating Chords – Level One (3 voices)

Simply, as one may use any scale and method to construct chords, the series may be used as a harmelodic resource.

In order to contain and manage the size and multiplication of the options for chords (or melodic cell constructs) it is necessary to establish appropriate parameters. The following parameters were selected for the creation of the harmonic language for the author’s *Concerto for Guitar* – ‘The Luthier’. At the ‘first level’ of chord construction, there are eight simple guiding principles or parameters (P1 – P8). These are:

P1) Chords contain only three voices.

P2) Chords are built using tones from the series strictly low to high, but not necessarily in numerical sequence. The following possible chords and ‘cells’, illustrated in Figure 5.4, are derived from the series based on the 6th string ‘E’, being series 1 (F#), illustrated in Figure 5.3.
Figure 5.3: Bi-tone Series 1 (F#)

Figure 5.4: Melodic Cells/Chords Based on Series 1

Again, no inversions are used, (confirming strictly the low to high sequence). A note in the upper part of the series is not transposed below its other chord components; that is, note 8 cannot be transposed below note 3, nor can note 5 come below note 4. This complication is not necessary in the development of a simple method. This material formed the harmelodic basis for much of the *Concerto for Guitar* by the author (see Figure 5.5).
P3) Within the confines of the above, use symmetrical or random sequences for chord construction. Owing to the asymmetrical nature of the series, the author used an asymmetrical base for chord construction in his *Concerto*.

P4) Keep all chords within the span of a minor 10th (for the most part).

P5) The resulting chords may be transposed either up or down by an octave or two (compound tessitura).

The following 21 chords are based on the bi-tone series I beginning on F#. They are representative of the possibilities (which easily exceed these) and were selected after hours of improvisation using the series (see Principle 6, below). These and their respective limited transpositions constitute all of the material for the first and second movements of the above mentioned *Concerto for Guitar*.

**Figure 5.5: Melodic Cells/Chords Used in the *Concerto for Guitar* by the Author**

P6) Become familiar with the nature of the material derived from the series.

P7) Group the chords into the following three categories or ‘types’. (Some subtle variations of the same chord are evident. This is quite advantageous).
Figure 5.6: Three Suggested Chord Categories

1. **Simple** - being triads (major and minor).

![Simple Chord Diagram]

1. **Blended** - being ‘displaced triads’ using suspension devices or omissions (the inclusion of the M2\(^{nd}\), the P4\(^{th}\) and the minor 7\(^{th}\)).

![Blended Chord Diagram]

2. **Complex** - being chords coloured by the distinctive intervals M7th, minor 9\(^{th}\) (or minor 2\(^{nd}\)) or the tritone.

![Complex Chord Diagram]

P8) Realise these so-called ‘simple, blended and complex’ chord types in the five various transpositions of the five series; that is, transpose them, as was the approach in the above mentioned *Concerto*.

The harmelodic language inherent within the bi-tone series is arrived at simply by building the chords of the series, as with any scale. The above parameters were fruitful in opening up the potential of the series.

5.4 Christopher Sainsbury: *Concerto for Guitar – ‘The Luthier’ (2001-02)*

The following material demonstrates a variety of applications of this original harmelodic language.
5.4.1 Applications of the Harmelodic Material of the Bi-tone Series

In the *Concerto for Guitar* – *the Luthier*, the above parameters (see 5.2.1 Creating Chords) were used to extract chords from the series and were also used to create melodic cells. The series in sequence, note for note, was not used in the first two movements.

