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A Survey of Extended Techniques on the Classical Six-String Guitar with Appended Studies in New Morphological Notation

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VOLUME 1

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Declaration

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Abstract

This dissertation comprises two volumes. Volume 1 presents a critique and exploration of the way extended techniques with particular sound properties are used and notated in the contemporary repertoire for the classical six-string guitar. In Volume 2, a set of practical exercises provide both instrumentalists and composers with a way to perceive, think through, and use a repertory of sounds based on developed and newly invented extended techniques.

Volume 1 is divided into three sections. The first section constitutes an extensive survey of the literature, where extended guitar techniques are investigated in relation to performance and pedagogy by centring on significant research and key repertoire. The examined techniques are characterized by being alternative to the conventional pitch-based attack/decay paradigm. This is followed by an examination of composers' notational practices, where certain anomalies in the repertoire are addressed. For example, how spectral relationships may be put into a morphological context by employing tablature-based systems. A concluding section summarises the current use of extended techniques and how compositional methodologies from key composers can be further developed.

Volume 2 presents two sets of studies. The first twenty-eight studies centre on individual techniques, after which techniques are combined in the remaining six studies. A new morphologically based notation model is employed, derived by developing the surveyed composers creativity further through enhancing the perception and execution of music comprising only extended techniques. The archetypal attack/resonance morphology of guitar sound is discussed, and this forms the basis for classifying certain extended techniques as archetypes or variants of the archetype. The pedagogical, compositional, and improvisational potential of the chosen extended techniques are exploited in the studies, both through the juxtaposing and the merging of morphologies.

After an overview that reflects upon musical relationships between the theoretical and practical aspects of the dissertation, the final section is concerned with the use of amplification in performance, and further ideas are proposed for expanding morphological combinations.

Volume 1: A Survey of Extended Techniques on the Classical Six-String Guitar

Introduction

> *By only repeating what we have seen and heard, humankind will never advance beyond imitation. The mind is crucial. We have to experience and express with the mind to be innovative. That requires relentless researching and personal effort. Only then do we gradually acquire the ability to express ourselves fully and naturally.*
>
> D. Ikeda 1998[2]

It was logical to use the guitar, my instrument, as a basis for sound exploration. The outcome of the research process produced two distinct strands; a critical survey of certain extended techniques in the current repertoire, and a didactic approach to solving specific notational challenges presented by these techniques. My ultimate intention in this work is the construction of a resource for contemporary guitarists and composers. It constitutes the musical results of my experience as a performer and composer (since 1968), reflecting my perception of a contemporary soundworld. This led to an investigation into areas of sound production that included inherent noise content, spectral detail, and the nurturing of improvisatory elements.

These two strands led to two separate volumes. Volume 1 is an examination of creative musical disciplines centred on discerning the properties of sounds eminating from certain guitar techniques. It comprises an introduction, a survey of significant research into contemporary guitar music, key repertoire that exemplifies the most representative extended techniques usage, and improvisation. Attention is given to tracing early instances of extended guitar techniques usage, for example, Halffter's *Codex 1* (1963) and Kagel's (1960) *Sonant*, followed by subsequent developments into the new millennium. The implications and shortcomings of notations employed in the repertoire are then examined critically, especially where conventional stave-based notation

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[2] From *Discussions on Youth [ch. 16 p. 109]* (1998) by Daisaku Ikeda, a series of dialogues between the SGI President and Soka Gakkai high school students.

manages to represent complex sound properties only in a vague or incomplete way. Volume 1 concludes with some observations on the exploration of relevant guitar sounds in the repertoire, principally key composers whose compositional strategies relate to my usage of the same techniques.

Volume 2 is a case study of carefully selected techniques, chosen for their inherent sound quality and practical significance. Spectral content and hand actions that influence performance and compositional considerations are of particular importance.[3] Therefore, the second volume is directed at guitarists and composers, offering a new notation system that focuses on the perception of sound, thus responding to a central issue raised in the previous volume's survey. In order to interpret the presented scores, the necessary theoretical, practical, listening, and awareness issues are explored through addressing pedagogical, compositional, and performative aspects of the carefully selected techniques. In both volumes, the aim is to explain the complex processes of musical creation and reception.

There are two key concepts that underpin the research – *morphologies,* and *extended techniques.* Firstly, the notion of morphology is used as an experiential tool. Expressing guitar music in terms of morphologies means a spectral and structural approach. For example, a *morphology* may be described as the spectral detail of a sound through time; put another way, morphologies are sound objects that engender a spectral continuum. These two mutually inclusive aspects, a spectrum and activity through time, provide a framework for understanding and experiencing music's temporal flow. Secondly, the sonic outcome from the extended techniques I am interested in form spectra that avoids the sound convention of attack followed immediately by a stable (though slowly decaying) resonance comprising as much pitch material as possible.

Learning to perform morphologies means engageing with the interelations of sound components and resonance values during the temporal flux of the music. Improvising involves capturing and maneuvering the spectral content involving elements of freedom. Composing is the process of depicting the morphologies in order to produce a score, where the composer strives to apply

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[3] For further explanation's on extended techniques inclusion, see Volume 2 Chapter 4 and Chapter 7; for non-inclusion see Volume 1 chapter section's 1.9.1, 1.9.2.

methods of representation that are as precise and simple as possible. These may have ties with traditional notation when relevant, or such methods may involve graphic symbols to capture the entire duration of the sound.

The expression *extended technique* is well established in contemporary music vernacular. Ellen Fallowfield reminds us that recent discussion regarding technique, especially terminology that influences technical and practical challenges, "has particularly focused on the term *extended technique* or synonyms such as *modern/contemporary performance techniques"* (Fallowfield 2009: 25). A quick Internet search produces many pages of diverse links. Moreover, as the exploratory nature of contemporary sound language has developed since the mid-twentieth century, any meaning will necessarily change with time. For example, Cristóbal Halffter's usage of extended techniques for short passages in *Codex 1* (1963) is in contrast to Rolf Riehm's extensive employment for *Toccata Orpheus* (1990).[4]

Researchers have attempted to delineate extended techniques on their chosen instruments. However, the two examples that follow show that finding a consistent definition in musicological texts is problematic; both are from recent dissertations. In *A Pedagogy of Extended Techniques for the Horn derived from Vincent Persichetti's Parable for Solo Horn, Opus 120,* concentrating on the performative aspects Carol Deats tells us that: "Extended techniques are unfamiliar, unusual, unconventional, nontraditional, novel effects and extra musical sounds occurring in contemporary music beginning in approximately 1970 (Deats 2001: iv). Amy Cherry states the following in her *Extended Techniques in Trumpet Performance and Pedagogy*: "Extended techniques, effects, and extra-musical sounds outside of the traditional technical demands of playing the instrument have become a standard component of trumpet performance. Extended techniques are defined as ways of playing a traditional instrument that produce new and often unexpected sounds" (Cherry 2009).

To express extended techniques in these general terms is to some extent vague. In this research, although the guitar is used to produce unconventional sounds, the meaning of extended technique is also grounded on the soundworld

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[4] The section *1.9 An all-inclusive view of extended techniques*, which is an overview of extended techniques, incorporates the aspect of changes in usage over time in more detail.

that resides in the music composed for Volume 2. Therefore, the process for inclusion or non-inclusion is established in the fabric of guitar technique. In other words, the performer or composer is concerned with the usefulness and importance of the morphology that results from an extended guitar technique; usefulness in terms of extending and deepening understanding of repertoire, and importance in regard to awareness of guitar morphologies in performance situations. Furthermore, the findings from investigating the morphological outcomes will be used to cultivate a pedagogical approach.

John Cage and Matthew Burtner point the way. In *The Future of Music: Credo,* Cage makes an insightful comment that has a direct relation with extended techniques: "Whereas in the past, the point of disagreement has been between dissonance and consonance, it will be, in the immediate future, between noise and so-called musical sound" (Cage 1937: 1). In *Making Noise: Extended Techniques after Experimentalism,* Burtner alludes to technique requirements: "[Extended techniques] require the performer to use an instrument in a manner outside of traditionally established norms" (Burtner 2005: 1).

One could deduce that the dichotomy of conventional or unconventional usage of an instrument to produce extended techniques is at the heart of the above quotes. The use of unorthodox techniques in playing is the fundamental justification for exploring the resultant morphologies, principally if the goal is to enhance technical control of sound for player and composer. In other words, the objective here is to bring sound morphology, usually the object of music analysis, into the creative areas of performance and composition. There is also a pedagogical purpose to this thesis, therefore. It aims to develop guitarists' awareness of inherent spectral content when producing sound events, and give composers ideas about how to incorporate elements of structure and spectrum into a newly devised notation.

In the above definitions of extended techniques, the emphasis is clearly on sound production, for example, *how* to achieve a certain sound. This is hardly surprising as the word 'technique' implies physicality, the act of playing, which is an important part of the pedagogical process. However, describing extended techniques in terms of aesthetic content gives us a much better idea of *what* is produced, beyond the 'how'. This is not to deny the importance of physical

production, but rather keep us focused on both poietic and aesthetic aspects of extended techniques, namely the technique itself and the active perception of the resultant sound. If there is any point to attempt a definition of extended technique, mine will therefore be: An unconventionally played procedure that produces morphologies containing a spectral content alternative to the conventional pitch-biased attack-sustain/decay model.

In relation to the guitar, the art of performing extended guitar techniques lies in learning the skill of executing particular actions in an unconventional manner. Furthermore, adaptability of hand movements in performance situations is essential. The importance of this corporeal aspect is evident in both Volumes; the precise approach for producing tapping morphologies by Riehm, and positional parameters employed for left-hand movements in rapid mute playing, are two of the many examples. (See sections 1.5.2, and 7.11.8.)

Regarding usage in the repertoire, Figure 1a has been devised to show the diversity of unconventional sounds used by composers over the last few decades. It comprises two columns - extended techniques (listed in alphabetical order) and execution. I have identified twenty-seven existing extended techniques, which have been extrapolated from cited repertoire in Figure 35 (pages 106-112); most of the pieces are published, some are in manuscript. From Figure 35: 1, for example, Bedford's *You Asked for It* (1973) is published by Universal Edition, however, Biberian has self- published his *Prisms no. II* (1970). (See Bibliography page 411.)

The extended guitar techniques mentioned in Figure 1a range between morphologies where pitched sounds dominate, snap pizzicato (long) for instance, to more noise-oriented morphologies, like rapid mute. Snap pizzicato (long) and rapid mute usage is mentioned in both volumes. Among the many examples are 1.4.1 to 1.4.3, 5.1 and 5.2, plus 7.5.1 and 7.11. However, in Figure 1a some morphologies are pure noise, golpé is an example. The list in Figure 1a also encompasses morphologies made by incorporating means other than the hands; there are thirteen external implements, as well as three body sounds and utterances. Short performance explanations of each technique and type of sound outcome are provided in the execution column.

To give a more extensive overview, Figure 1b follows Figure 1a. Figure 1b comprises a list of six new extended techniques invented by the author, which

will be discussed in volume 2. However, the listing in Figure 1a will be considered in the present volume.

Figure 1a
1

Extended techniques	Execution
Behind head-nut	Pluck the string length between the head-nut and tuning rollers to produce a filtered spectrum.
Buzz gliss (strings 6 or 1)	Pull string 6 or string 1 off the neck onto the neck's side, slide along to produce a glissando.
Cross stroke	Using combinations of the three lower strings, right-hand index fingernails scrape along the string length.
Cross stroke (active scordatura)	Using combinations of the three lower strings, right-hand index fingernails scrape along the string length. An iterative metallic-sound with a refracted rich spectral content results.
Finger scrape	Rub finger(s) along strings, usually lower ones, to produce noise.
Golpé	Tap the soundboard with a right-hand fingernail or fingertip to produce a percussive sound.
Harmonics, high and soundhole	Harmonics that are located between fret III and the headstock nut, and between the end of the fretboard and bridge.
Half-harmonic	A semi-dampened harmonic, actually an imprecise placement of a natural harmonic to filter the spectrum.
Hand-brushing	Move hand(s) across or along the strings to produce noise.
Harmonic tambora	Strike the strings with an outstretched right-hand finger, typically index or thumb, at a natural harmonic node point to produce a resonance.
Nail scrape	Drag a right-hand nail along a lower string to produce noise.
Nail sizzle	Place stopping finger next to a string, allowing adjacent plucked string to rattle against the fingernail.

Nut-side	Pluck the string-length between a stopped left-hand finger and the head-nut; pitch content with compressed nature occurs.
Multiphonic harmonic	Place a finger of one hand lightly on the string exactly over a node point, then attack with the other hand to produce a resonance.
Palm slam	Short percussive sound produced by attacking strings downwards onto wood.
Rapid mute	Resting the left-hand fingers lightly on the string(s), without pressing them to the fretboard, pluck with right hand in a conventional manner; successions of linear or refracted morphologies are used.
'Snare drum'	Cross adjoining strings then strike in a conventional manner, three phases occur; preparation, glissando resonance, and release.
Snap pizzicato (long)	Produced in two stages; lift the string away from the soundboard, then initiate a release allowing the string to bounce against the fretboard. The pitch material is left to resonate.
Snap pizzicato	Produced in two stages; lift the string away from the soundboard, then initiate a release allowing the string to bounce against the fretboard. The player intervenes to stop the resonance almost immediately.
Soundhole resonance (palm, fist, or thumb)	From just above the strings, use an appropriate part of the hand to press towards the soundhole quickly; an attack followed by a decaying noise-oriented spectrum occurs.
Tambora	Using a flat part of right hand, attack the strings rapidly just inside the bridge to produce a percussive sound followed by a resonance.
Tapping, bi-tone (long)	Use the fingers to apply a suitable amount of force to push the string(s) against an appropriate fret position. Two sounds emerge, resonances are a composite of lower and upper pitches.
Tapping, bi-tone	An interrupted version of *bi-tone (long)*. Use the fingers to apply a suitable amount of force to push the string(s) against the fretboard. Two sounds emerge, short resonances are a composite of lower and upper pitches.

Tapping, mute (long)	Damped version of bi-tone tapping, lower bi-tones are filtered out by damping action. Consequently, pitch content consists of upper bi-tones only; attack followed by a resonance.
Tapping, mute	An interrupted version *mute tapping (long)*, lower bi-tones are filtered out by damping action. Consequently, pitch content consists of upper bi-tones only; attack followed by a short interrupted resonance.
Wet finger	Slide a wettened finger lightly across the back of the guitar to produce a noise-based glissandi.
Whistling sound (also called sweep or finger rubs)	Slide along lower string(s), upwards or downwards, using thumb and middle finger or palm to produce a friction-based sound.
External implements	
Bottleneck	Using a finger, the player allows the bottleneck to attack with an appropriate amount of force before producing upwards or downwards glissandi.
Bow	Attack the string(s) in arco style using a cello or double bass bow to produce an attack and resonance.
Mallet	Strike strings with the head or rub guitar body to produce noise.
Mini alligator clip	Attach clip to string(s) to produce a rattling effect.
Paper clip	Attach clip to string(s) to produce a rattling effect..
Paper knife	Insert between the strings, alternately over and under to produce noise.
Rubber wedge (small)	Insert between the indicated strings, typically strings 6 and 5 to filter the spectrum..
"Snare drum" (matchstick)	Insert between two crossed adjacent strings to filter the spectrum.

8

Figure 1a

4

Sponge	Slide across or along the strings to produce noise.
Spoon (table or tea)	Apply to string(s), move along plucked string(s) to produce glissandi.
Thin metal rod	Insert between the strings, alternately over and under to filter the spectrum.
Tracing paper	Fold and place beneath the strings at the bridge to filter the spectrum..
Tuning fork	Strike the strings then apply to the strings and draw across to produce glissandi..
Body sounds and utterances	
Finger snapping	Apply tension by pressing the pad of the thumb firmly against the pad of middle finger - slide thumb towards your index finger while sliding middle finger towards your palm.
Tongue clicks	Produced by rapid movement of human tongue. Place the tip of the tongue directly behind front teeth then move the tongue along roof of the mouth. Stiffen tongue and apply pressure
Twine	Tie to string, typically string 6, and wrap over other strings or rest behind the neck to produce noise. with the tip creating a vacuum against the roof of your mouth with your tongue. Making sure that the tongue is not flat up against the roof of your mouth, create a hollow space in the middle but completely sealed all the way around the edge of the palette. Lower the jaw and pull tongue free from the vacuum to hear the click.

Figure 1a: Extended techniques in the repertoire.

Figure 1b

Extended techniques	Execution
Bottleneck (plucked)	Using a finger, place the top rim of a bottleneck lightly on two of the upper strings; two strings are plucked simultaneously by the other hand to produce upwards or downwards glissandi.
Bottleneck (unplucked)	Using a finger, the player allows the bottleneck to attack with an appropriate amount of force before producing upwards or downwards glissandi.
'Snare drum' (lateral glissando)	Cross adjoining strings then strike in a conventional manner, three phases occur; preparation, glissando resonance, and release.
'Snare drum' (slide glissando)	Cross adjoining strings then strike in a conventional manner, three phases occur; preparation, resonance, and refracted release.
Soundhole resonance (buzz)	A single-string version of *palm, fist, or thumb*. Use the fingertips to press towards the soundhole quickly; an attack followed by a decaying noise-oriented spectrum occurs.
Pinch mute	The right-hand thumb and index finger are used in a pinching motion to pluck a string simultaneously; a short noise-oriented sound results. Relationships with inherent natural harmonics occur when passing node points.

Figure 1b: New extended techniques.

Figures 1a and 1b are not posited as a comprehensive list. However, they are more complete than any inventory found to date. The following two pedagogically-based books come the closest, *Neue Notationsformen, Klangmöglichkeiten und Spieltechniken der Klassischen Gitarre* (1991) by Angela Lehner-Wieternik and *The Contemporary Guitar* (1985) by John Schneider. Lehner-Wieternik mentions nine extended techniques and five external implements. Her work is centred on charting notational usage in the repertoire.[5] Schneider cites seven extended techniques in the book. He concentrates on observing technical aspects from the repertoire, and the instruments development in the second half of the late twentieth century. Note that all of the extended techniques mentioned in these two works appear in Figure 1.

It is obvious from looking at Figure 1 that Schneider and Lehner-Wieternik have missed key techniques and repertoire.[6] For example, although Lorentzen's piece *Umbra* (1973) is mentioned by Schneider in regard to right hand damping technique, he does not refer to the *nail sizzle* effect employed in the second movement, marked 'misterioso'. Unusually, Lehner-Wieternik appears to have overlooked Lachenmann's *Salut für Caudwell* (1977) in her survey.[7] She cites rapid mute and bottleneck but not *hand brushing*.[8]

Through considering the invention and enterprise of contemporary composers and guitarists – composers who incorporate perception of sound in their work and guitarists that undertake learning to perform actions in an unusual manner - the content of this research demonstrates the need for an investigation into performance, improvisation, pedagogy, and composition in relation to extended techniques and guitar morphologies. An important means of achieving this is by understanding extended techniques historically, identifying problems of notation and offering solutions. Covering all extended

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[5] See chapter section 1.2, where Lehner-Wieternik's and Schneider's books are discussed in more detail.

[6] It is for this reason too that I have not cited Robert Lunn's *Extended Techniques for the Classical Guitar: A Guide for Composers*, as he misses out a lot of repertoire. This dissertation was completed in 2010 and mentions eight extended techniques and five external implements. However, he mentions only fifteen works. For example, one work is referred to after the new millennium, Benjamin Verdery's *11 Etudes* (2005).

[7] There is no mention of Lachenmann's piece in Lehner-Wieternik's Bibliography.

[8] *Hand brushing* is mentioned in Bruck's *'Pro Musica Nova'* (1992), page10.

techniques and their concomitant notational issues, however, is beyond the scope and objective of this thesis. Here the focus will remain on historical cases that give rise to more morphologically orientated resolutions.

In line with the definition of extended techniques above, perception of spectral content in the repertoire will be the main centre of attention, in particular, morphologies whose sound properties result from setting the strings of a six-string classical guitar into motion using particular unconventional actions. Moreover, I will show how idenifying morphologies as formal types, the archetypal attack/resonance model and variants of the archetype, can lead to providing musicians with a new repertoire. (See Chapter 5.)

1 Historical links

1.1 Prelude

This chapter, which is a study of the use of extended techniques in guitar music from the 1960s to 2012, especially works for solo six-string classical guitar, provides a context for the music composed for this research. After a short explanation relating to the inspirational Gaspar Sanz, the ensuing discussion centres on relevant research that has emerged since the mid-1980s, highlighting the diversity of existing practice.

Topics covered are as follows; the classification of works that incorporate relevant morphological structures, the noise and pitch nature of guitar morphologies, and observations on extended guitar techniques usage in recent repertoire. Research materials studied comprise scores, recordings, dissertations and articles, as well as email correspondence with relevant musicians.

Instrucción de Música by Gaspar Sanz (1674/5), the first known guitar treatise, is the book that inspired this exploration. Unlike other early books, his is a more comprehensive approach, the only work until this one that encompasses instruction on performing, improvising, and the inclusion of compositions.

In the Sanz treatise, the primary emphasis is on teaching the student to develop clarity of musical line. Interpretatively, this is achieved by using the least number of strings. However, to act as a contrasting texture Sanz used a method of playing called *campanelas* (Spanish. campana = bell). In campanelas style, graduated successions of notes are performed across adjacent strings, resulting in a merging of pitches rich in overtones, which is reminiscent of bells chiming. *Sound example, track 1* consists of two performances of the same passage from *Canarios* (by Sanz), where the second uses the campanelas style. The first extract is played by Julian Bream, who concentrates on bringing out the two-part texture clearly. In contrast, Rafael Bonavita creates a cascade of sound. Sanz developed a practical method for articulating consecutive and merged sounds, and used tablature to convey notational information.

1.2 Significant research

For this section, the discussion will centre on extended guitar techniques in relation to performance and pedagogy. The following books and dissertations, which are used here to illuminate relevant aspects, help shed light on contemporary guitar practice. However, unlike this research, no single work that examines performance, improvisation, and composition has been found.

In *The Contemporary Guitar* (1985)*,* John Schneider provides the reader with a very technical and thorough evaluation of the instrument's development up to the 1970s. In *PLAY! Philosophical and Practice-based Studies of Musical Performance* (2007) by Stefan Östersjö and *The Anxiety of the Dedicatee: Two Studies in Composer-Performer Collaboration* (2009) by Jonathan Leathwood, the authors examine performer and composer collaborations. Kimberley Perlak is concerned with guitarist-composers in *"Finding a Voice" in the American Classical Guitar Vernacular* (2008). Angela Lehner-Wieternik's *Neue Notationsformen, Klangmöglichkeiten und Spieltechniken der klassischen Gitarre* (1991) and Wilhelm Bruck in *'Pro Musica Nova' Studies for Playing Contemporary Music for Guitar* (1992) concentrate on performance aspects of contemporary composers' guitar works. Ricardo Iznaola in *Kitharologus* (1997) and Colin McAllister in *The Vanguard Guitar* (2004) present pedagogical work.