In strictly melodic contexts, the sole use of the ‘simple’ chord types (the triadic chord types) in sequence can tend to sound like a series of arpeggios. Thus, they should be used with discretion. Similarly, care must be taken with progressions using only the ‘blended’ chords as they can sound bland or ‘awash’ due to the intervals that dominate (perfect 4ths, major 2nds, minor 7ths). In sequence, their effect is not unlike the intentional ungrounded ‘drifting’ of ‘quartal harmonic concepts’ (ambiguous chords based on fourths) found in much contemporary jazz music. The third chord type (the ‘complex’) is best used to stimulate harmonic motion within the context of a broader progression employing an abundance of the other two chord types. Balance is the key. The full range of options, includes the mixing of chord types (simple, blended and complex) across the five transpositions of the series. The following two short excerpts from the *Concerto* are intended to demonstrate these principles.
Figure 5.7: Excerpt from C. Sainsbury’s *Concerto for Guitar*

The string upon which the series is based is given as is the type (simple, blended or complex):

![Musical notation](image)

Figure 5.8: Excerpt from C. Sainsbury’s *Concerto for Guitar*

![Musical notation](image)
Apart from employing the various chord types in sequence, one can overlay and interlock the various bi-tone chords to open up a broader range of options that works well either harmonically or melodically.

Figure 5.9: Overlaying the Various Chord Types

5.4.2 Creating Chords – Level Two (4 – 6 voices)

As the 'first level' of chord construction consisted of three voiced chords (see 5.2.1 Creating Chords), the 'second level' of chord construction concerns chords of four to six independent voices. The underpinning premise for these was essentially twofold:

1. The more complex chords provide a variety of densities in contrast to those chords of level one; and

2. Chords of 5 and 6 voices in lower positions on the guitar allow the full resonance of the instrument to be heard.

To further demonstrate the harmelodic applications in practice, a different approach is provided for the construction of the four to six voiced chords. This method is to use the bi-tone interval rather than the series, as the basis for chord construction. In other words, both the progenitor tone and its backtone. This leads to the following possibilities:
1) For a four voice chord, use two complete bi-tones;

2) For a six voice chord, use three complete bi-tones; and

3) For a five voice chord, use two bi-tones plus either one more progenitor tone or backtone.

Figure 5.10: The Bi-tone Series 2 (B) as a Resource Scale for the 4 – 6 Voice Chords

The 5th string ‘A’:

Possible chords that use bi-tone intervals in their construction, as extracted from the above series, follow (in Figure 5.11). The interval of the bi-tones characterising the chords are indicated below. (Any additional tones are doubling in these cases):

Figure 5.11: Chords of 4 to 6 Voices

M2, #4  M7, M7  P4, M3  m6, P4
The interval inherent in the two divisions of the string from any point, determines the harmonic result. How it is related to the first level of chord construction is simple. In as much as the bi-tone series is asymmetrical and chords of the first level were constructed asymmetrically (see previous examples), chords of the second level are also constructed asymmetrically within the context of the parameters affecting either four, five or six voice chords (outlined above). In other words, the bi-tone intervals are randomly selected from the series to form the chords. The ear casts the deciding vote as to whether to use one or another bi-tone. It is this second level of bi-tone chords that is used in the 3rd movement of the author’s *Concerto*. See below:

**Figure 5.12: Chords of 4 – 6 Voices in the Author’s Concerto**

A five or six voice chord may also simply involve the doubling of tones from a four voice chord (as in Figure 5.11). This doubling may be implemented at any 8va in the chord.
Also, one may use two complete bi-tones with the addition of two progenitors to form a six voice chord.

Generally, owing to the essential harmonic nature of the sonorous chords of the second level, it is best to reserve them for harmonic contexts, whereas the three voiced options of the first level also work well within melodic contexts. The approaches outlined here for the creation of the two distinct levels of bi-tone chords are concise and served well in the *Concerto*, yet they do not include all the possibilities of chord construction from the bi-tone series. Theoretically, twelve voiced chords are possible using the backtones, yet eight and nine simultaneous voices are more comfortable in practice on the guitar.

5.4.3 Bi-tones - The Premise for a New Code of Intervallic Relations

It is this second level of chord construction that demonstrates the effectiveness of the new intervallic relations that permeate all dimensions of working with bi-tones. In the context of bi-tones, the closest possible relation to the progenitor is not necessarily the 8va, then the 5th, and so on, as under the Pythagorean model. Rather, its resultant backtone is its closest relative. Indeed, the Pythagorean model is somewhat jeopardised in the bi-tone context because the initial stopped tone on the string serves simultaneously as two progenitors with two overtone series. The first of these rises on the main side of the string, and the second equally valid overtone series, rises on the upper portion of the string. In the bi-tone context, the argument therefore stands that the alternative closest intervallic relation to ‘E’ 5 (on the 7th fret) is ‘F♯’ a ninth above (the pitch of the backtone). Such intervallic relationships are consistent across the various guitar strings. So ‘A’ 4 (on the 7th fret) gives its ninth above, ‘B’. Therefore, while the Pythagorean
model of scales and chords is based on the physics of the overtone series, the bi-tone model is based on the physics of the guitar, and has been used extensively in the above mentioned *Concerto*.

### 5.5 Further Harmelodic Possibilities

#### 5.5.1 Linear Use of the Series

The series itself may be used in a linear fashion in the formation of melodies. This is quite distinct from the extraction of chords and melodic cells from the series. This approach is effective for either a solo instrumental passage or a sectional counterpoint. The steep rise of intervals of the last four tones, adds a unique upper dimension contrasting the lower stepwise movements of the first section of the series. The series was employed in counterpoint in various relief sections of Movement Three of the author’s *Concerto*.

*Figure 5.13: Excerpt from Movement Three of the Author’s *Concerto*\nDemonstrating the Use of the Series as a Scale for Melodic Purposes*

Violins I and II
5.5.2 The Second Generation Series

There are several further applications of the bi-tone series. One such application derives from the extraction of the ‘second generation’ series. The intervals between the progenitor and the backtone of the various bi-tones in any of the five series fall in a particular order as demonstrated in Figure 5.14.

Figure 5.14: The Intervals of the Series Between the Progenitor and the Backtone, in Sequence

\[
b3 \quad 4 \quad b6 \quad 7 \quad 2 \quad \#4 \quad b7 \quad 3 \quad 7
\]

If these intervals are then expressed linearly from the smallest to the largest based on the five tones of the original five bi-tone series, then five new modes are possible. These are the ‘second generation’ series. The following is the second generation series ‘F♯’. It is based on the 6th string ‘E’. The intervals listed below relate to the root of the series.

Figure 5.15: The Intervals of the Series Between the Progenitor and the Backtone, Arranged in Order from Small to Large

\[
2 \quad b3 \quad 3 \quad 4 \quad \#4 \quad b6 \quad b7 \quad 7
\]
The apparently missing interval is due to the duplication of the major 7th and is therefore irrelevant when expressed linearly.

Before five second generation series are taken on board 'gratis', however, an examination sheds light on the need for re-assessment. It has too many notes! It duplicates the chromatic scale extensively between degrees 2 to 6 (see above). Two versions of the second generation series are possible, however, and for these we borrow from familiar major and minor concepts. Drawing from the possibilities above, one uses either M3rd or m3rd and M7th or m7th respectively as shown in Figures 5.16 and 5.18.

5.5.3 The Bi-tone Harmonic Major Scale

**Figure 5.16: The Bi-tone Harmonic Major Scale**

This is a second generation series 3 (Major) in E, (based on the 4th string):

```
\begin{verbatim}
  \text{The b3 and the b7 have been omitted.}

Owing to the fact that familiar major and minor concepts have been utilised, it is appropriate to demonstrate the potential applications in music styles inclusive of jazz. Therefore, the chords of these five new series are indicated in 'jazz font'.

Chords derived from the above 'Major' series best use the familiar 1357 formula in keeping with jazz, and include:
```

99
Figure 5.17: Chords of the Bi-tone Harmonic Major

Emaj7#11, F#-7b5, G#-9, A-maj7, Ebdim/Bb, C+7 and D#dim7.