John Schneider's focus in *The Contemporary Guitar* is on extended technique usage, linking existing compositions with performance practice; he does not offer new compositions or pedagogy. The section on *pitched sounds* (Schneider 1985: 122-136), in dealing with both pitch and noise orientation, relates to morphologies that have been expanded in this work, for example, pitch-oriented *harmonics* and the unique pitched texture of *bi-tones*.

The well-known *snap pizzicato* is covered by Schneider as a percussive technique. Moreover, the resultant sound of *damped pizzicati* is an example of a filtered spectrum. Schneider cites cases in point from the guitar repertoire. For instance, Bedford uses snap pizzicati in *You Asked for It* (1973), and Biberian unfretted damped pizzicati in *Prisms no. II* (1970). (See sections 7.5, and 7.11.)[9]

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[9] David Bedford *You Asked for It* (1969), Universal Edition London 1973, and Gilbert Biberian *Prisms no. II* (1970), in manuscript.

In discussing the origins of *bi-tones*, Schneider refers to Luigi Russolo, who, in 1926, invented a device for bringing about the "simultaneous and independent vibration of two segments of the same string, thus producing a bitonal combination of two complementary sounds" (Schneider 1985: 126). He follows on with an account of the musical development of bi-tones up to the 1960s and 70s, entering into a detailed mathematical explanation of the resultant sounds using text and diagrams.[10]

Schneider discusses historical and contemporary use of guitar harmonics, from plucked instruments in second century China through to Giuliani and Sor in the nineteenth century, using diagrams to help explain the production and modern usage of natural harmonics before describing how a rich and imaginative notation arose in the twentieth century (Schneider 1985: 130). Examples include Bedford (1973) *You Asked for It*, Kagel (1960) *Sonant,* and Bartolozzi (1966) *Concertazioni per Oboe*.[11]

Multiphonic guitar harmonics have been a neglected area in guitar literature. Only Schneider's commentary has been found. He starts in the early 1960s, by referring to *New Sounds for Woodwind* (English Translation 1967) by Bruno Bartolozzi, explaining how Bartolozzi and his associates discovered woodwind multiphonics, and then discusses the mechanics, mathematics, and notation related to guitar multiphonics; Schneider also touches on the topics of higher harmonics and nodes (Schneider 1985: 136). Only the American composer William Bland, who used these sounds in the 1970s, is cited.[12]

Schneider's work is invaluable to the modern guitarist who seeks to understand, broaden and deepen knowledge of technique, the instrument, and relevant repertoire. *The Contemporary Guitar* has has become the standard text in the field.

In his treatise *PLAY!* Östersjö briefly mentions that Kent Oloffson uses extended techniques in the mid section of *Treccia* (1990-2). However, no details

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[10] My use of *tapping* has been influenced by the precise notation in Kagel's *Sonant* (1960) and Brouwer's *La Espiral Eterna* (1971), as well as examples by Schneider. (See Chapter sections 7.9 to 7.9.6.)

[11] Note that *harmonics* is a core technique in this research. (See Chapter section 7.2.)

[12] William Bland *Untitled Composition in Three Sections* (1975). (Unable to obtain manuscript copy).

are given.[13] He goes on to discuss the use of scordatura in the guitar parts of three more works, concentrating on the composer's ideology, *Tarpeian Rock* (1996-7) for chamber ensemble and electronics, *Liuto d'Orfeo* (1998-9) for charango, 6- and 10-string guitars and tape by Kent Oloffson, and Richard Karpen's *Strand Lines* (2007) for amplified guitar and live computer interaction. For example, of *Tarpeian Rock* Östersjö tells us: *"The experimental use of scordatura is an aspect of Olofsson's guitar writing that becomes fundamental for his reconsideration of classical guitar techniques and sound worlds"* (Östersjö 2007: 136). However, there is no discussion on Karpen's pitch usage.

Discussing his collaboration with composer Stephen Goss, Jonathan Leathwood mentions that in *The Oxen of the Sun* (2003-4) a number of passages exist where extended techniques are left to the performer to realise.[14] For example, in the movement *Aeolus*, bi-tones are used for a rhythmic passage in compound time.

Although Kimberly Perlak talks about Bryan Johanson's *13 Ways of Looking at 12 Strings* for two guitars in her treatise, touching on subjects such as bonds between the popular musical idioms, American cultural background, the classical tradition, and compositional as well as stylistic approaches in their music, she does not mention his use of extended techniques - snap pizzicati in the final movement *Jammus Vulgaris,* for instance.[15]

There are two types of performance manual - didactic guitar anthologies that concentrate on contemporary music, in particular where performance of extended techniques and unconventional notation systems is concerned (Bruck

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[13] Stefan Östersjö is a virtuoso guitarist who specialises in contemporary music. His treatise *PLAY! Philosophical and Practice-based Studies of Musical Performance* 2007 is an exploration into the relationship between the highly fragmented contemporary art music of today and a lack of common performance practice in terms of musical style and notational conventions.
[14] Jonathan Leathwood's *The Anxiety of the Dedicatee: Two Studies in Composer-Performer Collaboration* is an account of his experiences, as a performer, with two composers.
[15] In her abstract to *Finding a Voice*, Perlak explains: "This treatise focuses on four classical guitarist-composers who found their 'American voices' and played key roles in the creation of a distinctive sound in contemporary American classical guitar music" (Perlak 2008: vii). She goes on to explain how the work of Andrew York (b. 1958), Benjamin Verdery (b. 1955), Bryan Johanson (b. 1951), and David Leisner (b. 1953) illuminated the "American" guitar vocabulary that has become a common vernacular in American classical musical culture.

and Lehner-Wieternik), and handbooks of technical training, founded on practical methodology, or methods from first principles.

1.2.1 Didactic guitar anthologies

In *Neue Notationsformen* Lehner-Wieternik's focus is on how contemporary composers score extended techniques. She uses two categories - resultant notation and action notation.

Resultant notation is tied to the common parameters of traditional notation, where the symbols and verbal instructions provide a relatively exact arrangement of the desired sound - pitch, timing, dynamics, articulation, phrasing and textual instruction. Lehner-Wieternik starts by explaining conventionally written scores, citing Britten's *Nocturnal* and Henze's *Royal Winter Music,* before going on to include graphic representations that are superimposed onto standard configurations. There are many citations that date from 1964 to 1990, and some of the works are mentioned in Figure 2 - Koshkin's *The Prince's Toys* and Henze's *Memorias de 'El Cimarrón',* for instance. She includes a section on music that involves some freedom for the interpreter, for example the senza tempo passages in Halffter's *Codex 1* and Brouwer's use of boxes in *La Espiral Eterna.* Lehner-Wieternik also looks at aspects of spatial notation and proportional representation.

Action notation, according to Lehner-Wieternik, is more concerned with connecting with the instrument, generally to bring out unconventional sounds; graphic symbols and action instructions that supplement conventional notations are used. Relatively integrated notations and abbreviations are explained at the beginning of this section; she cites works by Rak and Berio, before going on to cover how glissandi, resonance, pizzicati, percussion, rasgueado, tremolo, vibrato, and harmonics are represented.

The final section is on experimental music, where Lehner-Wieternik gives insights into scores in which composers allow the performer freedom to manipulate elements of outcome. There are sections on the use of preparation and external devices, for example Brouwer's use of muted pitches by lodging matchsticks between strings in *Tarantos,* and Henze's application of a double bass bow to create bowed harmonics in *Memorias de 'El Cimarrón'*. To assist

the reader's comprehension, there is extensive use of diagrams with text explanation throughout this book.

To help the performer, Wilhelm Bruck utilizes key repertoire in *'Pro Musica Nova', Studies for Playing Contemporary Music for Guitar.* Mauricio Kagel's *Faites votre jeu I* from *Sonant* and Helmut Lachenmann's *Salut für Caudwell,* both cited in Figure 2, are included.[16] Bruck supplies informative commentary and explanation of the symbols with observations that refer to specific passages in the music. For example, he selects the second part of Lachenmann's guitar duo, explaining about the scordatura tuning system and that actions of the right and left hand are generally presented separately - right hand as tablature and left hand with stops and tones using a regular stave. He then describes the many unconventional symbols Lachenmann uses in the score. Finally, there is advice on how to prepare and learn the piece.

1.2.2 Handbooks of technical training

In regard to handbooks or methods, there is a lack of real investigation into use of extended techniques. Although in his introduction to *The Vanguard Guitar* Colin McAllister lists unusual systems of notation and extended techniques, he does not cover this in the body of the book. However, he confronts the issues of performing contemporary music by examining specific difficulties, telling us that: "*The Vanguard Guitar* is a collection of etudes and exercises that concentrate on three common areas to most contemporary concert music" (McAllister 2004: 6). These areas are:

• non-tonal melodic and harmonic language;
• increased rhythmic complexity;
• an expanded use of expressive devices (timbre and dynamics).

McAllister divides the book into three sections - expanding the tonal frame, developing the sense of time, and the expressive palette. Each section contains original compositions that focus on a particular issue, all written in standard notation. The pedagogical purpose is encapsulated in the notes that precede each study. For example, Section 1 opens with *Etude 1 – Impressionism,* where the

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[16] *Salut für Caudwell* was written for Wilhelm Bruck and Theodor Ross.

commentary includes a description of the prevalent compositional devices used, practice approach and goals. They are written in the style of obvious prominent twentieth century composers - Debussy, Bartok, and Schoenberg.

This book covers a wide range of topics, including frequently changing metres, subdivisions of beats, metric modulation, dynamic levels, and use of non-tonal language. *The Vanguard Guitar* is a welcome pedagogical work for the intermediate to advanced player. Moreover, it is useful training for tackling much of the standard twentieth century repertoire, especially where conventionally played pitches and standard technique are prevalent.

Iznaola's *Kitharologus: The Path to Virtuosity* includes a short section towards the end of the book on techniques that favour the left or right hand, which he terms "special effects". For the right hand he focuses on how to play conventional muted pizzicati and tambora. The exercises for the right hand in the special effects section are short and lack a sense of development. In relation to left-hand techniques, there is a brief explanation on 'snare drum' execution and nut-side playing. He tells us that in the literature 'snare drum' technique is, "…usually indicated as *tambor* or *tabalet"* (Iznaola 1977: 125). Discussion on nut-side technique is limited to Villa Lobos's use of upper partials in his *Etude no. 2,* which was originally written in the late 1920s. There is no mention of the nut-side playing that Kagel employed in the early 1960s, or Gilardino in 1971. (See Figure 2.)

Kitharologus is intended as a technical workout manual for guitarists, the main body of work containing a collection of 101 extremely useful graded exercises. Iznaola states: "A sound technical methodology is not one that tries to cover all possible forms of a given procedure, but rather one that identifies and trains the essential mechanism which makes the procedure, in all its forms, possible" (Iznaola 1997: 6). Iznaola's compositions couple his notion of essential mechanisms with expression in the music. He classifies guitar technique into seven categories:

• Right hand - arpeggios, tremolos, rasgueados, and repeated chords;

• Double notes;

• Scales;

• Slurs;

• Extensions and contractions;

• Shifts;

• Harmonics - natural and artificial.

    The material is divided into nine levels of proficiency, progressing from preparatory to advanced. For the best results, the exercises in Iznaola's systematic approach should be tackled in their chronological sequence. However, *Kitharologus* is also very useful in helping to solve specific technical problems, for example, weak slurs, faulty tremolo, and inconsistent finger alternation.

    McAllister and Iznaola produce exercises and studies that centre on pedagogical instruction. These books are not meant as methods from first principles.

1.2.3 Methods

Modern methods on learning to play the guitar are plentiful and tend to include detailed and precise instruction. These are good books for learning conventionally. Two examples are Noad (1968) and Gunod (1996). However, they are concerned with conventional Western musical language and do not seek to extend existing techniques or musical boundaries. The author has found no methods that concentrate on teaching extended techniques from a performance perspective.

1.3 Key repertoire

Ostensibly, the repertoire is founded on the interaction between composers, composer-performers, and performers. Typically, composers collaborate with guitarists, while composer-performers use their knowledge to explore possibilities. For example, in *PLAY!* the performer Stefan Östersjö discusses collaborative experiences in a series of projects with a number of composers, principally Per Nørgård and Kent Olofsson. In contrast, the primarily self-taught guitarist Leo Brouwer assimilated ideas from 1960s avant-garde composers into a unique and personal style of guitar writing. Brouwer tells us: "I received a great stimulus when I was in Poland in 1961 for Warsaw Autumn, an avant-garde festival. I remember Sylvano Bussotti, and the premiere of Krzysztof Penderecki's famous *Threnody in Memory of the Victims of Hiroshima.* It was a

kind of panorama from which I took the latest elements, like Cage and Berio"
(Guitar Review No. 75).[17]

Figure 2 has been devised to relate the relationship between key repertoire
from the twentieth and twenty-first centuries to the morphological structuring
ideas posited in Chapter 5, on which the Volume 2 studies are based. Although
solo works are the primary area of concern, relevant ensemble pieces are also
referred to. For example, Pereira is one of the few composers to utilize
multiphonic harmonics in his trio *Bento Box* (2007), and Lachenmann uses
cross stroke morphologies sparingly in duo *Salut für Caudwell* (1977).

Figure 2 consists of three columns - technique, connection, and works. The
specific extended technique is set out in the Figure 51 order. (See Volume 2,
pages 194-198.) Connection(s) to my extended guitar techniques usage relate to
single, consecutive, merged, and combined morphologies, which is the principle
behind the ordering of references in Figure 2. (See Chapter 5.) Note that the
inclusion of single morphologies refers to the occasional usage of an isolated
extended technique, or an occurrence within a phrase containing other
techniques.

The order from the techniques list is employed in the connection column
when other extended techniques are referred to. For example, in the combined
snap pizzicato section (Figure 2: 3), natural harmonics precede multiphonic
harmonics. Techniques not used in my studies appear at the end of the list.
Works are set out in chronological order for each connection.

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[17] Taken from www.anglefire.com/in/eimaj/interviews/leo.brouwer.html, which is an online
copy of *An Interview with Leo Brouwer by Constance McKenna*, Guitar Review No. 75, Fall
1988.

Figure 2: Key repertoire[1]

Technique	Connection	Works
Natural harmonics	Consecutive morphologies of higher harmonics.	Bedford, David *You Asked for It* 1969
	Merged morphologies.	Brouwer, Leo *Paisaje Cubana con Campanas* 1968
	"	Pisati, Maurizio *Sette Studi* 1990 Mvts II and IV
	"	Newland, Paul *Essays in Idleness* 2001 Mvts I and III
	Combined with higher harmonics and conventionally-plucked pitches, and merged higher harmonics including soundhole harmonics.	Durville, Philippe *Mouvement Apparent* 1988
	A higher harmonic combined with conventionally-plucked pitches.	Murail, Tristan *Tellur* 1977 (Figure C section)
	Merged natural with a single higher harmonic combined with conventionally-plucked pitches.	Shende, Vineet *Suite in Raag Marva* 2010 Mvt IV *Jhala*
	Combined with snap pizzicato.	Ferneyhough, Brian *Kurze Schatten II* 1983-9 Mvt 1
	Combined with conventionally-plucked pitches, merged, and single morphologies.	Kagel, Mauricio *Faites votre jeu I* from *Sonant* 1964
Multiphonic harmonics	Single morphologies.	Edgerton, Michael Edward *Tempo Mental Rap* 2005 Var 3
	Consecutive morphologies.	Pereira, Joseph *Bento Box* 2007 for alto flute, guitar, and vibraphone
	Merged morphologies.	Bland, William *Untitled Composition in Three Sections* 1975
	"	Durville, Philippe *Mouvement Apparent* 1988
Bottleneck	Consecutive morphologies.	Lachenmann, Helmut *Salut für Caudwell* 1977
	"	Edgerton, Michael Edward *Tempo Mental Rap* 2005 Var 1
	"	Baca-Lobera, Ignacio *La Lógica de los Sueños* 2010 for voice, 2 guitars (one player) and electronics
	Combined with etouffé pizzicato.	Brooks, William *Footnotes* 1982 Mvt 3 *Crump*

Figure 2: Key repertoire 2

Technique	Connection	Works
	Combined with natural harmonics, gong and tam tam (tremolo).	Biberian, Gilbert *Prisms no 2* 1970 for ten guitars and percussion
	Combined with electroacoustic sounds.	Kokoras, Panayiotis *Slide* 2002
	Combined with conventionally-plucked pitches and electroacoustic sounds.	Guzmán, Edgar *Apnea* 2004-2005 for acoustic guitar and tape
Snap pizzicato (long)	Single and consecutive morphologies.	Koshkin, Nikita *Usher Waltz* 1996
	Consecutive morphologies.	Lorentzen, Bent *Umbra* 1973 Mvt 4
	Merged (simultaneous), and single morphologies.	Giner, Bruno *Trans-errance 1* 1984
	Merged (simultaneous) morphologies.	Brouwer, Leo *La Espiral Eterna* 1973
	Merged morphologies.	Scelsi, Giacinto *Ko-Tha - "A Dance of Shiva"* 1967
	"	Henze, Hans Werner *Memorias de 'El Cimarrón'* 1970 Mvt II
	Combined with natural harmonics or golpé.	Kagel, Mauricio *Faites votre jeu I* from *Sonant* 1964
	Combined with natural harmonics, and conventionally-plucked pitches. Single and merged morphologies.	Guzmán, Edgar *Apnea* 2004-2005 for acoustic guitar and tape
	Combined with conventionally-plucked pitches.	Halffter, Cristóbal *Codex 1* 1963
	"	Haubenstock-Ramati, Roman *Hexachord 1 and 2* 1976
	"	Murail, Tristan *Tellur* 1977 (Figure E section)
Snap pizzicato	A single morphology.	Durville, Philippe *Mouvement Apparent* 1988
	Single morphologies.	Kagel, Mauricio *Faites votre jeu II* from *Sonant* 1964
	"	Bergman, Erik *Midnight* Op. 83 1977
	"	Dench, Chris *Severence* 1994
	"	Hayden, Sam *Axes(s)* 1997, revised 2008-9

Figure 2: Key repertoire

3

Technique	Connection	Works
	"	Guzmán, Edgar *Apnea* 2004-2005 for acoustic guitar and tape
	Single morphologies into slurred pitches.	Ginastera, Alberto *Sonata* 1976
	Single morphologies (within fast moving texture).	Kampela, Arthur *Percussion Studies I, II,* and *III* 1997
	Single, merged (simultaneous), and consecutive morphologies.	Giner, Bruno *Trans-errance I* 1984
	Consecutive morphologies.	Kagel, Mauricio *Faites votre jeu I* from *Sonant* 1964
	"	Bedford, David *You Asked for It* 1969
	"	Henze, Hans Werner *Memorias de 'El Cimarrón'* 1970 Mvt II
	"	Lorentzen, Bent *Umbra* 1973 Mvt 4
	"	Corghi, Azio *Consonancias y Redoubles* 1974 (Section C/1)
	"	Lachenmann, Helmut *Salut für Caudwell* 1977
	"	Murail, Tristan *Tellur* 1977 (Figure E section)
	"	Verdery, Benjamin *11 Etudes - Etude 11 Home is Here* 2005
	"	Baca-Lobera, Ignacio *La Lógica de los Sueños* 2010 for voice, 2 guitars (one player) and electronics
	Combined with natural harmonics.	Ferneyhough, Brian *Kurze Schatten II* 1983-9 (all Mvts)
	Combined with conventionally-plucked pitches (*Var 1*) and multiphonic harmonics (*Var 6*).	Edgerton, Michael Edward *Tempo Mental Rap* 2005 Vars 1 and 6
	Combined with "snare drum" and conventionally-plucked pitches, and single morphologies.	Heininen, Paavo *Touching Op. 40* 1978
	Combined with golpé.	Riehm, Rolf *Notturno für die trauerlos Sterbenden* 1977
	Combined with conventionally-plucked pitches.	Biberian, Gilbert *Prisms no 2* 1970 for ten guitars and percussion
	Combined with conventionally-plucked pitches, a single morphologies also used.	Haubenstock-Ramati, Roman *Hexachord 1 and 2* 1976 for solo or two guitars
	Combined with conventionally-plucked pitches; a single morphology also used.	Pereira, Joseph *Bento Box* 2007 for Alto flute, guitar, and vibraphone

Figure 2: Key repertoire [4]

Technique	Connection	Works
	Combined with electroacoustic sounds.	Kokoras, Panayiotis *Slide* 2002 MS
Cross stroke	Single morphologies	Lachenmann, Helmut *Salut für Caudwell* 1977
	Consecutive morphologies	Riehm, Rolf *Notturno für die trauerlos Sterbenden* 1977
	Combined resonance with golpé and consecutive iterative attacks	Maurizio, Pisati *Caprichos de Simios y Burro* 2003 Mvt I
'Snare drum'	Consecutive morphologies.	Koshkin, Nikita *The Princes Toys* 1992
	"	Verdery, Benjamin *11 Etudes* Etude 11 *Home is Here* 2005
	Combined with bi-tones and a natural harmonic.	Halffter, Cristóbal *Codex I* 1963
	Combined with snap pizzicato and conventionally-plucked pitches.	Heininen, Paavo *Touching Op. 40* 1978
	Combined with rapid mute and golpé.	Brooks, William *Footnotes* 1982 Mvt 1 *Cage*
	Combined with conventionally-plucked plucked pitches, and consecutive morphologies	Bergman, Erik *Midnight* Op. 83 1977
	Combined with golpé	Corghi, Azio *Consonancias y Redoubles* 1974 (Section C/1)
	Combined with golpé, and consecutive morphologies.	Pearson, Stephen Funk *Brunella the Dancing Bear* 1983
'Snare drum' lateral gliss		none
'Snare drum' slide gliss		none
Soundhole resonance (palm, fist, or thumb)	Single and consecutive morphologies.	Kampela, Arthur *Percussion Studies I, II, and III* 1997
	Consecutive morphologies.	Edgerton, Michael Edward *Tempo Mental Rap* 2005 Var 3
	Consecutive morphologies and combined with bi-tones.	Pisati, Maurizio *Caprichos de Simios y Burro* 2003 Mvts II and III
	Combined with bi-tones.	Riehm, Rolf *Toccata Orpheus* 1990 (system 12)
	"	Oehring, Helmut *Foxfire Eins* 1993
	Combined with golpé.	Olofsson, Kent *Treccia* 1990-92

Figure 2: Key repertoire
5

Technique	Connection	Works
Soundhole resonance (buzz)		none
Tapping (bi-tone)	Single and consecutive morphologies.	Kagel, Mauricio *Faites votre jeu I* from *Sonant* 1964
	Consecutive morphologies.	Brouwer, Leo *Paisaje Cubana con Campanas* 1968
	"	Biberian, Gilbert *Prisms no 2* 1970 for ten guitars and percussion
	"	Rak, Štěpán *Voces de Profundis* 1984
	"	Koshkin, Nikita *The Princes Toys* 1992
	"	Kampela, Arthur *Percussion Studies I, II and III* 1997
	"	Pisati, Maurizio *Caprichos de Simios y Burro* 2003 Mvt II
	"	Frengel, Michael *Bingo Variations* 2006 Mvt IV *Crazy 'T'* and Mvt VII *Normal Bingo 'B'*
	"	Pereira, Joseph *Bento Box* 2007 for alto flute, guitar, and vibraphone
	Consecutive morphologies and combined with soundhole resonance.	Oehring, Helmut *Foxfire Eins* 1993
	Consecutive morphologies and combined with conventionally-plucked pitches.	Riehm, Rolf *Notturno für die trauerlos Sterbenden* 1977
	Merged morphologies.	Kagel, Mauricio *Faites votre jeu II* from *Sonant* 1964
		Bryars, Gavin *The Squirrel And The Ricketty-Racketty Bridge* 1971
	"	Brouwer, Leo *La Espiral Eterna* 1973
	"	Corghi, Azio *Consonancias y Redoubles* 1974 (section R/2)
	"	Guzmán, Edgar *Apnea* 2004-2005 for acoustic guitar and tape
		Sam Hayden *Axes(s)* 1997, revised 2008-9
	Merge with natural harmonics (or conventionally-plucked pitches); single morphologies also used.	
	Merged morphologies and combined with nut-side.	Riehm, Rolf *Toccata Orpheus* 1990 (system 1)

Figure 2: Key repertoire

Technique	Connection	Works[6]
	Combined with "snare drum" and a natural harmonic.	Halffter, Cristóbal *Codex 1* 1963
	Combined with snap pizzicato.	Murail, Tristan *Tellur* 1977 (Figure E section)
	Combined with nail sizzle.	Lorentzen, Bent *Umbra* 1973 Mvt 2
	Combined with conventionally-plucked pitches (Vars 1, 3, and 6), and sponge motion - back and forth (Var 5).	Edgerton, Michael Edward *Tempo Mental Rap* 2005 Variations 1, 3, 5 and 6
	Combined with golpé.	Olofsson, Kent *Treccia* 1990-92
	Combined with conventionally-plucked pitches.	Dench, Chris *Severence* 1994
	Combined with conventionally-plucked pitches, and merged morphologies.	Goss, Stephen *Oxen of the Sun* 2003–4 (Mvts III and IV) for one player on 6- and 10-string guitars at the same time
Tapping (mute)	Merged morphologies.	Corghi, Azio *Consonancias y Redoubles* 1974 (section R/2)
	Combined with golpé then etouffé pizzicato.	Brooks, William *Footnotes* 1982 Mvt 3 *Crump*
	Combined with conventionally-plucked pitches.	Rak, Štěpán *Voces de Profundis* 1984
Nut-side	Consecutive morphologies.	Kagel, Mauricio *Faites votre jeu II* from *Sonant* 1964
	"	Ferneyhough, Brian *Kurze Schatten II* 1983-9 Mvt 7
	"	Pisati, Maurizio *Sette Studi* 1990 Mvt V
	"	Edgerton, Michael Edward *Tempo Mental Rap* 2005 Var 1
	Merged morphologies.	Gilardino, Angelo *Abreuana* 1971
		Frengel, Michael *Bingo Variations* 2006 Mvt IX *Bingo 'The Hard Way'*
	Merged with natural harmonics; single morphologies also used.	Hayden, Sam *Axes(s)* 1997, revised 2008-9
	Combined with bi-tones.	Riehm, Rolf *Toccata Orpheus* 1990 (system 1)

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Figure 2: Key repertoire
7

Technique	Connection	Works
	Combined with alto flute, percussion, and strings (opening section).	Fujikura, Dai *ICE* 2009/10 for 2 flutes, oboe, clarinet, bassoon, guitar, violin, viola, cello, and bass
	Combined with prepared clip and harmonics.	Shende, Vineet *Suite in Raag Marva* 2010 Mvts I *Alap* and IV *Jhala*
Rapid mute	Single and consecutive morphologies.	Guzmán, Edgar *Apnea* 2004-2005 for acoustic guitar and tape
	Consecutive morphologies.	Halffter, Cristóbal *Codex I* 1963
	"	Henze, Hans Werner *Memorias de 'El Cimarrón'* 1970 Mvt III
	"	Brouwer *La Espiral Eterna* 1973
	"	Bergman, Erik *Midnight* Op. 83 1977
	"	Ferneyhough, Brian *Kurze Schatten II* 1983-9 Mvt 7
	"	Giner, Bruno *Trans-errance I* 1984
	"	Durville, Philippe *Mouvement Apparent* 1988
	"	Pisati, Maurizio *Sette Studi* 1990 Mvts I, II, and IV
	"	Dench, Chris *Severence* 1994
	"	Kampela, Arthur *Percussion Studies I*, *II*, and *III* 1997
	"	Frengel, Michael *Bingo Variations* 2006 Mvt II Postage Stamp
	"	Ribot, Marc *Exercises in futility* 2007 Etude 1 *Five gestures*
	"	Riehm, Rolf *Toccata Orpheus* 1990 (final section)
	Consecutive morphologies and combined with etouffé pizzicato, conventionally-pluched pitches, bowed gong, and tam tam (tremolo).	Biberian, Gilbert *Prisms no 2* 1970 for ten guitars and percussion
	Consecutive morphologies and combined with conventionally-plucked pitches.	Pisati, Maurizio *Caprichos de Simios y Burro* 2003 Mvts II and III
	Combined with bottleneck, merged and consecutive morphologies.	Lachenmann, Helmut *Salut für Caudwell* 1977
	Combined with mute taps.	Corghi, Azio *Consonancias y Redoubles* 1974 (section R/2)

Technique	Connection	Works
	Combined with "snare drum" (using matchstick), and golpé.	Brooks, William *Footnotes* 1982 Mvt I *Cage*
	Combined with conventionally-strummed pitches.	Edgerton, Michael Edward *Tempo Mental Rap* 2005 Var 1
	Combined with conventionally-plucked pitches, and consecutive morphologies.	Heininen, Paavo *Touching Op. 40* 1978
	Combined with golpé.	Olofsson, Kent *Treccia* 1990-92
	Combined with harmonics, consecutive morphologies also used.	Murail, Tristan *Tellur* 1977 (Figure A section)
	Combined with electroacoustic sounds	Kokoras, Panayiotis *Slide* 2002 MS
Pinch mute		None

Figure 2: Key repertoire.

The following observations about extended technique usage can be deduced from the information in Figure 2. Snap pizzicato, bi-tone tapping, and rapid

mute are the most commonly used techniques. For example, thirty-one composers include snap pizzicato morphologies. Composers have been drawn to their timbral qualities and relative ease of performance; snap pizzicati are powerful and percussive, bi-tones have a dual nature with unusual upper pitches, and rapid mute morphologies have a dynamic noise-biased pizzicato sound. (See sections 7.5, 7.9.1, and 7.11.) Moreover, bottleneck, nut-side, soundhole resonance (palm, fist, or thumb) are reasonably well represented. Furthermore, nine composers use natural harmonics.[18]

Multiphonic harmonics, snap pizzicato (long), cross stroke and mute tapping are rarely utilized. To be effective, multiphonic harmonics require a high degree of performance precision, the aim being to produce a reliable spectrum. Therefore, an awareness of performance difficulty is essential when creating a compositional context. However, multiphonic harmonics enable the inclusion of a more dense resonance in the upper register. (See section 7.3.)

Although there are numerous possibilities for combining *snap pizzicato (long), cross stroke* or *mute tapping* morphologies with other extended techniques listed in Figure 2, it appears to be a neglected area that has not emerged until this research. *'Snare drum' lateral glissando, 'snare drum' slide glissando, soundhole resonance (buzz),* and *pinch mute,* which arose out of personal experimentation and improvisation, appear to be new techniques.[19]

1.4 Extended techniques and conventionally plucked pitches

Throughout thirty-four of the fifty works listed in Figure 2, normally played guitar sounds exist concurrently with extended techniques. Although conventionally plucked pitches occur to varying degrees in fifteen of the remaining works, these also include sections consisting exclusively of extended techniques. The remaining piece consists entirely of one extended technique. These sixteen works, which are discussed in detail in chapter section 1.7 and Figure 23: 1, may be considered in relation to the principles expressed in Chapter 5 and have a connection to my usage. (See Chapter 5 and chapter

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[18] Note that for the music in Volume 2, natural harmonics are extended beyond conventional use. (See Chapter sections 7.1.1, and 7.1.2.)

[19] Note that Bottleneck (plucked and unplucked) are also new ways of including glissandi. (See chapter section's 7.4.1 and 7.4.2.)

section 5.1.)

Seven general compositional tendencies can be observed in the following sections - harmonics usage, short passages of extended techniques, fragmented structures, integration of extended techniques and conventionally played sounds, improvisatory passages, exclusive usage of extended techniques, and scordatura. Note that some works encompass more than one tendency.

By looking at the contrast between works in every compositional tendency, an overall impression of each type of usage becomes apparent, noting that the integration of extended techniques with conventionally plucked pitches is the dominant factor.

1.4.1 Harmonics usage

Although the majority of composers listed use natural harmonics, the discussion will concentrate mainly on the development of campanelas style through usage of harmonics (where pitches are played across the strings). (See section 1.1.) In this research, campanelas style is synonymous with merged morphologies. This is reflected in the harmonics section of Figure 2, where the four types of harmonics are mentioned - natural, higher, soundhole, and multiphonic.[20] Six composers who have developed campanelas style using harmonics in contrasting ways are cited - Brouwer, Newland, Pisati, Shende, Durville, and Kagel.

Three composers have used passages consisting of merged natural harmonics morphologies. While Leo Brouwer in *Paisaje Cubana con Campanas* (1968) and Paul Newland *Essays in Idleness* (2001) have developed extended sections, in contrast Maurizio Pisati uses short phrases in *Sette Studi* (1990) Movement 4.

Paisaje consists of four sections. In the final section, which lasts for approximately 57 bars at crotchet equals 116-120, the music is iterative in nature. To evoke the sound of bells pealing, seven pitches are used in repeated

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[20] Also, see chapter sections 7.2 to 7.5.

short configurations of varying lengths.[21] As frets VII, IX, XII are employed, this passage may be played in one position.

Essays in Idleness is a work in eleven short movements. Movements 1, 3, and 4 are made up entirely of natural harmonics. The other movements consist of normally plucked pitches. The opening movement, marked senza misura and quaver = 192, consists of merged natural harmonics using six pitches; the five long phrases have a contemplative nature. Newland uses frets IV (just behind), V, VII, which can be played in one position. However, the inclusion of fret XII means that a left-hand shift will be necessary. (See Figure 3.)

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[21] In this section of the Brouwer work, for some bars the performer is free to choose the number of repeats.

Paisaje Cubana con Campanas by Leo Brouwer
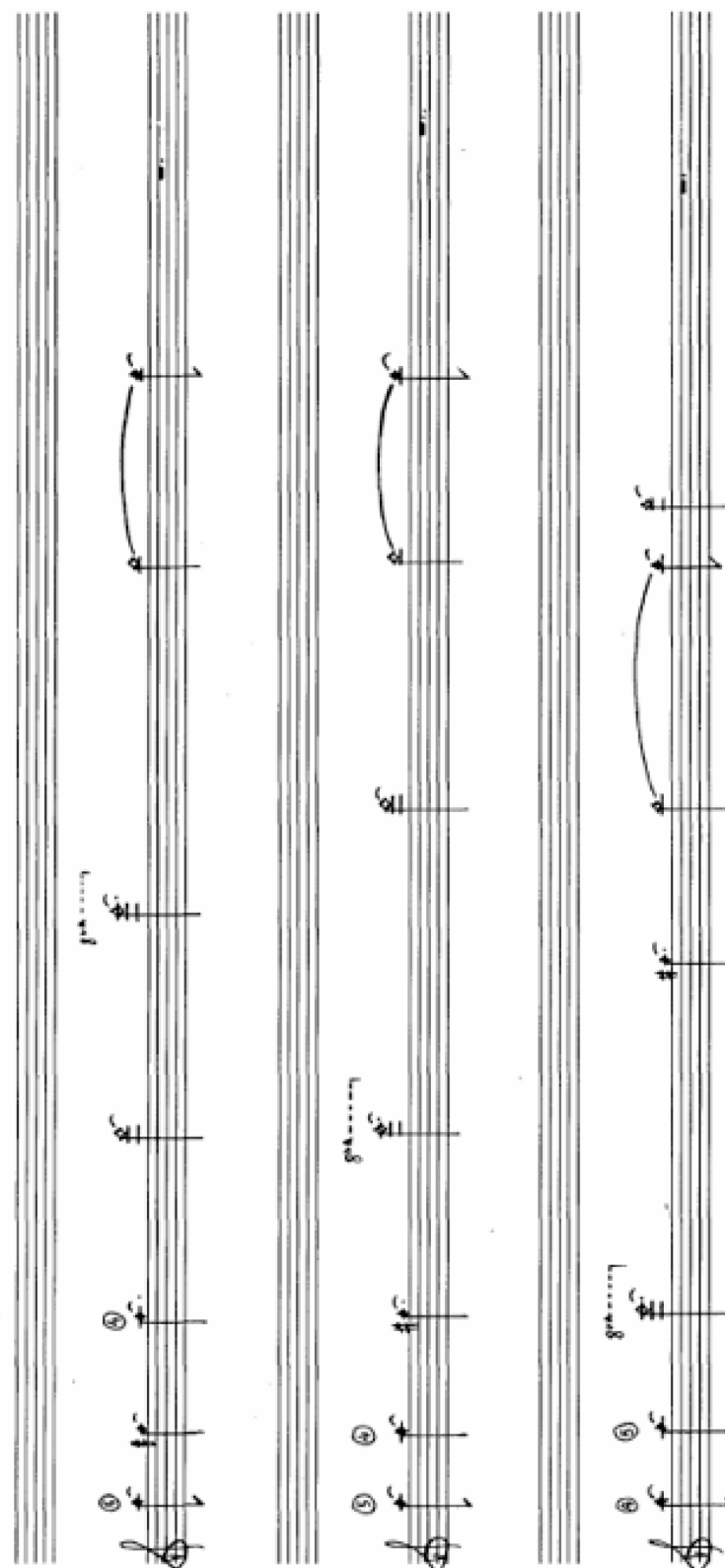
Figure 3: Brouwer and Newland score extracts.

Although Pisati uses harmonics on the same frets as Newland, there is a contrast in usage. For example, a campanile-style configuration can be found in the fourth of his *Sette Studi*. After a passage of quick rapid mute glissandi morphologies, which includes fluctuations in dynamic levels, the composite resonance from a group of seven natural harmonics, played rapidly across five strings, helps dissipate the accumulated tension. (See Figure 4.)

Figure 4: Short phrase of campanelas-style natural harmonics by Pisati.

The Brouwer, Newland, and Pisati pieces are included for their close links to the spirit of Sanz's campanelas-style development. Although the results are imaginative and effective, these composers do not include higher or soundhole harmonics. For the purposes of this research, where the emphasis is on higher and soundhole harmonics, campanelas-style natural harmonics are regarded as a hybrid, somewhere between extended technique and normally played pitches.

Three composers employ short phrases comprising natural harmonics in the campanelas style amalgamated with other techniques - Philippe Durville *Mouvement apparent* (1988), Mauricio Kagel *Faites Votre Jeu I* from *Sonant* (1960),[22] and Vineet Shende in *Raag Marva* (2010) Movement IV - *Jhala*.

Durville is the only composer found to date who includes all four types of harmonics. Approximately three quarters of the way through *Mouvement apparent* (system 20 in the score), there is a short passage made up of four merged natural harmonics.[23] Two are played normally on strings 4 and 3. The other two harmonics are found at the centre of the soundhole, played by the right hand on strings 6 and 5. The next harmonics configuration, towards the end of system 21, consists of merged natural, higher, soundhole, and multiphonic harmonics. Following on, towards the end of system 26 and functioning as an introduction to the final section, very loud conventionally plucked pitches (constituting composite resonances from low E and Bbs) are interspersed with three phrases that include harmonics. In the first of these phrases, which is similar to the others, all six strings are used in a configuration that starts with two merged conventionally plucked pitches, followed by a mix of nine harmonics. Figure 5 shows Durville's usage of soundhole harmonics. Listen to *sound example, track 2*.[24]

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[22] Kagel was the first non-guitarist composer to employ extended techniques. See Figure 1 for more details.

[23] The *Mouvement apparent* score is written using proportional representation, and there are therefore no bar numbers.

[24] Caroline Delume *L'art de la Guitar Contemporaine*, 1998.

Figure 5: Durville's usage of harmonics in *Mouvement apparent*.

In *Faites Votre Jeu I,* apart from phrases that consist of single natural harmonics integrated into atonal configurations, Kagel combines natural harmonics with conventionally plucked pitches that include merged natural harmonics. As there are many instances of each, typical examples have been chosen. Combining occurs approximately three quarters of the way through the work (page 2, system 1, of the score), where a configuration of eight natural

harmonics and two conventionally plucked pitches across five strings is written in campanelas-style.[25] Three merged natural harmonics morphologies (using strings 1, 2, and 6), whose composite resonance is dissonant, occur towards the end of the piece (page 2, system 4). They are part of a quickly played phrase that is preceded by a succession of étouffés-pizzicati and a chord consisting of two simultaneously played, conventionally plucked pitches. (See Figure 6.)[26]

Figure 6: Kagel's use of natural harmonics morphologies in *Faites votre jeu I.*

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[25] Similar to the Durville work, mentioned above, *Faites votre jeu I* is written using units given in seconds.

[26] Pizzicati *étouffé* are muted sounds, typically played by using part of the right-hand palm on the bridge (also known as pizzicato in standard guitar technique.)

To end his work in a reflective mood (marked *meditative, freely*), in *Suite in Raag Marva* Shende employs a passage consisting of natural harmonics across the top five strings, an array that includes one higher harmonic (found in front of the 2nd fret). This configuration occurs during the resonance of a conventionally plucked open 6th string. (See Figure 7.)

Figure 7: Shende's use of higher harmonics in *Suite in Raag Marva*.

Although a number of composers have engaged in integrating natural harmonics in a campanelas style, few have looked into the creative opportunities that arise from using higher harmonics or soundhole harmonics. Indeed, it is only Durville who embraces a soundworld that relates to the music in Volume 2. For instance, the phrase that occurs at system 21 of *Mouvement apparent* (mentioned above) is shown in Figure 5. Investigation into the compositional and performance possibilities of campanelas-style, higher harmonics, and soundhole harmonics is an integral feature in this thesis.

1.4.2 Short passages of extended techniques

Five of the pieces mentioned in Figure 2 include short sections based entirely of extended techniques - Cristóbal Halffter's *Codex 1* (1963), Gilbert Biberian's *Prisms no. II* (1970), Angelo Gilardino's *Abreuana* (1971), Nikita Koshkin's *Usher Waltz* (1996), and Stephen Funk Pearson's *Brunella the Dancing Bear* (1983). From Figure 2 it would appear that Biberian, followed shortly by

Gilardino, were among the first guitarist-composers to experiment with extended techniques.

In three of the works extended techniques are used to create a contrast to conventionally plucked pitches - *Codex 1, Abreuana,* and *Usher Waltz,* and Pearson follows a programme in *Brunella the Dancing Bear;*[27] all are single-movement works. However, *Prisms no. II*, for ten guitars and percussion, is more experimental in nature. Biberian explores sound structures through eighteen tableaux - short, contrasting sections played continuously. Note the array of extended techniques and preparation involved from the Figure 35: 1 list.

Most of *Abreuana* and *Codex 1* are composed in a serial-based style using conventionally plucked pitches.[28] However, in both pieces the composers include sections that incorporate extended techniques. In *Abreuana,* Gilardino features phrases comprising extended techniques (page 6 of the score) that are preceded and followed by a section of conventionally plucked pitches. These episodes consist of short configurations, each using one extended technique - tambora, nut-side, and behind the head-nut morphologies. Gilardino gives some textual performance instructions in the score. In order to execute the nut-side passage, for example, he explains where to locate both hands. (See Figure 8.)

Halffter's thematic development is based on a twelve-tone row, from which four further rows are developed using juxtaposition and contrapuntal groupings. The music builds in intensity as the piece unfolds; rhythms become increasingly complex and the tempo gradually quickens, leading to a *senza tempo* section approximately mid-way through the piece, where extended techniques occur. A snap pizzicato (long) that combines with conventionally plucked pitches opens the way to a group of consecutive rapid mute morphologies. This is followed by a natural harmonic whose resonance combines, for a short time, with a 'snare drum' morphology and then a bi-tone configuration.

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[27] In *programme music* the composer attempts to musically render an extra-musical narrative.
[28] 'Serialism may be defined as the structural principle according to which a recurring series of ordered elements is used to give a piece unity. Normally, a permutation or an arrangement of ordering the twelve notes of the chromatic scale, called a *tone row*, is manipulated in particular ways'. (This definition is taken from two online sources on 14th April 2011 – www.serialism .askdefne and *www.nhaccodien.info/forum/showthread.php/4710-12-tone-music-Atonality-Serialism)*.

Abreuana by Angelo Gilardino

percussione vicino al ponte

Tambora

Nut-side

C IV

→ i III → i III → i III

p   *ff*
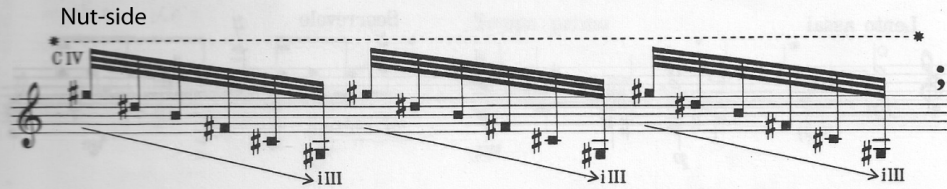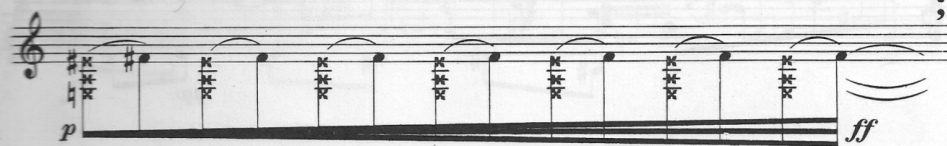
percussione sull'accordo, poi la nota Fa# con la sinistra

Behind head-nut

i (ms) i (ms)

⑥ ⑤ ④ ⑥ ⑤ ④

pp
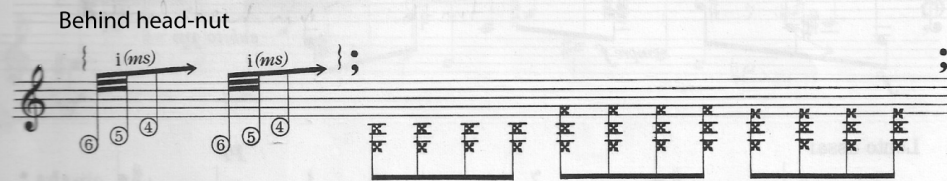
----- Il passaggio deve essere suonato prendendo le note con la mano sinistra al C IV e pizzicando con l'indice della mano destra sulla tastiera, al 3° o 2° tasto (incrociando le due mani).