The name bi-tone harmonic major derives from the similarities of the upper half of this scale to the harmonic minor scale.

5.5.4 The Bi-tone Dominant Minor

Figure 5.18: The Bi-tone Dominant Minor Scale

This is a second generation series 3 (Minor) in E:

The natural 3 and the natural 7 have been omitted.

This scale already has credibility in that it is the 3\textsuperscript{rd} mode of the lydian dominant mode (a popular jazz scale), which in itself is the fourth mode of the ascending melodic minor scale. Nevertheless, being derived from the intervals of the bi-tone series, it has its own inherent worth.
Chords derived from this ‘Minor’ series include:

**Figure 5.18: Chords of the Bi-tone Dominant Minor Scale**

E-7b5, F#-7b5, G-maj7, A-7, Bb maj7#5, C7 and D7.

The name ‘bi-tone dominant minor’ derives from its relationship to the lydian dominant and the ascending melodic minor scales.

Owing to the obvious inherent jazz worth, which is further confirmed by the accidental replication of the lydian dominant scale, and considering that these scales are in actual fact second generation, the limited transposition concept should not apply. It may be superseded by all 12 possible transpositions of both the ‘bi-tone harmonic major’ and the ‘bi-tone dominant minor’.

Whilst such second generation series yield some 24 scales of arguable worth, it must be remembered that it is the redefining of our perceptions of intervallic relationships that enables such a development. All the various transpositions of the so-called bi-tone harmonic major and bi-tone dominant minor rely upon a new focus on, and espoused worth of, the integral relationship of the two sides of the string, ‘the bi-tone’.
5.5.5 The Repetition of Unisons

The "repetition of unisons" \(^{15}\) is another application of bi-tones that features the intervallic relations of the two sides of the string. It is a term used by Australian guitarist and composer Roger Pell. The guitar is unique among harmonic instruments in that it offers the repetition of the unison on different strings in different positions, thus multiplying the tonal palette. Almost any tone within the scope of the lower positions of the first four strings can be repeated in another position (four and five repetitions are possible). On the same four strings, tones up to the ninth fret can be repeated at the unison three times.

However, although the unison can be repeated, the bi-tone interval is different with each repetition. The inherent backtone cannot be repeated by duplicating the main tone unison. This then is an opportunity in that several different backtones may be derived from the same pitch. Figures 5.20 and 5.21 illustrate these points.

![Figure 5.20: Backtones Derived from the Repetition of the Main Tone](image)

<table>
<thead>
<tr>
<th>Note:</th>
<th>G</th>
<th>G (at the unison)</th>
<th>G (same)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fret:</td>
<td>8(^{th})</td>
<td>12(^{th})</td>
<td>17(^{th})</td>
</tr>
<tr>
<td>String:</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

One may then transpose the resulting backtones to a common octave and stack them harmonically. The result is demonstrated by Figure 5.21.

\(^{15}\) R.Pell, 1995, Personal Interview, Wagga Wagga.
5.5.6 The Backtone Major

If one extrapolates the process for the entire G major scale, it becomes necessary at times to choose a separate string group in order to accommodate the repetition. One cannot continue the process beginning on the 1st or 2nd strings. This in turn means accepting a progenitor an octave lower. In Figure 5.22 below, the backtones of ‘C’ use two of the same progenitors and one an octave lower, hence the slash.

The various progenitor tones are indicated above without the bi-tones. Also included is the string group and fret. The resulting backtones form the following chords, as illustrated in Figure 5.23. They are transposed/compounded to a common octave.
These are the chords of the Backtone Major scale based on ‘G’. In practice one may create a ‘fatter’ voicing synonymous with the chord indicated in the ‘jazz font’, although this is not necessary. Whether one reads the notated version or the jazz version, it becomes evident that the chord/scale relationships inherent within the flip side of the simple ‘G’ major scale are more complex than at first envisaged. However, although the ‘backtone major’ yields an interesting chord set, there are some inherent problems.

1) Firstly, one cannot transpose these chords from ‘G’ into ‘Ab’, ‘A’, ‘Bb’ or any other key. The premise of bi-tones is string length. To begin the process on the ‘Ab’ and to follow similar string groups as above, all the chords will resolve differently; that is, the chords of the ‘backtone major’ will be different in every key because of the variable string lengths of the progenitor tones; and

2) Secondly, owing to the repetition of unisons, one has at times more choices of progenitor than is needed. This allows for the variability of personal taste when choosing backtones for the construction of chords.

5.5.7 Applications of the Backtone Major

The foregoing problems notwithstanding, there are options for use of the backtone major. The backtone major is essentially a new approach to chord sets that are inherent within a
simple major scale. Based on the same process as above, we can create the twelve
different bi-tone major scales; that is, the chord sets of the bi-tone majors. These may
then be liberally transposed to twelve respective keys resulting in 144 chord sets.
Although this is far removed from our principles of fixed scales (non-transposing), it is
acceptable and appropriate at least in a jazz context.

In light of the foregoing consideration of the backtone major, the possibility of the
backtone minor scales also begs inquiry. This too will result in new harmelodic
relationships. There seems to be an endless range of possible approaches to ‘backtone
scales’ (major, minors, modes, exotic scales, symmetrical, and so on), that will serve in
both music composition and improvisational contexts.

Figure 5.24: An Original Sketch for Guitar Based on the Chords of the Backtone
Major in ‘G’:
5.6 Bi-tones – Harmelodic Language Options: Conclusions

Bi-tones are a source of new harmonic and melodic material that is essentially ‘guitar specific’. The most important aspect of this is the ‘natural bi-tone mode’, called the ‘bi-tone series’. The material and its applications outlined herein, stems from extensive original research, the implications of which offer further language options for composers and performers of guitar music. Extensive reference to, and analysis of the author’s *Concerto for Guitar*, confirms the claims of the practical harmelodic applications of the bi-tone series.

The Pythagorean model of tonal relations is challenged by a new proposed bi-tonal premise for relations between intervals. Simply, this is, where two sides of a string each side of a stopped tone are sounded together, two progenitors result from the single stopped tone. The second progenitor is not a generation removed, as the first overtone under the Pythagorean model. It is an intervallic relationship born of the physics of the guitar. Thus, it is postulated as a relevant development pertinent to guitar music composition. This hierarchy of tonal relations permeates the bi-tone series, and all of the various melodic cells and chords constructed from the series.

Finally, several other bi-tone scales are introduced, including the bi-tone harmonic major, the bi-tone dominant minor and the backtone major. The various applications of these scales have been presented, forging new directions in chord-scale relationships and chord progressions, particularly pertaining to jazz, as a relevant guitar style.
CHAPTER SIX

Conclusion

The study of the performance and notation of bi-tones in contemporary guitar repertoire reveals significant variation. Firstly, this is confirmed through a review of existing performance practice and notational styles from the 1960's and 1970's (in Chapter One), and secondly, this is supported through a thorough study of four Australian works for solo guitar from the 1980's and 1990's (in Chapter Two). The major factors that have led to these discrepancies include scale length of string and the subsequent positioning of the frets, employing notation that does not account for the effect of finger pressure on microtones, and the context of the language of the work. They further arise from a lack of familiarity of notational options. This is compounded by a rarity of the performance of existing works that use bi-tones, and by a scarcity of new repertoire that uses bi-tones. Whilst some notations demonstrate that their respective composers perceive the bi-tone as an interval, others do not include the two tones of the bi-tonal interval in their notation. It is apparent that this is because some composers assume that the backtone is inherent in the notation of the main tone alone. This creates an interpretative margin that may be problematic for composers, as well as for conductors and performers. Finally, this variability necessitates the conclusion, that in the notation of bi-tones the two tones of the bi-tone must be clearly represented as an interval.