L'effetto si ottiene pizzicando con l'indice della mano sinistra le corde indicate nella porzione fuori tastiera, tesa tra il capotasto e i cilindri d'avvolgimento delle corde.

Figure 8: Extended techniques used by Gilardino and Halffter.

Usher Waltz is written using conventional diatonic harmony, except for short passages between bars 248-278 (pages 8 and 9 of the score). Here Koshkin uses snap pizzicati to form the climax of a fast-moving work, marked *allegro agitato* (apart from the slow opening six bars). In contrast to the conventional writing, Koshkin creates a visceral impact by using accented six-note conventionally plucked chords that are interspersed with single snap pizzicato

(long) morphologies, played sforzando and with exaggerated vibrato (altering the pitch by pulling sideways), followed by a few bars of consecutive snap pizzicati (still sforzando). (See Figure 9.) Listen to *sound example, track 3,* which is a recorded performance by John Williams.[29]

Figure 9: Pages 8 and 9 of *Usher Waltz* by Koshkin.

Like Koshkin in *Usher Waltz,* Stephen Funk Pearson utilizes conventional diatonic harmony for most of *Brunella the Dancing Bear*. However, the freely played bar forty-one comprises 'snare drum' and golpé morphologies that start moderately loudly then crescendo. Pearson uses right-hand tremolando to create

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[29] John Williams *The Seville Concert,* 1981.

a snare drum roll, while the left-hand fingers walk "…a tight rope on the crossed 5th and 6th strings",[30] as if to "…imitate Brunella walking the tight rope up the neck".[31] These consecutively played 'snare drum' sounds culminate in a short combined passage, where the resonance from the final 'snare drum' unites with golpé morphologies. (See Figure 10.)

Figure 10: Pearson's extended technique usage.

Although extended techniques sections exist in *Abreuana, Codex 1, Usher Waltz* and *Brunella the Dancing Bear,* their compositional development is limited due to short overall durations. For example, all of the extended techniques used by Halffter - snap pizzicato, 'snare drum', bi-tones, and rapid mute - are developed much further in this research; the rapid mute morphologies he uses in *Codex 1* are always single or consecutive. In this early exploration of extended techniques, Halffter does not attempt combining the extended techniques.

In *Prisms no. II* there are two passages consisting of extended guitar techniques with no percussion accompaniment. Biberian's creativity is shown in the way he manipulates the techniques. Firstly, during the eighth sub-section (marked H) a 20" duet occurs, consisting of rapid mute morphologies; the

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[30] Taken from the score performance notes.
[31] Taken from email correspondence with the composer on 1st July 2011.

guitarists generate a hemiolic cross-rhythm of merged morphologies with contrasting graduations of dynamic levels.[32]

Secondly, an awareness of the performance space is present as Biberian utilizes an antiphonal effect. Section thirteen (marked M) starts with 7" of combined morphologies; the guitar 5 player produces glissandi using a spoon, which combines with guitars 1-4 who perform behind the head-nut arpeggios. This is followed by 8" of consecutive rapid mute morphologies, played by guitars 6-10, which diminish in intensity.[33] Then an echo effect happens, where for 3" guitars 1-5 playing behind the head-nut arpeggios followed by 2" of rapid mute morphologies from guitars 6-10. Before conventionally plucked pitches return, this section finishes with behind the head-nut arpeggios (guitars 6-10) combining with snap pizzicati played by guitars 1-5. Figure 11 shows the relevant sections.

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[32] In Volume 2, merged rapid mute morphologies first occur in *Rapid mute study 2: Synchronous morphologies*. (See Volume 2, page 380.)

[33] There are similarities with the usage in *Rapid mute (normal) study 1*, where consecutive morphologies and dynamic levels are explored. (See Volume 2, page 379.)

Figure 11: Two examples of Biberian's extended technique usage in *Prisms no. II.*

Biberian's seeking spirit to search for new musical possibilities is evident in a musical output that also combines guitar with string instruments. Moreover, the influence of his pioneering work with rapid mute morphologies, which is more extensive than Halffter's, is evident in my rapid mute usage, where they appear in six pieces.

1.4.3 Fragmented structures

Five of the composers cited in Figure 2 have developed music that features fragmented structures. Phrases that last a relatively short amount of time are framed by rests of variable durations - Leo Brouwer's *La Espiral Eterna* (1971), Azio Corghi's *Consonancias y Redobles* (1974)*,* Roman Haubenstock-Ramati's *Hexachord 1 and 2* (1976), Hans Werner Henze's *Memorias de 'El Cimarrón'* (1970), and Mauricio Kagel's *Faites Votre Jeu I* (1964) from *Sonant*. Note that although extended techniques are included to varying degrees, conventionally plucked pitches are common in all pieces.

The works by Kagel, Henze, and Haubensock-Ramati have the greatest proportion of conventionally plucked pitches. In *Faites Votre Jeu I* Kagel combines conventionally plucked pitches with natural harmonics; he also includes very short phrases of consecutive bi-tones, and consecutive snap pizzicati; Henze uses consecutive rapid mute morphologies in *Memorias de 'El Cimarrón'* as well as tongue clicks. He also asks the player to whistle and play certain normally played pitches simultaneously; in *Hexachord 1 and 2* Haubensock-Ramati employs very short juxtaposed phrases to form passages that include snap pizzicati and 'snare drum' morphologies.

The works by Brouwer and Corghi contain passages consisting entirely of extended techniques.[34] However, in section B of *La Espiral Eterna* and the closing section of *Consonancias y Redobles* they use fragmented structures. Brouwer has three sub-sections*,* the second containing a series of short phrases separated by very short pauses; a low pitch initiates each phrase, played staccato and very loudly, followed by a contrasting set of soft étouffé pizzicato pitches. In the final section, Corghi uses short phrases of consecutive, merged, and

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[34] As Brouwer and Corghi employ passages of this kind, it gives them a close connection to the music in Volume 2. (See Chapter section 1.7.)

combined morphologies, comprising a mixture of conventionally plucked
pitches, bi-tones, and golpé. The relevant score sections are shown in Figure 12.
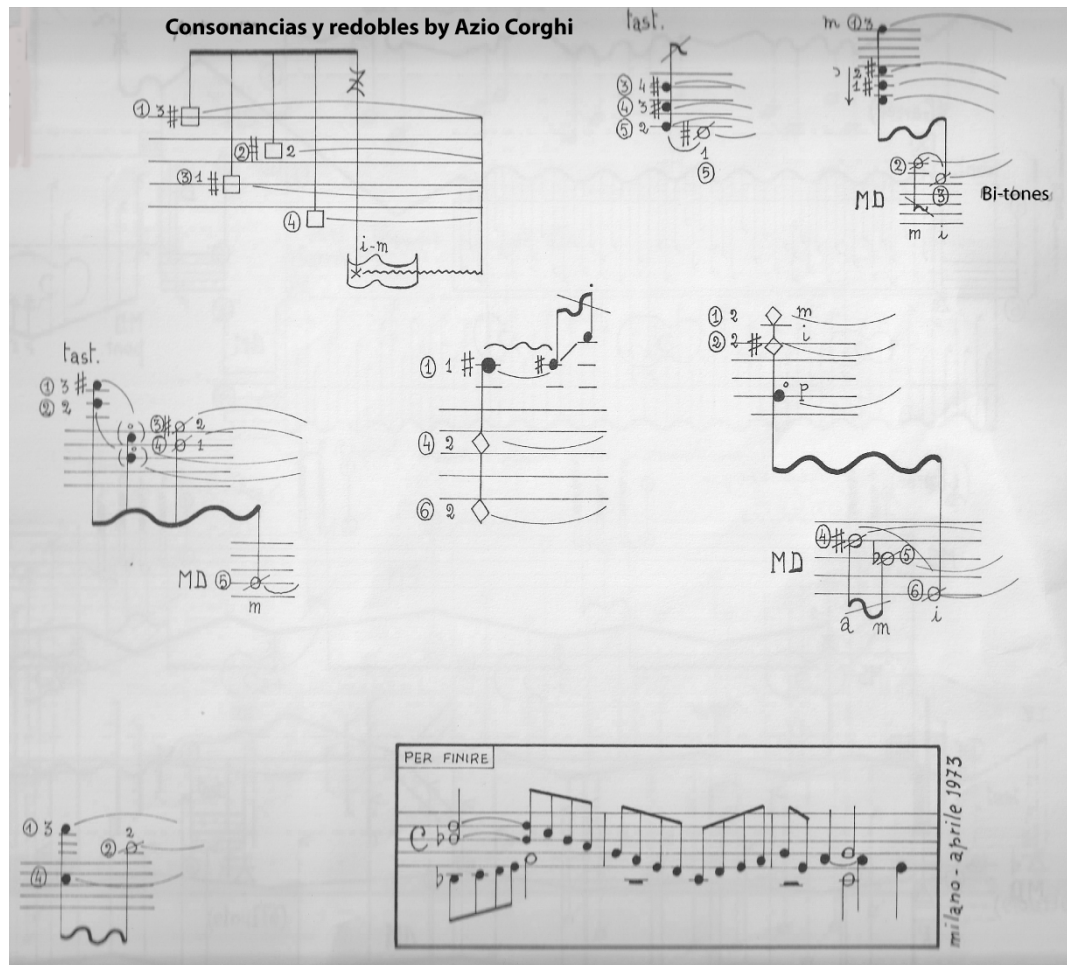
Figure 12: Fragmented structures usage by Brouwer and Corghi.

1.5 Extended techniques within a pitch-based language

Twenty-nine of the composers cited in Figure 2 integrate conventionally plucked pitches with extended techniques throughout pieces. The works fall into four sub-categories with the focus on key compositional principles:

1 Traditional melody, harmony, rhythm, or a mixture;

2 Morphological contrast;

3 New complexity;

4 Investigation of sound spectra and resonance.

The first category is by far the most common. Established developmental strategies are used in categories one, two, and three, such as repeats, iterations, inversions, retrogrades, retrograde inversions, transpositions, motivic transformations, and changes in durational patterns. However, music which may be regarded as belonging to "new complexity", a term dating from the 1980s,

applies to composers who use a process of simultaneous multi-layered interplay of the musical material. Less conventional approaches are found in category 4.

1.5.1 Traditional melody, harmony, rhythm, or a mixture of the three

In the first category, music that is tied to traditional designs involves building motives into phrases, then phrase-groups and chains into larger structures. Figure 13 has been devised to help clarify how composers have integrated extended techniques with conventionally plucked pitches, and highlight compositional characteristics. Seventeen works are cited. Focusing on the dominant tendency used by the composer, Figure 13 shows that works can be sub-divided further into horizontal or vertical aspects. In accord with the principles expounded in the *Morphological structuring* section, the horizontal aspect connects to single and consecutive morphologies, and vertical to merged and combined. (See Chapter 5.) Moreover, the prevalent durational activity of morphologies is documented as either being tied to a pulse-based framework, or including elements of interpretive freedom when it comes to decision-making.

Figure 13
1

Compositional tendencies in category 1

Works	Horizontal aspect: single and consecutive morphologies	Vertical aspect: merged and combined morphologies	Durational activity
Bergman, Erik *Midnight Op. 83*	Bi-tones, and rapid mute	Snap pizzicato and 'snare drum'	Pulse-based
Bland, William *Untitled Composition in Three Sections*		Multiphonic harmonics	Pulse-based (flute) element of freedom (guitar)
Brooks, William *Footnotes*		Mvt 1 - "Snare drum", rapid mute, golpé, clip and twine Mvt 3 - Bottleneck	Always pulse-based
Ginastera, Alberto *Sonata, op 47*	Mvt 1 - Tambora Mvt 2 - Snap pizzicato (long), behind the head-nut, and golpé	Mvt 1 - Whistling sound, tambora, and golpé Mvt 2 - Snap pizzicato (long), and tambora Mvt 4 - Tambora, and golpé	Elements of freedom then pulse-based Pulse-based "
Goss, Stephen *Oxen of the Sun*	Mvt 3 - Tambora	Mvt 3 - Tambora Mvt 4 - Bi-tones	Always pulse-based
Guzmán, Edgar *Apnea*	Bottleneck, snap pizzicato and rapid mute	Bottleneck, snap pizzicato (long), and bi-tones	Pulse-based and elements of freedom
Heininen, Paavo *Touching Op. 40*	Snap pizzicato, rapid mute, nail scrape, nail sizzle, and golpé	Snap pizzicato, and 'snare drum', rapid mute, nail sizzle, behind the head-nut, and golpé	Pulse-based and elements of freedom

Figure 13
2

Works	Horizontal aspect: single and consecutive morphologies	Vertical aspect: merged and combined morphologies	Durational activity
Koshkin, Nikita *The Prince's Toys*	Mvt 2 - Bi-tones, and rapid mute (reverse action) Mvt 3 - Nail scrape, golpé, whistling sound, and tambora Mvt 4 - "Snare drum", and tambora	Mvt 2 - Snap pizzicato (muted) Mvt 4 - Bi-tones and behind the head-nut, and golpé	Always pulse-based
Olofsson, Kent *Treccia*		Rapid mute	Pulse-based
Pereira, Joseph *Bento Box*	Multiphonic harmonics, snap pizz, bi-tones, and rapid mute	Snap pizzicato	Pulse-based
Pisati, Maurizio *Caprichos de Simios y Burro* Mvt I	Cross stroke, tambora, and golpé		Pulse-based
Pisati, Maurizio *Sette Studi*	Mvt 2 - Rapid mute Mvt 4 - Rapid mute, and bi-tones	Mvt 2 - Rapid mute	Always pulse-based
Rak, Štěpán *Voces de Profundis*	Bi-tones, rapid mute, tambora, spoon, and nail scrapes	Bi-tones, and rapid mute	Pulse-based and elements of freedom
Ribot, Marc *Exercises in Futility*	Exercise II - rapid mute, and golpé		Pulse-based and elements of freedom
Riehm, Rolf *Notturno für die trauerlos Sterbenden*	Bi-tones. Snap pizzicato, golpé, and conventionally-plucked pitches	Snap pizz (long) and golpé, cross stroke	Pulse-based
Shende, Vineet *Suite in Raag Marva*		Mvt 1 - Nut-side and clip Mvt 4 - Nut-side	Always pulse-based
Verdery, Benjamin *11 Etudes*	Etude 11 - "Snare drum"	Etude 7 - Bi-tones, and golpé	Always pulse-based

Figure 13: Integrated extended techniques with conventionally plucked pitches in category 1.

In the works written in standard notation there is a tendency for composers to use a significant but sometimes not obvious pulse. In contrast, however, proportionally notated compositions incorporate improvisational factors, where the musical events include elements of freedom that are set within a time-frame. For example, Kent Olofsson's *Treccia* (1990-2) is mostly written with four

crotchet beats to the bar. In some sections, however, durational relations are such that morphologies (predominantly conventionally plucked pitches) are offset in respect to the beats, bars 1 to 14 for instance. In other portions of the work Olofsson employs a more obvious metre, like the minims between bars 14 and 32.[35]

Edgar Guzmán's approach in *Apnea* (2004-2005) differs to that of Olofsson. Each system, which should last 30", is divided into sub-divisions of 5". He uses a mixture of precise durations and elements of interpretive freedom. For example, horizontal lines and arrowed beams are utilized for approximate durations, whereas crotchets, quavers, and semi-quavers convey specific durations. The variable ratio of balance between the usage of extended techniques to normally played pitches, during the relevant sections, can be found in Figure 35: 3.

Figure 14 below shows page 1 of *Treccia* and the opening two systems of *Apnea*. There are six other composers who employ a system of framing time, they are Ignacio Baca-Lobera in *La Lógica de los Sueños* (2010)*,* Gilbert Biberian in *Prisms no. II* (1970)*,* Leo Brouwer in *La Espiral Eterna* (1971), Philippe Durville in *Mouvement apparent* (1988), Bruno Giner in *Trans-errance 1*(1984)*,* and Tristan Murail in *Tellur* (1977).

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[35] The importance of pulse usage in the repertoire and Volume 2 in relation to rhythm is discussed further in 2.3.1, 2.3.4, and 7.1.

Treccia
for guitar solo

Kent Olofsson (1990-92)
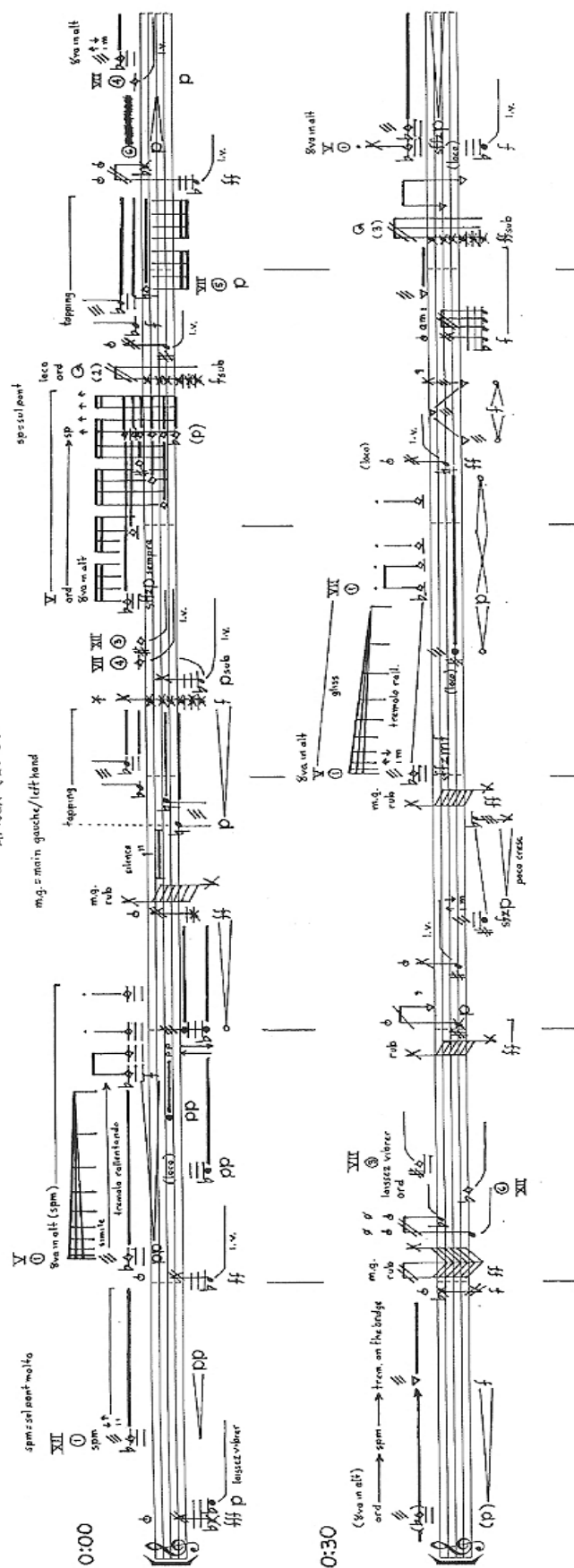
Figure 14: Relevant score samples from Oloffson and Guzmán.

Some of the composers mentioned in Figure 13 manipulate extended techniques in particular ways. For example, Maurizio Pisati employs campanelas-style harmonics, rapid mute morphologies, and conventionally plucked pitches in *Sette Studi* Movement 2 (1990). His usage is equally weighted between conventionally plucked pitches and extended techniques. After an initial short configuration of natural harmonics and half-harmonics,[36] in the campanelas-style, the following two phrases start with combined natural harmonics and conventionally plucked pitches, and end with rapid mute morphologies that alter in trajectory over the decaying harmonics.

In Movement 4, Pisati's dominant tendency is in the horizontal aspect - consecutive rapid mute, bi-tones, and normally played pitches. Listen to *sound example, track 4.*[37] His phrase construction is similar to my usage of the same technique. See Volume 2, page 381, and listen to *Sound example, track 83.*

Three further examples occur in works by William Bland, Štěpán Rak, and William Brooks. Bland merges multiphonic harmonics in the guitar part of *Untitled Composition in Three Sections* (1975). Štěpán Rak combines bi-tones and rapid mute morphologies with conventionally plucked pitches in *Voces de Profundis* (1984), and William Brooks integrates 'snare drum', rapid mute, golpé, clip, twine,[38] and normally played pitches in *Footnotes* Movement 1 *Cage* (1982).[39]

Taken as a whole, Figure 13 shows a set of works that cover a wide range of musical expression. Most composers integrate horizontal and vertical aspects; ten works encompass both. However, four composers use only the vertical aspect, and three the horizontal aspect.

Eleven of the composers cited in Figure 13 give precise instructions for durations of morphologies. However, there are instances of elements of freedom in six works. For example, three forms of rhythm that are tied to counting

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[36] Half-harmonics are created by an imprecise left-hand placement of natural harmonics. For instance, playing the first partial, normally at fret XII, somewhere between fret XI and XII - just enough to get the harmonic, but not enough to produce a characteristic ringing tone.

[37] Elena Càsoli *Audio Source: www.last.fm/music/maurizio+pisati*, 2011.

[38] Brooks recommends "braided fishline" in note 1 of *Cage*, which is the title of the opening movement of *Footnotes* (1982).

[39] Utilizing campanelas-style harmonics, merged multiphonic harmonics, consecutive rapid mute and bi-tone morphologies, and combining bi-tones and rapid mute morphologies are all compositional strategies used in the Volume 2 music.

measured durations are observed - time signature (usually with a metronome marking), no time signature, and proportional notation. Brooks uses the conventional time signature with metronome marking for *Cage,* while Koshkin gives a text instruction but no metronome indication in *The Prince's Toys; Animato* (1992) in Movement 2 for example. In *Touching Op. 40* (1978), Heininen uses similar text instructions at the start of sections and include bar lines of varying duration. However, there is no use of a time signature or metronome markings, leaving choice of tempo to the performer. Bergman uses proportional notation in *Midnight Op. 83* (1977)*,* where each pitch of long duration or phrase is divided into a precise time frame.[40]

Composer's who use elements of freedom in works that relate to conventional usage of melody, harmony, and rhythm, always include an amount of compositional control. For example, Bland notates rhythm precisely in *Untitled Composition in Three Sections* but the choice of pitches is left to the performer. During the opening of *Sonata, op 47* (1976) Ginastera allows the player to determine changes in velocity (in the form of accelerandi and decelerandi), and the guitarist sometimes chooses the number of iterations within a given duration in Heininen's *Touching Op. 40;* the first occurrence is at the end of system 2.[41]

Furthermore, in *Improvisatory passages*, the impact of elements of freedom in relation to extended techniques with conventionally plucked pitches is discussed in more detail. (See section 1.6.)

1.5.2 Morphological contrast
Two composers belong to the second category - David Bedford and Rolf Riehm. They present music featuring morphological contrast, based on hand movements. However, their approaches differ.

In *You Asked for It* (1969), David Bedford asks the performer to produce interrupted archetypal morphologies. Here are two contrasting examples.

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[40] A form of proportional notation is used for the majority of scores in Volume 2 (23 out of 34). (See Chapter section 2.1.)
[41] In the Volume 2 scores, improvisational elements are developed progressively by building areas of freedom. This scheme for performer decision-making is explained fully in Chapter 7.

Iterative consecutive higher harmonics, similar to left-hand violin harmonic technique, are found at the beginning of system 15. Left-hand finger 1 stops specific pitches on string 1 while finger 4 stops the fourth or fifth harmonics on the same string. However, the resultant sound is like rapid mute; there is little pitch content. (See section 7.11.)

Bedford also explores differences in timbral quality. In the opening section, for instance, he uses a variety of right-hand actions - golpé, tambora, sweep (whistling sound), nail, flesh, movements between ponti to tasti and visa versa. Taking the opening phrase, which consists of three chords that are equal in duration within a four-second time frame, percussive sounds are superimposed onto chords one and two - striking wood (golpé) and conventionally plucked pitches, and striking with the hand to produce pitches (tambora). Chord three is made up of two phases - whistling sound into pitched resonance. (See Figure 15.) For a further example of Bedford's usage is contrasting dynamic levels, see sections 1.7.2, and 7.5.

Figure 15: Opening chords of *You Asked for It* by Bedford.

Riehm occasionally uses conventionally plucked pitches in *Toccata Orpheus* (1990). (See section 1.7.2.) For example, system 9 bar 2 shows that the resonance from four conventionally plucked pitches - performed simultaneously

on beat 1 - continues while a nut-side arpeggio is played using the right hand immediately after the initial chord. Riehm creates a contrasting combined resonance. Listen to *sound example, track 5*.[42]

In Chapter 8 *Combining techniques* (Volume 2, page 303), morphological differences are explored that are ideologically similar to Bedford and Riehm. For example, balancing noise and pitch is an integral part of *'Snare drum' and snap pizzicato combined study*. (See section 8.1.6.)

1.5.3 New complexity

In the third category, a more intense melodic and harmonic interaction is the compositional tendency, which leads to complex rhythmic activity. Although conventionally plucked pitches dominate, inclusion of extended techniques enables a broader level of expression. Five works that require extreme virtuosity are cited in Figure 2 - Chris Dench's *Severence* (1992-4)*,* Michael Edward Edgerton's *Tempo Mental Rap* (2005)*,* Brian Ferneyhough's *Kurze Schatten II* (1983-9), Sam Hayden's *Axes(s)* (2008-9)*,* and Arthur Kampela's *Percussion Studies I, II* and *III* (1995-7).

In terms of commonality of morphological usage, all five works include snap pizzicati and bi-tones. Furthermore, Dench employs rapid mute, and Edgerton as well as Hayden use nut-side playing. Edgerton and Kampela employ golpé, and although Ferneyhough and Kampela use tambora, their morphologies tend to be interrupted. They do not exploit resonances. Indeed, as far as extended techniques are concerned, the emphasis is always on noise-based percussive sounds. When pitch-based morphologies from extended techniques are used, they are nearly always fleeting in nature.

Regarding the number of extended techniques used in the five works referred to, Dench is the most sparing in comparison to Kampela, who adopts a more liberal approach. These are the works we shall highlight. *Severence* by Chris Dench is in four sections. It was inspired by the writing of Ernst Jünger, in particular, a passage from *On the Marble Cliffs*.[43] Dench employs four

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[42] Susanne Hilker *Rolf Riehm Compositions for Guitar*. 1995.
[43] German title: *Auf den Marmorklippen* (1939). Jünger uses metaphor to describe negative perceptions of the situation in Hitler's Germany.

extended techniques in a work that is dominated by conventionally played pitches. Snap pizzicato, bi-tones, rapid mute, and golpé morphologies are used occassionally. For example, two snap pizzicato morphologies occur in the second system, integrated with conventionally plucked pitches. Moreover, he employs three consecutive rapid mute morphologies in system five. (See Figure 16.)

Figure 16: Example of Dench's extended techniques usage.

In the *Percussion Studies I, II* and *III* Arthur Kampela emphasises percussive techniques more than Edgerton, Ferneyhough, and Hayden.[44] For example, he presents five ways of playing golpé and three of tambora. Kampela has created a playing technique that exploits timbre, pitch, texture and complex rhythmic designs. Moreover, ergonomic considerations take a prominent thematic role. This is achieved by interspersing percussive and pitch-oriented morphologies in a fast and continuous manner. He explains:

> The percussion studies series, as the name indicates, is a way to extend the gamut of sounds found in a traditional instrument incorporating percussive and noise-oriented effects/objects to the palette of its possible, known, or expected sounds (Kampela 2010).[45]

Kampela starts *Percussion Study I* with conventionally plucked pitches and the occasional snap pizzicato, bi-tone and golpé morphologies, which make their first appearance in bar 3. However, by bar 7 three distinct layers become apparent, comprising fast successions of natural harmonics that integrate with conventionally plucked pitches, or consecutive golpé and bi-tones. The music is based on developing a coordinated attack-based percussive language, where independent movements for each hand are constantly mixing the techniques' varied sound qualities. Kampela's compositional approach enables a blend of percussive and pitch-oriented sounds moving at a fairly quick tempo. Figure 17 is a copy of page 1. To hear the opening of *Percussion Study I,* listen to *sound example, track 6.*[46]

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[44] So far there are five percussion studies - I, II, and III are for solo guitar; IV and V, unusually, call for a guitarist to play the viola 'alla chitarra'.

[45] Taken from an interview with the Dutch guitarist Marlon Titre. See the composer's website *www.kampela.com*.

[46] Paul Bowman. *Paul Bowman – Classical Guitarist*, 2003-2011.

Figure 17: Page 1 of *Percussion Study* by Kampela.

Although extended techniques are used in the works mentioned above, they are generally integrated with conventionally plucked pitches. Moreover, apart from the odd fleeting moment, extended techniques are rarely developed in terms of consecutive, merged, or combined morphologies. One example is the final five consecutive morphologies of Kampela's *Percussion Studies I* bar 5. (See Figure 17.) Therefore, there tends to be a marked difference in their soundworld compared with the exploration in my studies.

1.5.4 Investigation of sound spectra and resonance

Two works are cited in the final category. In *Tellur* (1977) Tristan Murail investigates sound spectra, and Giacinto Scelsi resonances from composite sounds in *Ko-Tha - "A Dance of Shiva"* (1967).[47]

Murail's music is based on the evolution of particular spectral qualities, forming gradual morphological transformations. He tells us that in *Tellur, "...*sound aggregations evolve slowly, methods of playing are substituted one after another indiscernibly" (Murail 1977: 1).[48] His compositional premise was twofold, 1 - resolving the issue of how to continue sound on an instrument with a fundamental attack/decay nature, and 2 - balancing the pitch/noise duality through combining morphological characteristics. To resolve these issues, Murail uses the flamenco rasgueado (in its continuous form – right-hand *e,a,m,i*).[49] He explains that subtleties of Flamenco playing inspired usage of some techniques: "It is desirable that the rasgueado be performed with a considerable degree of suppleness" (Murail 1977: 1).[50] This allows simultaneous resolution of the problems of maintenance of sound, and pitch/noise balance; the right-hand impact of nails on strings at specific positions produces the characteristic rasgueado rattle.

By using this method, two textures can be produced on one string simultaneously by utilizing left-hand positioning on the fretboard, enabling pitches to superimpose themselves on the principal rasgueado sound. For example, *Tellur* commences with the rasgueados being realised on a single string, the 6th; the right hand plays about 9.5 cms from the bridge. Depending on precise left-hand placement, the continous rasgueados produce noise-based rapid mute morphologies, or with movement combining rapid mute and natural harmonic, pitches come into focus. Neighbouring strings are then introduced using the same rasgueado technique. Moreover, by moving the right hand

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[47] Both works have closer ties to the studies found in Volume 2 than category 2.

[48] Taken from the performer notes that accompany the score of *Tellur*.

[49] All right-hand fingers are used in a continual cycle of rhythmically precise and rapid iterations.

[50] Taken from the performer notes that accompany the score of *Tellur*. Rasgueado is the strumming technique that has its origins in Flamenco guitar playing.

towards the bridge, a lighter percussive roll can be obtained. (See Figure 18.)
Listen to *sound example, track 7,* for the opening of *Tellur* by Tristan Murail.[51]

Figure 18: Opening page of *Tellur* by Tristan Murail.

To contrast with the long opening rasgueado section, Murail uses a single higher harmonic (near the beginning of the Figure C section) combined with

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[51] Stefan Östersjö. *Stefan Östersjö*, 1977.

conventionally plucked pitches. Curiously, this is the only occurrence, played to the left of fret III on string 3; Murail does not develop the idea.

In Scelsi's *Ko-Tha,* the main compositional aim is the production of resonances from the composite sounds of two guitars. Although Scelsi specifies use of acoustic steel-strung guitars, it is sometimes performed on classical guitars.[52] To facilitate plucking the strings and playing percussively on the body from above, the performer rests the guitar horizontally on the knees; only open strings are used. Distributing the music between both hands, with the focus on creating varying tension, allowed Scelsi to investigate phrases based on overtones and their resonances.[53] (See Figure 19.) *Sound example, track 8 is a performance of the opening section of Ko-Tha*.

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[52] For example, Nick Tolle performed *Ko-Tha* on the classical guitar, in the Seully Hall, The Boston Conservatory on October 2008.

[53] Elena Càsoli (two classical guitars). *Standard YouTube License*, 2008.

Figure 19: Opening page of *Ko-Tha* by Giacinto Scelsi.

1.6 Improvisatory passages

In this section we will concentrate on composers who include elements of freedom in their music - specific sections where interpretive decision-making within prescribed boundaries occur. For the performer this means improvisatory passages that are biased towards pitch, noise, duration of morphologies, or a mixture of the three. Apart from the works mentioned in section 1.5.1, where

elements of freedom occurring within time frames are discussed, eleven other works from Figure 2 include improvisatory factors. Figure 20 has been devised to give a more detailed overview. It comprises three columns – works (composers are listed in alphabetical order), technique(s) employed by the composer, and improvisatory element(s) left to the performer.

In order to convey the necessary information for improvisatory sections, works are classified in the form of freedom-based parameters. The performer concentrates on making informed choices to create music that encompasses use of conventionally played pitches and/or extended techniques. Six categories, which are centred on the repetition and ordering of material as well as the duration of morphologies, are used in the third column:

• Repetition of music notated in boxes that are employed as units of time. The boxed information comprises groupings of specified or unspecified noise- or pitch-based morphologies with given durations;

• Ordering of sections that are noise- or pitch-based;

• Ordering of specified material that consists of noise- or pitch-based morphologies;

• Choice of unspecified pitches;

• Free use of given material;

• Morphologies of indeterminate durations.

Work: Notation type	Techniques used	Improvisatory element(s) left to the performer
Biberian, Gilbert *Prisms no. 2* (Figure H)	Rapid mute	Repetition of material in boxes
Brouwer *La Espiral Eterna* (Figure A)	Conventionally-plucked pitches	Repetition of material in boxes
Corghi, Azio *Consonancias y Redoubles* (Section R/2) 1974	Snap pizz, "snare drum", bi-tones, rapid mute, mute taps, tambora, and golpé	Ordering of sections
Edgerton, Michael Edward *Tempo Mental Rap*, *Variation 5*	Sponge	Indeterminate durations
Frengel, Michael *Bingo Variations*	Conventionally-plucked pitches, nut-side, bi-tones and rapid mute	Indeterminate durations, and ordering of of specified material
Ginastera, Alberto *Sonata, op 47 II Scherzo*	Conventionally-plucked pitches	Choice of unspecified pitches
Goss, Stephen *Oxen of the Sun VI Circe*	Conventionally-plucked pitches and bi-tones	Indeterminate durations
" *VII Narcissus*	Conventionally-plucked pitches, nut-side, bi-tones and rapid mute, tambora, nail and finger scrapes	Repetition of material in boxes
Guzmán, Edgar *Apnea* (6.36"-7.05")	Rapid mute and bottleneck	Free use of given material
Halffter, Cristóbal *Codex 1* (page 6)	Snap pizzicato, "snare drum", bi-tones, and rapid mute	Indeterminate durations
Henze, Hans Werner *Memorias de 'El Cimarrón'* (Mvt I)	Conventionally-plucked pitches	Indeterminate durations, and choice of unspecified pitches
" (Mvt II)	Golpé and tambora	Indeterminate durations, and ordering of of specified material
Oehring, Helmut *Foxfire Eins* (bars 57-64)	Soundhole resonance (palm) and bi-tones	Indeterminate durations, and ordering of of specified material

Figure 20: Composers who incorporate improvisatory passages.

To elucidate further, improvised sections are occasionally used within a system based on standard notation. For example, Helmut Oehring incorporates noise-based morphologies between bars 57-64 of *Foxfire Eins* (1993). He employs improvised mute taps; phrases consisting of differing durations interrupted by short pauses are notated with imprecise standard notation stems and unconventional graphic beams. In contrast, Alberto Ginastera incorporates "…an indeterminate group of high-pitched sounds" in bar 89 of the *Scherzo* from *Sonata, op 47* (1976) - a movement that is predominantly written with conventional symbols.[54] Another unusual use of standard notation may be found in *Bingo Variations Variations* (2006), which Michael Frengel describes as "…a set of improvisatory pieces based on patterns derived from common variations on the game of bingo".[55] The focus of Frengel's work is a set of exercises on musical invention, memory, and recognition of configurations. (See Figure 21.)

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[54] Taken from the *Symbols* section of performance notes, Alberto Ginastera *Sonata*, *op 47* 1976.
[55] Taken from the *Introduction* notes of *Bingo Variations* 2006 by Michael Frengel.

Figure 21: Relevant score sections from the Oehring, Ginastera, and Frengel scores.

Composers occasionally group sound events that are framed by boxes. As the performer is left to judge the number of repetitions, which are not fixed, overall durations are variable. This occurs in the works by Biberian, Brouwer, and Goss, who use boxes to convey short iterative phrases. Biberian and Brouwer specify a time framework, and Goss has an accelerando (there is a suggested starting speed of crotchet = 80-108).

In contrast, towards the end of *Apnea* (2004-2005)*,* Edgar Guzmán includes a single box instructing the performer to improvise on the preceding combined rapid mute and bottleneck passage. Figure 22 shows relevant samples from the Brouwer, Goss, and Guzmán scores - for Biberian see Figure 11.

La Espiral Eterna

Leo Brouwer
(1971)

Oxen of the Sun by Stephen Goss

Figure 22: Use of boxes by Brouwer, Goss, and Guzmán.

Some composers employ sections where parameters are not precisely specified. The tendency is an absence of a time signature, and graphic representations are sometimes included; the performer is left to make decisions on placing and durations of sound events, and time lengths are characterised by

being indeterminate or variable. For instance, in *Memorias de 'El Cimarrón'* (1970) Hans Werner Henze uses a system of spacing morphologies proportionally without giving a specific time frame. Moreover, Azio Corghi includes graphic representations in *Consonancias y Redobles* (1974). He refers to his phrase constructions as "musical designs",[56] where the player chooses the ordering. (See Figure 25.)

Eight extended techniques that match those found in my studies are used for improvisational purposes. (See section 1.4.) Here is a list connecting techniques to the composers, extrapolated from Figure 20. Note that usages are explained further under the seven general compositional tendencies:

• Rapid mute is used in seven works - Biberian, Brouwer, Corghi, Frengel, Goss, Guzmán, and Halffter;

• Bi-tones in five - Corghi, Frengel, Goss, Halffter, and Oehring;

• Bottleneck in one - Guzmán;

• Snap pizzicato and 'snare drum' in two - Corghi, and Halffter;

• Soundhole resonance (palm) in one - Oehring;

• Mute taps in one - Corghi;

• Nut-side - Frengel.

Occasionally, composers include textual information directly related to elements of freedom. For example, in *Apnea* Guzmán asks the performer to improvise using fast and aggressive iterative morphologies of combined rapid mute and bottleneck. (See Figure 22 above.)

Existing pedagogy is scarce in the area of performative freedom and improvisation. However, a few musicians have made insightful remarks. Here are three examples - from a composer, a collaborator, and a guitarist. In *Consonancias y Redobles* Corghi encourages an atmosphere of interpretive freedom: "…the player must establish dynamics and rhythmic designs freely" (Corghi 1974: 1).[57] Improvisation played a role in the development of *Oxen of the Sun* by Stephen Goss. For example, in *The Anxiety of the Dedicatee,* when discussing Movement VII *Narcissus*, Jonathan Leathwood explains: "Because

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[56] Taken from performance notes, page 1, of *Consonancias y Redoubles* by Azio Corghi 1974.
[57] Ibid.

this movement grew out of live improvisation, learning the finished composition presented perhaps fewer difficulties than any of the previous movements" (Leathwood 2009: 22).[58] Moreover, a number of passages exist where the performer is asked to interpret rhythm and realise extended techniques. In *"Finding a Voice"* Kimberley Perlak talks about the role of improvisation in American popular and traditional playing and mentions, "…many modern classical players have little or no experience with this technique" (Perlak 2008: 108). She also notes that modern composers, "…meet this challenge by writing specifically for skilled improvisers or by creating a controlled environment for the classical guitarist who is inexperienced with this technique" (Perlak 2008: 108).[59] This point is strongly emphasised when observing Figure 20; here are a few examples of collaborations – Leo Brouwer/Óscar Cáceres, Michael Edward Edgerton/Stefan Östersjö, Stephen Goss/John Leathwood, Hans Werner Henze/Leo Brouwer, and Alberto Ginastera/Carlos Barbosa-Lima.

When fused with other components (for example, learning techniques, interpreting symbols, performing and composing), improvisation was a creative development that was key in helping produce the musical style found in Volume 2. Part of the underlying design of this work is to help guitarists learn to manage and respond to improvisational strategies that include extended techniques. Tom Nunn reminds us that: "improvisation is the imagination unleashed through impulse" (Nunn 1998: 5). The aim is twofold - in performance, the propagation of a range of musical expression without prior planning, and in pedagogy, enabling the player to develop confidence when taking appropriate action. In summary, improvising cultivates procedures that require skill and practice, where the player engages with process and change within given parameters.

1.7 Exclusive usage of extended techniques

Fifteen of the pieces cited in Figure 2 contain sections consisting entirely of extended techniques. Figure 23 has been devised to help give an overview of

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[58] Jonathan Leathwood *The Anxiety of the Dedicatee: Two Studies in Composer-Performer Collaboration* (2009).
[59] Full title of Perlak's thesis is *"Finding a Voice" in the American Classical Guitar Vernacular: The Work of Andrew York, Benjamin Verdery, Bryan Johanson, and David Leisner.*

compositional approach; it comprises three columns - consecutive (including single), merged, and combined morphologies. Therefore, we can now explore the musical ideas in this repertoire in general, and from the perspective of successive, composite, and superimposed sounds.[60] Furthermore, the exclusive usage of extended techniques mentioned in Figure 23 forms a bond with the studies; unifying the author's work to existing repertoire. It would appear that a unique area in guitar repertoire has been identified, serving as a ground for the specific research focus of writing music that uses only extended techniques.

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[60] Noting that the music in Volume 2 consists only of extended techniques and is based on strategies expounded in the *Morphological Structures* section (see Chapter 5).

Figure 23
1

Work	Duration	Consecutive (including single)	Merged	Combined
Baca-Lobera, Ignacio *La Lógica de los Sueños* 2010	23.5"			Bottleneck and voice (5.5"); Bi-tones and voice (3"); Bi-tones, golpé, and voice (7"); Bottleneck, golpé, and voice (8")
Brouwer *La Espiral Eterna* 1968	52"	Rapid mute (10")	Bi-tones (42")	
Bryars, Gavin *The Squirrel And The Ricketty-Racketty Bridge* 1971	11'		Bi-tones (11')	
Corghi, Azio *Consonancias y Redoubles* 1974 Section R/2	3'	Bi-tones to mute taps (55")		Rapid mute and mute tap (35"); Rapid mute and golpé (45")
Durville, Philippe *Mouvement apparent* 1988	1.15"	Rapid mute (30")	Soundhole harmonics with natural harmonics (45"). Soundhole, higher, and multiphonic harmonics with natural harmonics (10") - campanelas-style	
Fujikura, Dai *ICE* 2009/10	46"-52"			Nut-side and ensemble, opening (26" 30") then bar 53 (20"-22")
Kokoras, Panayiotis *Slide* 2002	2.04'			Bottleneck and tape (2.04')
Lachenmann, Helmut *Salut für Caudwell* 1977	3.20"		Rapid mute *bars 1-10* (19"), bottleneck *bars 429-434* (15"), hand-rubbing *bars 468-533* (1.50")	Rapid mute and bottleneck *bars 11-20* (26"), bottleneck and hand-rubbing *bars 435-467* (1.30")

Figure 23

2

Work	Duration	Consecutive (including single)	Merged	Combined
Lorentzen, Bent *Umbra* 1973 Mvt 4		Snap pizzicato, and snap pizzicato [long] (45")		
Olofsson, Kent *Treccia* 1990-92	1'	Bi-tones	Bi-tones (Integrated texure 20")	Bi-tones and golpé (40")
Oehring, Helmut *Foxfire Eins* 1993 opening section (bars 1-18)	1.35"	Soundhole resonance (palm) - single, and mute taps (15")	Bi-tones (1.20")	
Pisati, Maurizio *Caprichos de Simios y Burro* 1990 Mvt I	2'			Golpé and tambora *bars 11-35* (45") Cross stroke and golpé *bars 39-68 (50")*. Golpé, cross stroke, and tambora *bars 71-72* (c. 8")
Rak, Štěpán *Voces de Profundis*	3.36"	Finger scrapes (30") Spoon [including wah-wah effect] (1')	Spoon [arpeggios] (43")	Finger scrapes and bi-tones (23") Bi-tones and spoon (1')
Ribot, Marc *Exercises in Futility* 2007 Exercise 1 *Five gestures and* Exercise 2 *Morton*	1.22"	Exercise 1 - Rapid mute (35")		Exercise 1 - Rapid mute and nail scrapes (37") Exercise 2 - Rapid mute and golpé (20")
Riehm, Rolf *Toccata Orpheus* 1990 opening section	2'			Bi-tones integrated with mute taps, nut-side, soundhole resonance (palm), and whistling sounds (2')

Figure 23: Overview of exclusive extended techniques usage.