Existing guitar performance techniques and the apparently preferred notation of bi-tones (based on the G.Biberian example of Figure 1.6), serve as a familiar and sure foundation
upon which to extend the timbral palette of the guitar through new bi-tone techniques. A hierarchy of bi-tones is established in chapters Three and Four as demonstrated below.

1) Bi-tones of the First Order, which include the ‘primary bitones’ at Level One, and simple embellishments of these at Level Two.

- The Bi-tone Type One (T1) - Level One (a Primary Bi-tone)
- The Backtone (upper bi-tone) - Level One (a Primary Bi-tone)
- The Bi-tone Type Two (T2) - Level Two
- The Pizzicato Bi-tone - Level Two
- The Bi-tone Glissando 1 - Level Two
- The Backtone Glissando - Level Two
- The Pizzicato Bi-tone Gliss - Level Two

2) Bi-tones of the Second Order, which depart from simple extensions of their cousins of the First Order.

- The Prepared Bi-tone (Reverse Ligado)
- The $lh$ Backtone
- The Interrupted Reverse Ligado
- The Synchronised Bi-tone (T3)
- The Pizzicato Prepared Bi-tone
- The Bi-tone Auxiliary (Backtone Prefix)
- The Bi-tone Trill/Tremolo
- The Responsive Bi-tone Auxiliary
• The Synchronised Bi-tone Glissando (Bi-tone Gliss 2)
• The Synchronised Bi-tone Trill
• The Artificial Bi-tone
• The Bi-tone Cascade (Bi-tone Gliss 3)

Each one has been graded in terms of difficulty. In addition, various ‘bi-tone combinations’ are expounded upon in the tables of Chapters Three and Four, making more than fifty bi-tone techniques available to the composer and the performer of guitar music. Furthermore, within this hierarchy, certain concepts are made evident including the notion of ‘pure bi-tones’ and ‘harmonic’ and ‘melodic’ bi-tones. Such a range of new bi-tone techniques require a comprehensive approach and precise detail in regard to:

1) mode of execution;

2) notation;

3) associated terminology (inclusive of suggested names of such techniques); and

4) performance directions.

These new ‘bitone techniques’ represent the unique dimension of the guitar that focuses both ‘tonal dynamics’ and ‘timbral extension/diversity’: parameters of bi-tones, and qualities of the instrument that ensure its individual distinction. The notation of these figures has been developed specifically to encapsulate much that has hitherto been left to performance directions. Many terms have been presented that are both original and unique to the techniques.
Finally, the defining of the ‘bi-tone series’ and its limited transpositions serve as a rich harmonic and melodic resource, the applications of which are presented through examples drawn from the *Concerto for Guitar – ‘The Luthier’* by the author (as demonstrated in Chapter Five). An argument is established that a bi-tone is effectively one stopped note sounding as two progenitors, each with its own inherent overtone series. This therefore, is proposed as a premise for new intevallic relations. Simply stated, the two sides of the string of the bi-tone are more closely related than the octave and the fifth under the Pythagorean model. Both the ‘bi-tone series’ and this new hierarchy of intervals are used in the creation of two levels of bi-tone chords which feature in the author’s *Concerto*. In addition, various methods are presented for the formation of several other bi-tone scales. The applications of these scales are demonstrated with particular reference to jazz, as it is a major style and heritage of the modern guitarist. These scales and their applications are proven to be only a preliminary glimpse of the possibilities that await further study by composers and guitarists using bi-tones.

Bi-tones form part of an essential and pertinent language for the contemporary guitarist and the contemporary composer of guitar music. They are ‘guitar specific’; that is, the various bi-tone techniques, the bi-tone series and the new code of intevallic relations and its resultant harmelodic material, is only able to be derived from the standard guitar. In this original document, the author has intended to both qualify and significantly broaden the execution, notation, terminology and performance directions accompanying bi-tones.
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