It is apparent from Figure 23 that durations of usage are variable.[61] For example, there is marked contrast of bi-tone usage between *The Squirrel And The Ricketty-Racketty Bridge* (1971) by Bryars, which has a duration of 11', and Brouwer's 42" in *La Espiral Eterna* (1971).

In terms of links between Figure 23 and the extended techniques listed in Figure 51, bi-tones and rapid mute are used the most. (See page 80, and Volume 2, pages 193.) Baca-Lobera, Brouwer, Bryars, Corghi, Olofsson, Oehring, Rak, and Riehm employ bi-tones, while Brouwer, Corghi, Durville, Lachenmann and Ribot include rapid mute morphologies. Riehm and Oehring use two other extended techniques - nut-side and soundhole resonance (palm), soundhole resonance (palm) and mute taps respectively. Four composers use one other extended technique. While Baca-Lobera and Lachenmann employ bottleneck morphologies and Pisati cross stroke, only Durville includes an array of harmonics. (See section 1.4.1.)

'Snare drum', soundhole resonance (buzz), rapid mute (sixth string), and pinch mute are extended techniques used in my studies that do not occur in Figure 23. Note that there is an abundance of snap pizzicati in the other 35 works. (See Figures 2 and 35.) Moreover, seven extended techniques, mentioned in Figure 23 below, are not used in Volume 2 - spoon, whistling sounds, tambora, golpé, finger and nail scrapes, and hand-rubbing. (See section 1.9.1.)

1.7.1 Single, consecutive, and merged morphologies

In this section, the discussion will centre on composers who have used extended techniques to produce consecutive and merged morphologies. Score samples are included to show the diversity of compositional approaches.

Eight composers use consecutive morphologies.[62] Taking rapid mute morphologies as an example, Brouwer includes a short passage,[63] while Durville and Ribot have written longer sections. (See chapter section 1.10.) On

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[61] Note that all durations given for this section are approximate.
[62] Note that seven of these works result in passages of consecutive and merged morphologies reminiscent of the usage in Volume 2.
[63] This occurs towards the end of Figure B of Leo Brouwer *La Espiral Eterna* 1971 (page 7 in the score).

page 3 system 19 of the *Mouvement apparent* (1988) score, Durville employs a long phrase that starts with fast, very loud rapid mute morphologies played ponticello before they gradually become slower. (See Figure 24.) Listen to the opening of *sound example, track 2*. Also, *sound example, track 9* features the opening section of Marc Ribot's *Exercises in futility* (2007) Etude 1 *Five gestures.*[64] It is only *Voces de Profundis* (1984) that does not relate to my studies; Rak uses finger scrapes and effects with a spoon.

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[64] Marc Ribot *Exercises in Futility*, 2007.

Figure 24: Durville's usage of rapid mute (page 3 system 6).

Corghi and Olofsson incorporate passages that involve bi-tones, both seeking to blend imperceptibly from one state to another. For example, Corghi includes bi-tones that transform into mute taps in *Consonancias y Redobles* (1974) Section R/2, whereas Olofsson employs a subtle change of emphasis; starting on the 4th beat of bar 146 in *Treccia* (1990-2), a 20" section of merged and consecutive bi-tones emerges from the preceding passage that consists of combined bi-tones and golpé. Figure 25 shows the relevant score sections from *Consonancias y Redobles* and *Treccia*.

Consonancias y Redoubles by Azio Corghi
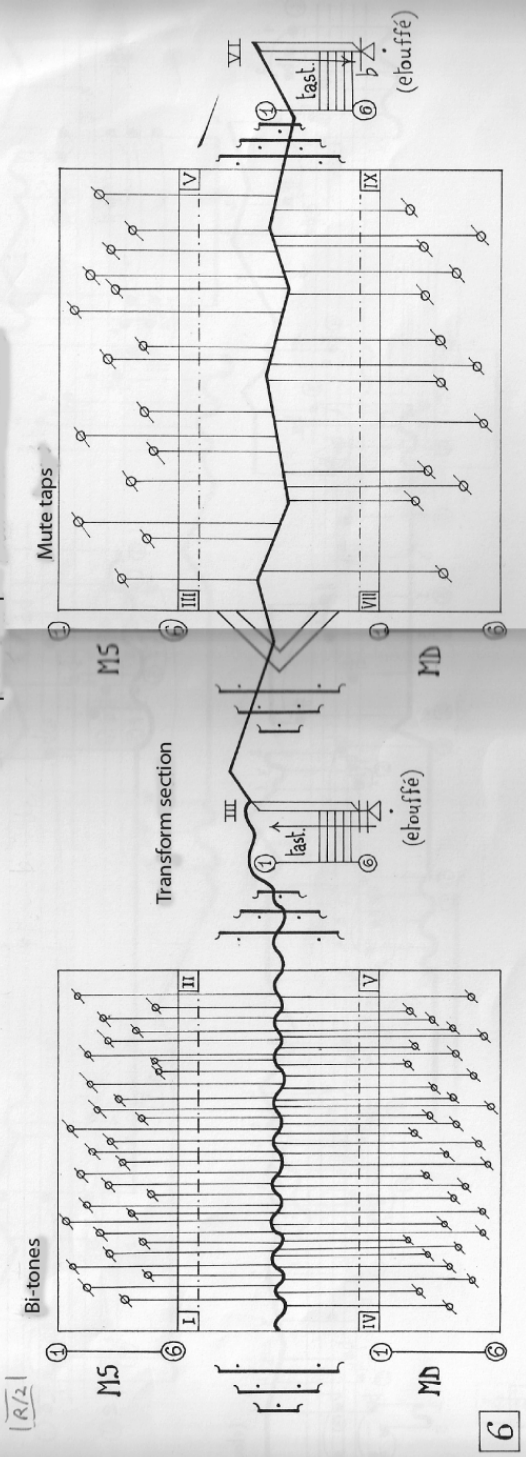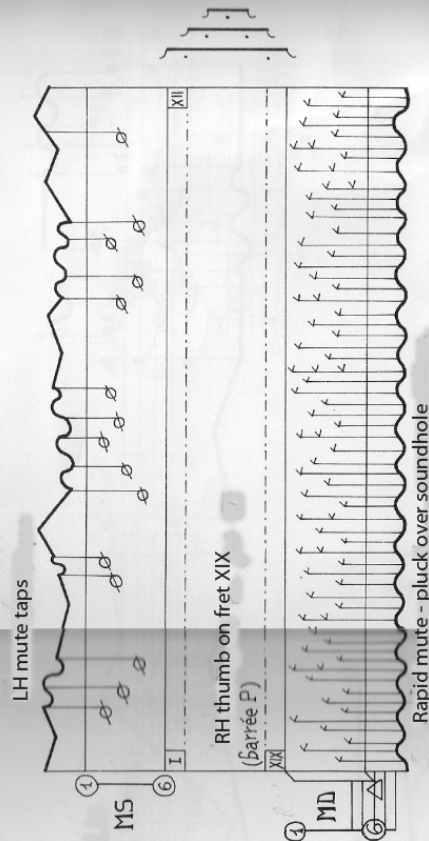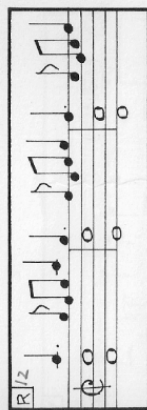
Figure 25: Corghi's bi-tone to mute tap transformation in *Consonancias y Redobles* and the bi-tone usage of Olofsson in *Treccia*.

In *Foxfire Eins* (1993), Oehring uses single soundhole resonance (palm) morphologies. They function in two ways, as a contrasting percussive sound within a merged bi-tone configuration in bar 3, and to initiate mute tap phrases; the first one occurs at beat 1 of bar 5. The composer explains: "The ball of the right hand is placed with a clear accent on all the strings over the soundhole and

stays there until the end of the phrase" (Oehring 1993).[65] Figure 26 shows Oehring's use of extended techniques, including soundhole resonance (palm), notated with a capital B attached to a stem.

When soundhole resonance (palm) morphologies occur in *Foxfire Eins* they are always played with short durations, resulting in interrupted morphologies. Moreover, none of the composers cited in Figure 35 has sought to explore the compositional possibilities of working with successive (or merged) soundhole resonances. (See pages 106-112.)

Figure 26: The opening two systems of *Foxfire Eins*, showing Oehring's extended technique usage.

In the merged column of Figure 23, bi-tones are the dominant extended technique. Four composers have explored merged bi-tones - Brouwer, Bryars, Olofsson, and Oehring. Due to the nature of Olofsson's usage of merged bi-tones, it has been mentioned above. (See section 1.7.1.) Durville's use of merging harmonics has been discussed earlier too. (See section 1.4.1.) Lachenmann makes use of the two guitars by merging three extended techniques across the instruments in *Salut für Caudwell* (1977) - bottleneck,

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[65] From Helmut Oehring *Foxfire Eins* (1993) performance notes.

rapid mute, and hand-rubbing. Rak incorporates arpeggio passages during the spoon section, producing composite morphologies.

Brouwer's use of bi-tones in *La Espiral Eterna* (1971) can be found in the Figure C section (page 8 of the score). He indicates the interactivity of both hands in a visual form. Merging occurs through dividing the hands using conventionally based rhythmic units, supplemented by textual instruction. (See Figure 27 below.) Listen to *sound example, track 10*.[66] However, as this section is played rapidly, there is no exploration of the possibilities for resonance relationships, an underlying principle used for bi-tone treatment in Volume 2. (See *Bi-tone tapping study 1: Merged and consecutive morphologies* and *Bi-tone tapping study 2: Improvisation,* Volume 2, pages 369 and 371.)

Figure 27: Brouwer's bi-tones usage in *La Espiral Eterna*.

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[66] Leo Brouwer *La Obra Guitarrística Volume V*. Leo Brouwer, 2002.

The Squirrel And The Ricketty-Racketty Bridge by Gavin Bryars is made up entirely of merged bi-tones. Originally scored for one player using two guitars (or multiples of this), it was written for Derek Bailey in 1971.[67] The score is entirely text-based. (See section 2.1.) Bryars gives performance instruction for the manner of bi-tone execution. He tells us: "All the notes are played by the fingers playing firmly downwards on the fingerboard" (Bryars 1971: 1.21).[68] A percussive manner is used for the left hand slurs, while the strategically placed right-hand morphologies are played with vibrato. The outcome is a rich texture consisting of upper and lower bi-tone pitches. An even metrical pulse is used throughout. Figure 28 is a copy of page 1. Listen to *sound example, track 11*.[69]

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[67] Recordings by Derek Bailey on LP in 1971 as *Incus 2* but re-released on CD as *Incus CD10*. There are two other recording in later arrangements by the composer - Gavin Bryars and Seth Josel on *"The Marvelous Aphorisms of Gavin Bryars, the early years"*, and with four layers (eight guitars) on *Obscure 8 "Machine Music"* played by Derek Bailey, Gavin Bryars, Fred Frith and Brian Eno.

[68] Taken from performance note 1.21, Gavin Bryars *The Squirrel And The Ricketty-Racketty Bridge* 1971.

[69] Ibid, footnote 50 above.

The Squirrel And The Ricketty-Racketty Bridge by Gavin Bryars

L.H.	4/5	5/6	6/7	7/8	8/9	9/10	10/11
R.H.	9	11	14	15	9	10	9(2) or (5)

(quiet, modest, highly intelligent and articulate, indistinguishable in dress from the young lawyer or record company executive - even to the briefcase)

L.H.	11/12	12/13	13/14	14/15	15/16	16/17
R.H.	10(2) or 5 9	9	11	14	6	

(the clown is no longer necessary, even if the musical journals are now thrown back more than ever on their own invention for the picaresque tales)

L.H.	17/18
R.H.	9

(a reservoir of human tenderness, love, rage, fear, happiness, despair, wonder; in a word, beauty)

Figure 28: Page 1 of *The Squirrel And The Ricketty-Racketty Bridge* by Bryars.

Oehring uses merged bi-tone morphologies in *Foxfire Eins.* As well as allowing right- and left-hand bi-tone resonances to merge naturally, Oehring explored merged glissandi. This is achieved by off-setting the hands. The opening bars of Figure 26 above shows the relevant score section. Two fingers from each hand strike the indicated string for the notated duration; glissandi are performed in the corresponding direction as indicated in the score.

Rapid mute, bottleneck, and hand-rubbing are the dominant extended techniques used by Lachenmann. Merging always occurs by giving the two guitarists contrasting rhythms. The music opens with rapid mute morphologies, and merged bottleneck sounds are employed between bars 429-434. It is not possible to merge rapid mute morphologies with one guitar, due to their short spectral activity. (See Figure 2: 4.)

Lachenmann also employs a hand-rubbing technique to merge morphologies.[70] Hand-rubbing produces an extreme noise-based morphology through brushing movements of hands across the strings. Lachenmann develops the resulting scrapes and whistling sounds. (See Figure 35: 5, and Figure 36: 1.)

In his instructive book *'Pro Musica Nova',* Wilhelm Bruck spells out the importance of Lachenmann's *Salut für Caudwell* in the guitar repertory, telling us it is "…without a doubt one of the most important pieces ever written for the instrument" (Bruck 1992: 9a).[71] Lachenmann embraces robust characteristic guitar-playing elements, snap pizzicati and use of a plectrum for example; he also reshapes finger technique to include development of sensitive morphologies that derive from hand-brushing and intimate bottleneck glissandi.

1.7.2 Combined morphologies

Composers who combine extended techniques morphologies are listed in Figure 23. For example, Lachenmann includes combined bottleneck and hand-rubbing in his duet (Figure 23: 1), Pisati mixes cross strokes with the percussive sounds tambora and golpé, and Rak combines finger scrapes and spoon sounds with bi-tones (Figure 23: 2). Note that Corghi (Figure 23: 1) and Olofsson (Figure 23: 2) also include tambora and golpé when combining morphologies.

Baca-Lobera, Fujikura, and Kokoras (Figure 23: 1) combine extended guitar techniques with other instruments or media - voice, ensemble and tape respectively. In *La Lógica de los Sueños* (2010), Baca-Lobera opens the guitar part with a phrase consisting of consecutive bottleneck morphologies, played tremolando, followed by consecutive bi-tone chords. As part of the next phrase,

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[70] It is the only extended technique from the merged column of Figure 23 not used in Volume 2.
[71] Taken from the introduction to his selected section of *Salut für Caudwell*. *'Pro Musica Nova' studies for playing contemporary music for guitar* by Wilhelm Bruck. Unfortunately, *'Pro Musica Nova'* comprises two books that are both numbered using the same numeral system. Therefore *(a)* denotes *Remarks and explanation of signs* and *(b) Scores*.

he combines bi-tones and golpé before combining bottleneck and golpé. In *ICE* (2009-10)*,* Fujikura has two senza misura sections - at bar 1 and bar 53 of the score, where he integrates nut-side chords, played rasgueado-style, with an ensemble consisting of two alto flutes playing loud 'tut' sounds, a string section playing pizzicato (tremolando) with plectrums, and a percussion section made up of two pod-rattles (small and large) as well as a small rainstick and sea shell wind-chimes. For the opening 2.04" of *Slide* (2002)*,* Kokoras combines bottleneck morphologies with electroacoustic sounds. The first conventionally plucked pitch, a very soft open 6th string, occurs at 2.05".

With the main focus on combining morphologies, the discussion will now centre on two works - *Consonancias y Redobles* (1974) by Azio Corghi and *Toccata Orpheus* (1990) by Rolf Riehm. *Consonancias y Redobles* was inspired by the music of Luys Milán.[72] Each of the five movements begins with a statement of the original fragment, which can be repeated several times before passing on to performance of the different 'musical designs'.[73] The composer tells us: "The form and method of performance of *Consonancias y Redobles* are derived from the indications which Luys Milán wrote as a preface to his *Fantasias for Vihuela"* (Corghi 1974).[74] The *Fantasias* may be found in Milán's book entitled *El Maestro* (Milán 1535)*.*[75]

Corghi uses a number of extended techniques. (See Figure 35: 2.) The 4th movement comprises four sections, where the player chooses the ordering. After the opening Milán quote, Corghi explores combinatorial possibilities, fusing rapid mutes with mute taps. (See Figure 25 above.) He also combines rapid mutes, mute taps, and then golpé in this section.

Riehm uses extended techniques throughout the technically demanding *Toccata Orpheus*. However, conventionally plucked pitches occasionally occur, the first appearing after approximately 2' - a discord consisting of four pitches, played simultaneously (system 9 bar 2, located near the end of page 4 of the score).[76] *Tapping* is the fundamental playing technique in the opening

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[72] Luys Milán (c. 1500-1561 or possibly later).
[73] See footnote 56.
[74] Taken from performance notes of *Consonancias y Redoubles by Azio Corghi* 1974, page 1.
[75] The full title of Luys Milán's book is *El Maestro, Libro de Música de Vihuela de Mano*.
[76] *Toccata Orpheus* is written using proportional notation.

section.[77] From Figure 51: 4 we note that bi-tone (long) and mute tap (long) are archetypal morphologies. In *Toccata Orpheus* bi-tone (long) morphologies are predominant and Riehm combines them with mute tap (long), nut-side, and occasionally palm or whistling sounds; these combinations occur at various points in the score.

Riehm creates a carefully planned and organised interchanging of movements. He divides tapping production further by specifying the manner of attack and release - attack by striking from a distance or quickly from directly above, release by lifting off rapidly (abrupt termination) or allowing the finger to glide along the string in either direction (a whistling sound occurs). Similar to the release usage applied to 'snare drum' morphologies, Riehm induces a variant phase by adding a further action to bi-tone production. (See section 7.7.1.) However, bi-tone (long), mute tap (long), and nut-side are all related - mute taps, and nut-side are upper partials of bi-tones - there is no exploitation of conrtrasting morphologies.

System 1 is typical of the ensuing music. (See Figure 29.) There is a sound event on every pulse. The music starts with three bi-tone morphologies that are played simultaneously by the left hand. The upper pitches are interrupted by four nut-side morphologies played simultaneously by the right hand, allowing the lower pitches from the opening bi-tones to combine with the nut-side morphologies. On the third quaver pulse, the right hand plays three simultaneous bi-tones, interrupting the lower pitches from the opening attack but combining with the nut-side resonance, still sounding, which is then interrupted by an abrupt termination played with the left hand.[78]

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[77] Riehm employs consecutive rapid mute morphologies in the penultimate section, from system 30.

[78] Interruption is a strategy used as one of the elements of shaping morphological content to create spectral variety in the Volume 2 scores. (See Chapter 5, in particular 5.2.6 and 5.3.)

Figure 29: System 1 of *Toccata Orpheus* by Riehm.

A good example of an extended passage occurs in system 5 bar 2 of *Toccata Orpheus*, where Riehm combines bi-tones and whistling sounds. (See Figure 30.) The metronome marking is quaver = 132. In this section, which is approximately 52" in duration, bi-tone morphologies are executed entirely on string 6, sound events occuring on every pulse. The upper pitch of the first morphology - a bi-tone (long) played by the right hand on fret XII - is interrupted by a mute tap (long) at fret VII that causes a further upper pitch to sound, the lower pitch from the opening morphology rings on until the abrupt termination on beat 3. This is followed by another bi-tone (long) played by the right hand at fret XII, whose resonance rings over a whistling sound initiated by the left hand; the termination of the upper pitch from beat 2. Listen to *sound example, track 12*.[79]

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[79] Susanne Hilker *Rolf Riehm Compositions for Guitar*. 1995.
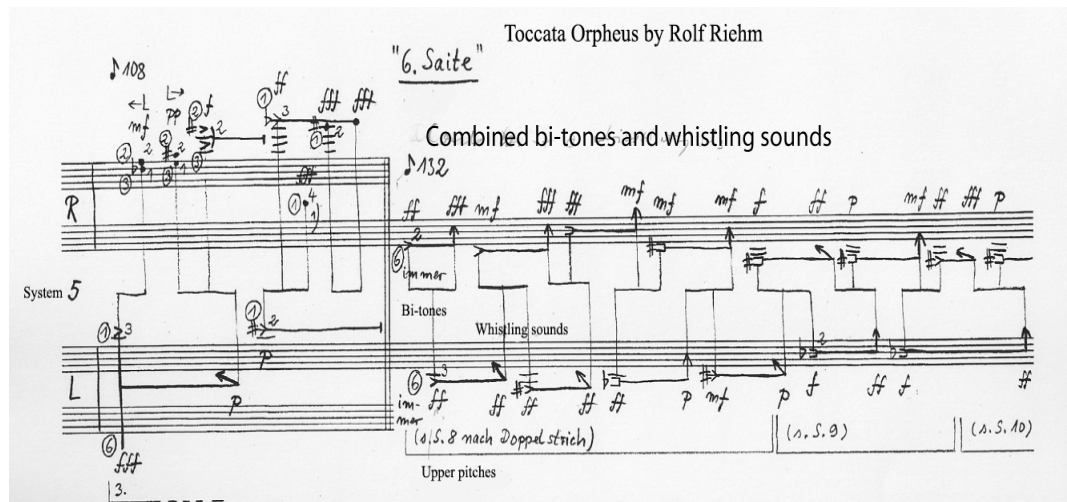
Figure 30: System 5 of *Toccata Orpheus* by Riehm.

Riehm (similar to Bryars) uses a predominantly emphatic pulse, where much of the character of his soundworld relies on the mechanical action of accurate finger placements using the tapping technique; rhythmic configurations and relations to time are rigidly fixed. Listen to *sound example, track 5.* Moreover, the finger glide glissandi release actions, which imbue the resonances with a whistling sound, have a similar outcome to the extended technique used by Bedford in *You Asked for It,* Ginastera in *Sonata op. 47,* and Koshkin in *The Prince's Toys.*

A difference in compositional approach between the Corghi and Riehm scores is evident. Corghi encourages the player to develop a wide range of interpretive freedom. For instance, his performance notes open with: "While interpreting the graphic symbols and signs, the player must realise the formal tendencies of the material with personal fantasy and improvisation" (Corghi 1974: 1). In contrast, to bring about his fundamental compositional aim, Riehm's approach is to provide performative detail: "…only the precise execution of the fingerings can guarantee that the composed sound will actually be produced" (Riehm 1990: 13).[80]

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[80] Taken from the 'Explanation to the score' booklet of *Toccata Orpheus* by Rolf Riehm.

1.8 Scordatura

Composers often experiment with alternative tuning systems, especially when seeking to find unusual pitch combinations that can occur simultaneously or across the strings. An example can be found in Lachenmann's duo *Salut für Caudwell* (1977), where guitar 1 is tuned normally while guitar 2 is tuned a semitone lower.

Scordatura usage is common among contemporary works. For example, eleven of the composers cited in Figure 2 employ altered tunings. Three types of scordatura are identified - diatonic, microtonal, and active. Although diatonic and microtonal scordatura have a direct impact on a work's soundworld, they are not extended techniques. However, diatonic and microtonal scordatura are listed to give a full overview. In contrast, active scordatura production allows performers and composers to experiment with changes in pitch trajectory. Therefore, it is treated as an extended technique in this research.

Diatonic scordatura refers to re-tuning the guitar using the common twelve-pitch equal temperament system. Five composers, who keep the same re-tuned intervals throughout their pieces, are cited - Bryars, Durville, Fujikura, Lachenmann, and Shende. For example, in *The Squirrel And The Ricketty-Racketty Bridge* (1971), Bryars asks the player to use the pitches - E, B, D, G#, B, and E. This could be analysed traditionally as an E7 chord if played simultaneously. Perhaps the seventh chord and steady pulse (mentioned in Bryars' performance note 2.21) are references to conventional jazz. Durville's tuning for *Mouvement apparent* (1988) is E, Bb, D, G, B, F - Fujikura's E, A, D, G#, C#, F# for *ICE,* and Shende's E, Bb, C#, G#, Bb, E for *Suite in Raag Marva* (2010); Lachenmann's is mentioned above.

Microtonal scordatura is where composers use tuning systems outside equal temperament. For instance, Baca-Lobera and Ferneyhough incorporate quartertones. In *La Lógica de los Sueños* (2010), Baca-Lobera uses a fixed tuning system and employs two guitars. The first is tuned to quartertone below D, A, D, quartertone above G, B, and quartertone above F; similar to Lachenmann, the second guitar is a semitone lower. In the pauses between movements Ferneyhough includes a gradual re-tuning of several scordatura strings in *Kurze Schatten II* (1983-9), initially tuned in quartertone intervals before leading to a progressive re-emergence towards the customary tuning. The

opening tuning is quartertone above E, quartertone below B, D, G, Bb, and a quartertone below E. Then there are two changes, the 6th string down to E for movement three and the 5th string down to A for movement five. However, the 3rd string remains as Bb and characterises the final seventh movement, which is written in a fantasia style; the work concludes with a virtuoso passage executed on String 3.

1.8.1 Active scordatura

Re-tuning 'on the fly' as the music unfolds is a technique used by five composers from Figure 2 - Brouwer, Edgerton, Gilardino, Murail, and Shende - an action termed *active* scordatura by the author. It results in glissando-based morphologies that are either single (used to initiate and/or finish a passage), or consecutive (part of an iterative passage, or integrated as part of the musical structure).

Brouwer in *Paisaje Cubana con Campanas* (1968), Gilardino in *Abreuana* (1971), and Shende in *Suite in Raag Marva* (2010), movement 1 *Alap* ask the performer to re-tune one string for short sections. Brouwer employs conventional tuning except for the opening passage, where string 6 is tuned up a semitone to F at the outset (near the beginning of system 3). After two florid phrases, Brouwer ends the section by tuning string 6 back down to the usual E open pitch by deploying active scordatura. Figure 31 shows that the guitarist plays a XII fret natural harmonic just before the detuning action.

Figure 31: Opening passage of *Paisaje Cubana con Campanas* by Brouwer.

Vineet Shende uses an active scordatura to close the opening statement in *Suite in Raag Marva,* movement 1 *Alap*. In bar 6 (beginning of system 2), a natural harmonic played on String 5 fret VII is detuned by a semitone during its two-beat duration. (See Figure 32.)

Figure 32: Opening of *Alap* by Vineet Shende.

During the second system after Figure D of *Tellur*, as part of an extended rasgueado-style passage, Tristan Murail employs active scordatura to produce consecutive morphologies. While the right hand carries the rasgueado action, the left hand de-tunes the F, 6th string, down a diminished 4th to C# (notated with a mixture of pitch indication and graphic representation). Similarly, in movement IV *Jhala* (bar 182) of *Suite in Raag Marva,* Shende employs active scordatura in a short iterative passage; string 6 is slowly tuned down by a semitone (notated conventionally with a glissando line). Figure 33 shows Murail's and Shende's active scordatura usage.

Tellur by Tristan Murail

Figure 33: Score sections from *Tellur* by Murail and *Jhala* by Shende.

In *Tempo Mental Rap,* Edgerton instructs the performer thus: "(Variation 3) features a progressive scordatura, in which the initial tuning is retuned through a series of five steps" (Edgerton 2005).[81] Compositionally, he employs a layered approach that includes active scordatura. For example, the movement starts in standard tuning, shortly before the end of system 4, string 3 is tuned down a minor 3rd with the left hand while tapping occurs in the right hand. (See Figure 34.) The other occurrences are similar in nature - system 14 for instance: String 2 is tuned down a minor 3rd to G# by the left hand while strums are improvised by the right hand.

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[81] Taken from performance notes for Variation 3 of *Tempo Mental Rap* by Michael Edward Edgerton.

Figure 34: Variation 3 system's 3 and 4 of *Tempo Mental Rap* by Edgerton.

Active scordatura technique is not exploited in the repertoire as an integral part of compositional texture. For example, none of the above-mentioned composers use merged morphologies that arise from active scordatura usage, nor do they develop the possibilities of merging microtonal glissandi.

1.9 An all-inclusive view of extended techniques

It is apparent from Figure 2 that composers often employ extended techniques that are not listed in Figure 51; bearing in mind that the techniques used in Volume 2 are taken from Figure 51. (See pages 22-29, and Volume 2, pages 193-198.) Therefore, the function of Figures 35 and 36 is to give a more comprehensive overview of extended techniques usage. Figure 35 consists of four columns. The focus is on works mentioned in Figure 2 - work details, extended technique(s) used, ratio of usage, and compositional tendencies.

The work details column comprises composer, title, and year of original copyright;[82] unpublished pieces are marked *MS*.[83] In order to facilitate easy access to the relevant information, works are set out in alphabetical order. This column is divided into two sections - nylon, and steel strung guitars, classical (nylon strung) guitars being the most commonly used. It seems logical that composers working in the classical Western tradition would tend to experiment with an established instrument. However, a few composers have experimented with the contrasting sound properties of electric or acoustic (steel strung) guitars, which have a more metallic sound with longer durational possibilities.

A list of the extended techniques employed in each work is shown in the second column. Five of them - bottleneck, snap pizzicato, nut-side, bi-tones, and active scordatura (diatonic) - have connections to my pieces (listed in the order set out in Figure 2). However, application of a sponge across the strings and golpé are extended techniques not taken up in the studies. (See section 1.9.1.)

The third column is a general guide to extended techniques usage in each work. An approximate ratio is used to express the varying amounts of extended techniques in comparison to conventionally plucked pitches. *Abreuana* (5:95)

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[82] Published dates are listed in the Bibliography, from page 411.
[83] See page 106 onwards.

and *Toccata Orpheus* (95:5) are typical examples from opposite ends of the scale.[84] References to compositional tendencies adopted by each composer are listed in the fourth column, where usage of extended techniques is divided into the seven general compositional tendencies discussed in *Extended techniques and conventionally plucked pitches.*[85] (See section 1.4.)

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[84] Ratio of usage is expressed with extended techniques *left* and conventionally plucked pitches *right.*

[85] A reminder that these compositional tendencies are - harmonics usage, short passages of extended techniques, fragmented structures, integration of extended techniques and conventionally played sounds, improvisatory passages, exclusive usage of extended techniques, and scordatura.

Figure 35
1

Work details (nylon strung guitar)	Extended Technique(s) used	Ratio of usage	Compositional tendencies
Baca-Lobera, Ignacio *La Lógica de los Sueños* 2010 for voice, 2 guitars (one player) and electronics MS	Bottleneck, snap pizzicato, (muted), bi-tones, golpé, nail scrape, and hard mallet - scordatura (microtonal)	50:50	Fragmented structures, improvisatory passages, and exclusive usage of extended techniques
Bedford, David *You Asked for It* 1969	Natural higher harmonics, snap pizzicato, teaspoon, sweep, wet finger, tambora, golpé Prepared - tracing paper	20:80	Morphological contrast
Bergman, Erik *Midnight* Op. 83 1977	Snap pizzicato, "snare drum", rapid mute, spoon, tambora, and golpé	20:80	Traditional melody, harmony, and rhythm
Biberian, Gilbert *Prisms no 2* 1970, revised 1973 for ten guitars and percussion MS	Snap pizzicato, bottleneck, bi-tones, rapid mute, spoon, paper knife, tuning fork, behind head-nut, and nail scrapes. Prepared - paper	20:80	Short passages of extended techniques, and improvisatory passages
Bland, William *Untitled Composition in Three Sections* 1975 MS	Multiphonic harmonics	100:00	Traditional melody, harmony, and rhythm
Brooks, William *Footnotes* 1982 MS	Bottleneck, rapid mute, and golpé. Prepared "snare drum" (matchstick), clip, rubber wedge, thin metal rod, and twine	Mvt I 95:5 Mvt 3 40:60	Traditional melody, harmony, and rhythm
Brouwer *La Espiral Eterna* 1971	Snap pizzicato, bi-tones, rapid mute, and nail scrapes	15:85	Fragmented structures, improvisatory passages, and exclusive usage of extended techniques

Figure 35
2

Work details (nylon strung guitar)	Extended Technique(s) used	Ratio of usage	Compositional tendencies
Brouwer, Leo *Paisaje Cubana con Campanas* 1968	Natural higher harmonics (campanile), and bi-tones - active scordatura	15:85	Harmonics usage
Corghi, Azio *Consonancias y Redoubles* (Section R/2) 1973	Snap pizzicato, "snare drum", bi-tones, rapid mute, mute tap, tambora, and golpé	60:40	Fragmented structures, improvisatory passages, and exclusive usage of extended techniques
Dench, Chris *Severence* 1994 MS	Snap pizzicato, rapid mute, bi-tones, and golpé	5:95	New complexity
Durville, Philippe *Mouvement apparent* 1988	Natural and higher harmonics (campanile) and soundhole harmonics, bottleneck, snap pizzicato, and rapid mute - scordatura (diatonic)	20:80	Harmonics usage, traditional melody, harmony, and rhythm, improvisatory passages, and exclusive usage of extended techniques
Edgerton, Michael Edward *Tempo Mental Rap* 2005 (6 Variations) MS	Bottleneck, snap pizzicato, nut-side, bi-tones, sponge, and golpé - active scordatura (diatonic)	Var I 10:90 Var 5 95:5 Var 6 5:95	New complexity, and improvisatory passages
Ferneyhough, Brian *Kurze Schatten II* 1983-9 (7 Mvts)	Snap pizzicato, nut-side, bi-tones, rapid mute, and tambora, golpé - scordatura (microtonal)	Mvts I, V, and VII 5:95 Mvt III 20:80	New complexity

Figure 35

3

Work details (nylon strung guitar)	Extended Technique(s) used	Ratio of usage	Compositional tendencies
Frengel, Michael 2006 *Bingo Variations* Mvt II *Postage Stamp*, Mvt IV *Crazy 'T'*, and Mvt IX *Bingo 'the Hard Way'* MS	Nut-side, bi-tones, and rapid mute	Mvt IV 50:50 Mvt IX 60:40	Improvisatory passages
Fujikura, Dai *ICE* 2009/10 for 2 flutes, oboe, clarinet, bassoon, guitar, violin, viola, cello, and bass	Nut-side and plectrum - scordatura (diatonic)	5:95	Traditional melody, harmony, and rhythm, and exclusive usage of extended techniques
Gilardino, Angelo *Abreuana* 1971	Nut-side, tambora, and behind the head-nut - active scordatura	5:95	Short passages of extended techniques
Ginastera, Alberto *Sonata, op 47* 1976	Snap pizzicato, tambora, behind the head-nut, whistling sound, and golpé	10:90	Traditional melody, harmony, and rhythm, and improvisatory passages
Giner, Bruno *Trans-errance 1* 1984	Snap pizzicato (long), snap pizzicato, bi-tones, rapid mute, behind the head-nut, tambora, and golpé	70:30	Fragmented structures
Goss, Stephen *Oxen of the Sun* 2003 –4 for one player on 6- and 10-string guitars at the same time	Bi-tones, tambora (including harmonic tambora), nail and finger scrapes	5:95	Traditional melody, harmony, and rhythm, and improvisatory passages
Guzmán, Edgar *Apnea* 2004-2005 for acoustic guitar and tape MS	Bottleneck, snap pizzicato (long), snap pizzicato, bi-tones, rapid mute, nail scrapes, hand-rubs, and golpé - active scordatura	60:40	Traditional melody, harmony, and rhythm, and improvisatory passages
Halffter, Cristóbal *Codex 1* 1963	Snap pizzicato, "snare drum", bi-tones, and rapid mute	5:95	Short passages of extended techniques, and improvisatory passages

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Figure 35
4

Work details (nylon strung guitar)	Extended Technique(s) used	Ratio of usage	Compositional tendencies
Haubenstock-Ramati, Roman *Hexachord 1 and 2* 1976 for solo or two guitars	Snap pizzicato, "snare drum", tambora, nail scrapes, and golpé	20:80	Fragmented structures, and improvisatory passages
Hayden, Sam *Axes(s)* 1997, revised 2008-9 MS	Snap pizzicato, nut-side, bi-tones, and half-harmonics	15:85	New complexity
Heininen, Paavo *Touching Op. 40* 1978	Snap pizzicato, "snare drum", rapid mute, behind the head-nut, nail sizzle, nail scrapes, and golpé	15:85	Traditional melody, harmony, and rhythm, and improvisatory passages
Henze, Hans Werner *Memorias de 'El Cimarrón'* 1970	Snap pizzicato, golpé, bow, whistle (human), tongue clicks (vocal sounds) and finger snaps	10:90	Fragmented structures, and improvisatory passages
Kagel, Mauricio *Faites votre jeu I* from *Sonant* 1960/64	Natural harmonics (campanile), snap pizzicato (long), bi-tones, and golpé	10:90	Harmonics usage, and fragmented structures
Kampela, Arthur *Percussion Studies I, II, and III* 1995-7 MS	Snap pizzicato, bi-tones, rapid mute, spoon, buzz glissando (strings 6 or 1), tambora and golpé	35:65	New complexity
Kokoras, Panayiotis *Slide* 2002 MS	Snap pizzicato, bottleneck and rapid mute. Prepared - paper clip	95:5	Improvisatory passages, and exclusive usage of extended techniques
Koshkin, Nikita *Usher Waltz* 1984	Snap pizzicato (long)	5:95	Short passages of extended techniques, and traditional melody, harmony, and rhythm

Figure 35
5

Work details (nylon strung guitar)	Extended Technique(s) used	Ratio of usage	Compositional tendencies
Koshkin, Nikita *The Princes Toys* 1992	Snap pizzicato, 'snare drum', bi-tones, snap pizzicato (muted), rapid mute (reverse action), tambora, behind the head-nut, whistling sound, nail scrape, and golpé	15:85	Traditional melody, harmony, and rhythm
Lachenmann, Helmut *Salut für Caudwell* 1977 (Four parts)	Bottleneck, snap pizzicato, cross stroke (one short attack), rapid mute, plectrum, hand-brushing, and golpé – scordatura (diatonic)	95:5	Investigation of sound spectra, traditional rhythm, and exclusive usage of extended techniques
Lorentzen, Bent *Umbra* 1973	Snap pizzicato, bi-tones, and nail sizzle	20:80	Traditional melody, harmony, and rhythm
Murail, Tristan *Tellur* 1977	Snap pizzicato (long), snap pizzicato bi-tones, rapid mute, and palm slam on strings (tasto or ponti) - active scordatura	15:85	Investigation of sound spectra
Newland, Paul *Essays in Idleness* 2001 Mvts I and III MS	Natural harmonics (campanile)	00:100	Harmonics usage
Oehring, Helmut *Foxfire Eins* 1993	Bi-tones, mute taps, soundhole resonance (palm), behind head-nut	90:10	Traditional melody, harmony, and rhythm, and exclusive usage of extended techniques
Olofsson, Kent *Treccia* 1990-92	Bi-tones, rapid mute, and golpé	70:30	Traditional melody, harmony, and rhythm
Pearson, Stephen Funk *Brunella the Dancing Bear* 1983	"Snare drum", and golpé	10:90	Short passages of extended techniques, and traditional melody, harmony, and rhythm

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Figure 35

6

Work details (nylon strung guitar)	Extended Technique(s) used	Ratio of usage	Compositional tendencies
Pereira, Joseph *Bento Box* 2007 Alto flute, guitar, and vibraphone	Multiphonic harmonics, snap pizzicato, and bi-tones	5:95	Traditional melody, harmony, and rhythm
Pisati, Maurizio *Caprichos de Simios y Burro* Mvt I 2003 MS	Cross stroke, soundhole resonance (thumb), bi-tones, rapid mute, tambora, and golpé	Mvt I 100:00 Mvt 2 60:40 Mvt 3 20:80	Harmonics usage, and traditional melody, harmony, and rhythm
Pisati, Maurizio *Sette Studi* 1990 Mvt's 2 and 4 MS	Natural and half harmonics (campanile), rapid mute, and golpé	80:20	Traditional melody, harmony, and rhythm, and exclusive usage of extended techniques
Rak, Štěpán *Voces de Profundis* 1984	Bi-tones, rapid mute, spoon, tambora, and nail scrapes	20:80	Traditional melody, harmony, and rhythm
Ribot, Marc *Exercises in Futility* 2007 MS	Exercise 1- rapid mute and nail scrapes. Exercise I1- rapid mute and golpé	Exercise I 40:60 Exercise II 15:85	Traditional melody, harmony, and rhythm
Riehm, Rolf *Notturno für die trauerlos Sterbenden* 1977	Snap pizzicato, cross stroke, bi-tones tambora, and golpé	10:90	Traditional melody, harmony, and rhythm, and exclusive usage of extended techniques

Figure 35

7

Work details (nylon strung guitar)	Extended Technique(s) used	Ratio of usage	Compositional tendencies
Riehm, Rolf *Toccata Orpheus* 1990	Bi-tones, nut-side, soundhole resonance (palm), and finger rubs	95:5	Morphological contrast
Shende, Vineet *Suite in Raag Marva* 2010 MS	A higher harmonic, nut-side, (diatonic), mini-alligator clip - active scordatura	Mvt I 25:75 Mvt IV 10:90	Harmonics usage, and traditional melody, harmony, and rhythm
Verdery, Benjamin *11 Etudes* - Etude 7 *Start Now*, Etude 11 *Home is Here* 2005	Etude 11 - snap pizzicato, and "snare drum", Etude 7 bi-tones and golpé	Etude 7 15:85 Etude 11 15:85	Traditional melody, harmony, and rhythm
(Steel strung guitar)			
Bryars, Gavin *The Squirrel And The Ricketty-Racketty Bridge* 1971	Bi-tones - scordatura (diatonic)	100:00	Traditional melody, harmony, and rhythm, improvisatory passages, and exclusive usage of extended techniques
Hespos, Hans-Joachim *Kitara* 1971	Snap pizzicato, bi-tones, rapid mute, half harmonics, and nail sizzle	50:50	Fragmented structures,
Kagel, Mauricio *Faites votre jeu II* from *Sonant* 1960/64	Snap pizzicato, bi-tones, rapid mute, nut-side, behind the head-nut, between bridge and tailpiece	40:60	Traditional melody, harmony, and rhythm
Scelsi, Giacinto *Ko-Tha - "A Dance of Shiva"* 1967	Snap pizzicato, tambora, nail sizzle, and golpé	50:50	Investigation of resonance

Figure 35: Extended techniques used in the selected works.

1.9.1 Future research

The potential for opening up a larger repertoire, based on principles from the *Morphological structuring* section, may be considered by including extended guitar techniques not used in Volume 2. (See Chapter 5.) To highlight these extended techniques, Figure 36 was obtained by extrapolation from Figure 35.

Figure 36 comprises two columns - extended techniques and execution. Thirteen extended techniques are listed in the first column, in alphabetical order. The list also encompasses twelve external implements, and three body sounds and utterances.[86] Brief performance explanations of each technique are provided in the execution column.

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[86] As Figure 36 is based on Figure 2, it is not comprehensive in regard to the existence of other external implements. For example, in his guitar quartet *Mummychogs [le monde]* (c. 1989) Stephen Funk Pearson includes a new bridge placed under the strings at fret twelve, thus creating two stringed instruments; both sides of new bridge are used to imitate middle-eastern instruments. Moreover, he uses ping pong balls in the solo work *Pongue* (c. 1991) to produce percussive sounds against strings and body.

Figure 36
1

Extended techniques	Execution
Behind head-nut	Pluck the string length between the head-nut and tuning rollers.
Buzz gliss (strings 6 or 1)	Pull string 6 or string 1 off the neck onto the neck's side, slide along to produce a glissando.
Finger scrape	Rub finger(s) along strings, usually lower ones.
Golpé	Tap the soundboard with a right-hand fingernail or fingertip to produce a percussive sound
Half-harmonics	A semi-dampened harmonic, actually an imprecise placement of a natural harmonic.
Hand-brushing	Move hand(s) across or along the strings.
Harmonic tambora	Strike the strings with an outstretched right-hand finger, typically index, at a natural harmonic node point.
Nail scrape	Drag a right-hand nail along a lower string.
Nail sizzle	Place stopping finger next to a string, allowing adjacent plucked string to rattle against fingernail.
Palm slam	Short percussive sound produced by attacking strings downwards onto wood.
Tambora	Using a flat part of right hand, attack the strings rapidly just inside the bridge.
Wet finger	Slide a wettened finger lightly across the back of the guitar.
Whistling sound (also called sweep or finger rubs)	Slide along lower string(s), upwards or downwards, using thumb and middle finger or palm.
External implements	
Bow	Attack the string(s) in arco style using a cello or double bass bow.
Mallet	Strike strings with the head or rub guitar body.
Mini alligator clip	Attach clip to string(s).

Figure 36

2

External implements	Execution
Paper clip	Attach clip to string(s).
Paper knife	Insert between the strings, alternately over and under.
Rubber wedge (small)	Insert between the indicated strings, typically strings 6 and 5.
"Snare drum" (matchstick)	Insert between two crossed adjacent strings.
Sponge	Slide across or along the strings.
Spoon (table or tea)	Apply to string(s), move along plucked string(s) to produce glissandi.
Thin metal rod	Insert between the strings, alternately over and under.
Tracing paper	Fold and place beneath the strings at the bridge.
Tuning fork	Strike the strings then apply to the strings and draw across.
Twine	Tie to string, typically string 6, and wrap over other strings or rest behind the neck.
Body sounds and utterances	
Finger snapping	Apply tension by pressing the pad of the thumb firmly against the pad of middle finger - slide thumb towards your index finger while sliding middle finger towards your palm.
Tongue clicks	Produced by rapid movement of human tongue. Place the tip of the tongue directly behind front teeth then move the tongue along roof of the mouth. Stiffen tongue and apply pressure with the tip creating a vacuum against the roof of your mouth with your tongue. Making sure that the tongue is not flat up against the roof of your mouth, create a hollow space in the middle but completely sealed all the way around the edge of the palette. Lower the jaw and pull tongue free from the vacuum to hear the click.
Whistle	Purse lips into an O shape, leaving a small opening for air; gently expel air.

Figure 36: Lexicon of extended guitar techniques for continued investigation.

The techniques listed could be used to discover further useful morphological possibilities - resonances that possess an amount of pitch content, spectral intervention, additional noise-biased resonance, and alternative modes of attack. For example, two of the thirteen opening extended techniques listed in Figure 36 have a pitch bias - half-harmonics and harmonic tambora; five extended techniques that rely on physical interference during the resonance phase tend to

be noise-biased - buzz glissando, finger scrape, hand-brushing, nail scrape and nail sizzle.

The techniques that I view as significant involve using the hands to make contact with strings between the head-nut and bridge, taking into account that maintaining flexibility of left- and right-hand actions under performing conditions is a compositional consideration. However, some of the extended techniques cited in Figure 36 are outside this area of use. For example, behind head-nut means pluck the length of guitar string between the head-nut and tuning rollers, and for golpé as well as wet finger the wood is utilized.

In the opinion of the author, three of the percussive techniques have been overused in the repertory, and have therefore not been chosen - golpé, tambora, and palm slams. Golpé (a short noise-based sound) and tambora (an archetypal morphology), both derive from the Tàrrega School of playing, have appeared extensively since the early twentieth century, and palm slams (a variant morphology) are a constant feature in latin-style rhythm sections.[87]

The cited external implements are not employed in the studies, as the author has mainly concentrated on creating music using both hands on one guitar. The exceptions are use of a bottleneck and plectrum, which are both designed for guitar use. Bottleneck morphologies are used to create pitch-oriented glissandi in an unconventional manner and a plectrum is used to generate a contrast in mode of attack. (See sections 7.4.4, and 7.10.1.) Note that all of the external implements cited in Figure 36, except the spoon, will add noise to the resultant morphologies. The spoon, which is awkward to use, could be considered an inadequately designed bottleneck.

Five of the thirteen implements listed - bow, mallet, sponge, spoon, and tuning fork - are used to produce a variation in the quality of sound. For example, using a mallet will result in a sharp and pronounced onset. Moreover, utilizing a tuning fork will add a further fixed pitch. The sponge is employed for multiple noise-based attacks.

The remaining external implements may be used to prepare the guitar before performance. However, as the potential for fluency of performance is a prime

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[87] The *Tárrega School* is a term applied to the philosophy of guitar study developed by Francisco Tárrega (1852-1909).

consideration, they were not considered for use here. Actions like inserting or attaching objects would impact upon the musical flow. For example, placing a matchstick between two crossed strings during a movement is cumbersome and would add parasitic sounds.

1.9.2 Overview of works not discussed

The majority of contemporary pieces contain very little or no extended techniques usage. When composers have used the occasional extended technique, they tend not to be from the Figure 51 list. (See section 5.1) However, to be familiar with the wide range of contemporary styles, significant standard repertoire that consists of conventionally played works written in standard notation has been explored. When extended techniques occur in the scores, they are tied to standard usage; their derivation is usually from the Tàrrega School of playing. (See chapter section 1.9.1, and footnote 87.) For example, Leo Brouwer uses golpé in *Elogio de la Danza* (1964). This body of works forms a rich and diverse area of repertory, from music inspired by the past, as in Benjamin Britten's *Nocturnal after John Dowland* (1963) to works influenced by the Second Viennese School, such as Humphery Searle's *Five* (1974) and Barbara Kolb's *Three lullabies* (1980) [using a twelve-tone system in the style of Schoenberg, Berg, or Webern].[88] To give a general impression, works of this nature are referenced under Index II. (See page 172.)

Nevertheless, there is a large repertoire of guitar works that involve extended techniques existing in Volume 2. Index III is intended as an overview of the many pieces not mentioned in the main body of this research. With an emphasis on solo guitar pieces, Index III consists of thirty-seven solo works for six-string classical guitar, six for ten-string and five for electric guitars. However, some ensemble works are also referenced, including guitar (classical and electric) and electroacoustic sounds (tape/computer), guitar and live electronics, prepared electric guitars, guitar duo (including electric), guitar and voice/instrument duo, ensemble (including electric), and concerti. (See pages 173-178.)

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[88] The *Second Viennese School* is the general term to denote the group of composers that comprised Arnold Schoenberg and his pupils and close associates in early 20th century Vienna.

Two underlying factors prevent Figure 35 from constituting an exhaustive list of works that include extended techniques - insufficient information, or limited usage of extended techniques. There are instances where, although extended techniques are known to exist in particular pieces, scores and/or recordings are not available. For example, *Rhythmische Studien Heft* (1975) by Siegfried Behrend is on a few lists as published by Zimmermann. However, it is out of print. Moreover, references to this work in published sources do not provide sufficient information to compensate for not being able to see a score.[89] Nevertheless, the author intends to continue investigations with all such works. There is one exception. Although up to now information is limited, *Untitled Composition in Three Sections* (1975) by William Bland is cited because usage of multiphonic harmonics is rare in guitar literature.[90] (See section 1.5.1.)

Pieces were not chosen for inclusion when extended techniques usage was too limited. Such works tend to be very heavily weighted towards conventionally plucked pitches, and when extended techniques appear they occur occasionally. In short, there is a lack of compositional connection in comparison to my studies. An example is "…*Getting rid of the glue….*" (1978) by Larry Polansky. Although it is of interest in regard to notation and improvisation, it only contains four rapid mute morphologies; the rest of the piece consists of conventionally plucked pitches.

1.10 Concluding comments

Closing thoughts for this chapter are concerned with the soundworld and performance boundaries of recent repertoire. We have seen that musical settings centred exclusively on extended techniques occur, but are uncommon. Thus enriching the relevance of an aspect of the research inquiry made in the Introduction: That a detailed examination into extended techniques morphologies in contemporary repertoire is an important development for

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[89] For instance, Composing for the guitar part IV: *Extended Techniques and Electronic Music with Guitar* by David Hahn 2007: 1 - pdf.

[90] Although John Schneider mentions the Bland work in *The Contemporary Guitar* (1985: 136), with only one system available, it is difficult to appraise in detail. John Schneider tells me: "I just checked my library and don't seem to have a copy" (email on 7 July 2013), and efforts to contact David Starobin (who has collaborated with William Bland on many occasions) have proven unfruitful, so far.

guitarists. Hence the importance of investigating sections where only extended techniques exist and looking into ways of developing new repertoire.

The works cited by Corghi, Lachenmann, and Riehm come closest to this ideal, especially as they combine two relevant extended techniques in extended passages. However, there are no examples of exploring the richer possibilities of combining three extended techniques that match those found in Figure 51. For example, Pisati combines three extended techniques on one short occasion. (See Figure 23: 2.)

Six composers use consecutive morphologies - Brouwer, Corghi, Durville, Olofsson, Oehring, and Ribot, while four composers who employ elements of improvisation have the strongest links - Brouwer, Corghi, Durville, and Ribot. For example, Brouwer, Durville, and Ribot use rapid mute morphologies, Corghi bi-tones and mute taps.

It would appear that exploring the possibilities that extended techniques offer is a way for composers to increase the diversity of instrumental colour in contemporary guitar pieces. Three types of works, which vary in their main focus, are identified.

1 - exploring the physical or acoustic nature of sound,

2 - examination of performance boundaries,

3 - a mix of 1 and 2.

Here are examples from Figure 2 (page 22):

1 In Murail's *Tellur* (1977) for instance, the music is about the morphologies themselves. He breaks away from the constraints of traditional concepts, basing much of the music on an evolutionary flux rather than on pitch relationships. (See section 1.5.4.)

2 In *Kurze Schatten II* (1983-9), as well as integrating layers of sound, Ferneyhough is concerned with exploring the physical act of playing, including bodily aspects and pushing the performer to the limit. For example, to help the guitarist encounter extreme performance margins, in the climactic final

movement, he instructs: "As if performing (whilst unconscious) several pieces simultaneously" (Ferneyhough 1983-9).[91] (See section 1.5.3.)

3 In *Toccata Orpheus* (1990), Riehm integrates corporeal aspects and concentration on morphological activity. Notably, there is less usage of conventionally plucked pitches than the Murail or Ferneyhough works. For long periods, the performer has to muster mental concentration, physical stamina, and technical control over the guitar, generating and maintaining specific timbral transformations that result in resonance-based patterns. (See section 1.7.2.)

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[91] Taken from the score of Brian Ferneyhough's *Kurze Schatten II* (1983-9) Mvt 7.

2 Notation in the repertoire

2.1 General comments

The purpose of this chapter is to examine appropriate composers' notational practices. For this section we will concentrate on *The Squirrel And The Ricketty-Racketty Bridge* (1971) by Gavin Bryars, *Consonancias y Redobles* (1974) by Azio Corghi, and *Salut für Caudwell* (1977) by Helmut Lachenmann.

To open, we will discuss anomalies in the repertoire that are sometimes present, especially visual and textual information, used to help the performer to interpret passages. See the score examples of Corghi (Figures 12 and 25), and Bryars (Figure 28). Both composers involve bi-tones usage and employ methods that separate the hands. Moreover, it is also of note that the Bryars and Corghi works relate to this research through exclusive extended techniques usage for solo guitar. [See chapter section 1.7, Figure 23: 1, and (Volume 2) chapter section 4.1.]

In the Corghi score for *Consonancias y Redobles*, graphic representations cover left- and right-hand actions, rhythmic activity, iterations, and performance technique textual instruction. The result is an over-complicated form of tablature that is difficult to decipher. Figure 25 (page 86) shows the relevant bi-tones graphic representation. (See sections 1.4.3, 1.6, 1.7.1, 1.7.2, and 1.10.)

Bryars notation for *The Squirrel And The Ricketty-Racketty Bridge* is based solely on textual instruction for hand placements. Once the instructions have been assimilated, it is clear how to learn the music. Instructions for left and right hand are like a description of tablature. He tells us that: "The notation for each hand is affected by giving the fret number at which the pitches are to be played" (Bryars 1971: 1):[92] string numbers, in parenthesis, accompany the fret number. For example, *4/5* indicates the A string at the fourth fret. Left-hand pitches are played at an even metrical pulse. Right-hand notation is in the form of fret numbers or specified pitches at a fret number. The player chooses from strings 5 to 2, which is an improvisational element. Pitches are sustained for as long as possible. If the Bryars piece involved more subtlety of nuance (dynamic levels

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[92] Taken from performance note 2.1 of Gavin Bryars *The Squirrel And The Ricketty-Racketty Bridge*.

are constant and iterative pulse unrelenting for a long period - c. 11'), his use of a text-only score may not have worked so well.

Also of interest is how resonance durations are expressed in appropriate repertoire, principally with regard to placing morphologies in the time continuum and learning to improvise using extended techniques. As a sample, here are some cases in point, highlighting inconsistencies in the tablature notation.

Lachenmann uses a two-stave system in *Salut für Caudwell*. Looking at the Guitar 2 part in Figure 37, we note that durations are given on the top tablature stave using standard notation rhythm symbols, while the bottom treble clef line is used to indicate pitch area and left-hand positioning. In his performance instructions for Lachenmann's *Salut für Caudwell,* Bruck tells us that: "The strings that are plucked or brushed by the right hand are indicated in a tablature system, applying to the left hand which stops the tones" (Bruck 1992: 9a).[93] This approach must be problematical for the conventionally taught player as conflicting signs are present. Taking the opening bar as an example, the tablature line displays conventional rhythmic configurations; however, the bottom line appears to be a minim, which is an impossible in a three-eight bar. This graphic inconsistency can be overcome, of course, through familiarity, but on the other hand it is impossible to argue that conventional-looking notation here is more intuitive or easier to read. (See sections 1.2.1, 2.3, and 2.4 for further information on *Salut für* Caudwell.)

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[93] '*Pro Musica Nova' studies for playing contemporary music for guitar* by Wilhelm Bruck.

Figure 37: Section from *Salut für Caudwell* by Lachenmann.

In some sections of *Consonancias y Redobles* we can see that initiation points are given but Corghi leaves duration terminations to the performer. Although a further degree of help would be useful for interpretational purposes, giving some working parameters for resonance values, for instance. However, Corghi's durational approach is in line with his compositional strategy of including elements of freedom and encouraging an environment of discovery. (See Figures 12 and 25.)

For the right-hand notation in *The Squirrel And The Ricketty-Racketty Bridge,* instructional text only is needed for Bryars to describe durations. It reads: "The pitches in this system are held for as long as a considerable vibrato can sustain them and, without any temporal gap between them, are played without reference to the rhythmic pulse of the left hand, the criterion for their individual duration being the vibrato and how long the pitches can be sustained" (Bryars 1971).[94] See Figure 28, listen to *sound example track 11,* and (Volume 2) 4.1 and 7.9.2.

In order to put notation in the repertoire into a clearer context, after a short evaluation of historical and pedagogical aspects, we will look at composers' method of tablature notation. The focus will be on putting notation usage into a morphological context, and the impact of communicating spectral detail on technique.

2.2 A short historical and pedagogical evaluation

From the first half of the sixteenth century to the present, guitar treatises have taken varied and diverse forms. The earliest books were about instruments. They included anthologies of pieces that were written in a system based on symbols and graphic representations, called *tablature.* The first significant book of guitar tablature pieces, *El Maestro, Libro de Música de Vihuela de Mano 1535,* which was published in Valencia by Luys Milán (c.1500-c.1561), is most valuable for its music content; he included Fantasias (the source of inspiration for the Corghi work), Pavans, Villancicos, and many others.[95]

Figure 38 is a sample of numeric vihuela tablature from the book *Orphenica Lyra* by Miguel de Fuenllana (c. 1500-1579) published in Seville 1554.[96] A stave with horizontal lines is used to give a visual map of the strings. Numbers along the stave indicate placement of left-hand fingers or open strings - 1 = first

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[94] Taken from performance note 2.31 of Gavin Bryars *The Squirrel And The Ricketty-Racketty Bridge*.

[95] The *vihuela de mano* was a guitar-like instrument with double-strings (arranged in pairs and called *courses*) made of gut. Milán appears to be the first composer in history to publish music for a fretted string instrument. However, the music contained very little value to the teacher; this is similar to other Vihuela books of this period.

[96] *Orphénica Lyra* comprises 188 pieces in six volumes: 51 Fantasias, 8 Tientos, songs and intabulations - mostly for six-course vihuela, plus nine pieces for five-course vihuela, and nine pieces for four-course guitar.

fret, 2 = second etc, and 0 for open strings. A stack of numbers (from 2 to 6) will represent a chord, appearing in the vertical plane. This basic information is all that is needed for a student to start tackling the music. Rhythmic activity is denoted above the stave.

Figure 38: Example of early tablature by Fuenllana.

Many more books followed during the rise of the Baroque guitar. For example, Dr. Juan Amat (1572-1642) published Guitarra Española de Cinco Órdenes in 1596, which was the first guitar method.[97] Amat's focus was the art of accompanying popular songs, providing the beginner with basic instruction on how to play in the *strumming* style, discussing such topics as tuning, formation and fingering of chords (using an *alfabeto* system),[98] and how to accompany popular dances.[99] The significance of *Instrucción de Música* by Gaspar Sanz, which appeared around eighty years later than the Amat work, is referred to in chapter section 1.1. (See page 13.)

Books written in standard Western notation started to appear in the late eighteenth century. *Arte de Tocar La Guitarra Española por Música* published in Madrid in 1799 by Fernando Ferrandière (1771-1816) for example, *por música* in the title, meaning "from musical notes", was in opposition to the normal tablature prevalent in eighteenth century guitar music.[100] Moreover, it was Dionisio Aguado (1784-1849) who was the first pedagogue to investigate extending guitar morphologies. For example, in *Escuela de Guitarra* (1825) he describes how to play artificial harmonics, realising that they have "…a good quality when played correctly" (Roos 2009: 30), an area neglected by Sor, Carulli, and Giuliani. He also explains how the *tambora* (drum effect) is performed with the right hand.

In the last century, books that discuss the significance of tablature systems started to appear. For example, in the notation chapter of *Escuela Razonada de la Guitarra,* Emilio Pujol includes a significant section explaining about ancient systems. He points out that: "Music for guitar used to be written in tablature, whose aim was to show how the music was to be performed on the instrument itself" (Pujol 1934: 37).[101] Furthermore, John Schneider also mentions tablature

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[97] The Amat work was published in many editions between 1596 and 1639.

[98] *Alfabeto* is a music notation system in which letters of the alphabet are used to represent specific chord forms.

[99] Morphologies that are produced by strumming are used in Volume 2, especially in the *rapid mute* studies. (See *Rapid mute study 2: Synchronous morphologies*, Volume 2, page 380.) They are also associated with multiple attacks in *'snare drum'* morphologies. (See Chapter section 7.7.)

[100] Ferrandière was the first to use stave notation in this book.

[101] *Escuela Razonada de la Guitarra* 1934 by Emilio Pujol (1886-1980) consists of three books that are based on the technical and pedagogical systems of Francisco Tàrrega (1852-1909). Pujol studied with Francisco Tàrrega at the Conservatory of Barcelona in 1901.

in *The Contemporary Guitar,* from the stylistic perspective of eighteenth century *punteado* (plucking) and *rasgueado* (strumming) to Kagel and Corghi's usage in *Faites votre jeu II* and *Consonancias y Redobles* (Schneider 1985: 98-129).

A list of notable treatises and methods, through the ages, is presented in Index I. It comprises pedagogical works for *vihuela* and four-course guitar from the Guitar sixteenth century to contemporary books for six-string guitar. (See page 168.)

Tablature is a quick to learn and easy-to-sight-read pictorial method that features horizontal and vertical aspects. Moreover, in recent times it has become a general learning resource for guitar players; a wealth of repertoire that covers most genres exists.[102] For example, Marcy Paulson discusses the current popularity of tablature in *Free Guitar Lesson on Guitar Tab Pros and Cons;* in particular learning to read from tablature in relation to conventional musical notation. She tells us that: "Tabs (tablatures) are a popular way for guitarists to read and write music. The six-lines of a stave written for guitar tab(lature) are a visual map of the guitar's strings" (Paulson 2009: 1).[103]

In many scores that involve extended techniques, composers use words to help guide the guitarist to play accurately. Moreover, in order to elucidate the symbols used on the tablature, some composers make extensive use of explanatory text alongside appropriate stave systems, Helmut Lachenmann in *Salut für Caudwell* (1977), Michael Edward Edgerton in *Tempo Mental Rap* (2005)*,* and William Brooks in *Footnotes* Movement 1 *Cage* (1982), for example.

2.3 Tablature usage in the repertoire

Eight of the composers listed in Figure 2 employ tablature systems to convey the necessary musical information - Brooks, Corghi, Edgerton, Haubenstock-

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[102] From the author's experience as a guitar teacher, many musicians today are comfortable with tablature, especially in the early stages of learning, but feel intimidated by sheet music. This is mainly because guitar tablature can be understood quickly without much previous musical knowledge. Music notation requires more effort to learn.

[103] Marcy Paulson is a feature writer for Suite 101's *Musical Instruments Section*. See www. Suite101.com.

Ramati, Kagel, Kokoras, Lachenmann, and Riehm.[104] (See pages 21-28.) Their usage is underlined by three methods - separation of the hands, highlighting of left-hand movement, and production of percussive and/or prepared morphologies.

Corghi, Edgerton, Haubenstock-Ramati, Kagel, Lachenmann, and Riehm generally present right- and left-hand usage separately. Edgerton and Lachenmann use tablature to convey right-hand actions and a normal stave for the left hand, running concurrently, on which extended techniques and conventionally plucked pitches are placed. For example, in his performance instructions for Lachenmann's *Salut für Caudwell* (1977), Bruck tells us that: "The strings that are plucked or brushed by the right hand are indicated in a tablature system, applying to the left hand which stops the tones" (Bruck 1992: 9a).[105] (See Figure 37.)

Corghi, Kagel, and Riehm develop systems that focus on treating both hands equally. For example, an emphasis on graphic representations enables Corghi and Kagel to present a balance between left- and right-hand actions in *Consonancias y Redobles* (1974) and *Faites votre jeu II* (1964). They both use supporting text: *Rechte hand* and *Linke hand,* Kagel and *MS* (Mano sinistra) and *MD* (Mano destra), Corghi. [See Figure 25 and (Volume 2) Figure 58.]

Throughout *Toccata Orpheus* (1990), Riehm utilizes both hands in the same way. Riehm creates a carefully-planned and organised interchanging of movements where either the left hand strikes the strings near the soundhole, and the right-hand over the fretboard, or vice versa. Riehm explains: "Essentially the notation indicates what the right and left hand have to do and not what the actual sound is; like the *tablature*, with the right and left hand separated. In particular where the hammer-on strokes occur *both* parts of the string should be easily audible. This can be achieved by striking right in the middle between the frets" (Riehm 1990: 13). Right and left hand are notated on separate staves. (See

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[104] The reader should note the following. For *Colloid* (1988-91), Richard Barrett employs a similar notation system to the one used by Lachenmann in *Salut für Caudwell* (1977). I have listed this particular Barrett work in Index III (see page 173) as *Colloid* is written for ten-string guitar, whereas this Guitar Treatise centres on the standard six-string classical guitar. Also, Riehm and Edgerton use a related scheme for sections of *Toccata Orpheus* (1990) and *Tempo Mental Rap* (2005).

[105] *'Pro Musica Nova' studies for playing contemporary music for guitar* by Wilhelm Bruck.

Figure 39.)

Figure 39: Typical score example of Riehm's left- and right-hand usage in *Toccata Orpheus*.

While the fingering and string numbering system are aligned with fairly conventional guitar notation, becoming proficient at deciphering stem positioning for left and right hand in *Toccata Orpheus* has a dual aspect. Firstly, taking the time needed to practice, and secondly understanding that the physical actions of the performer is an intentional compositional parameter. As a

consequence of following Riehm's instructions notes a theatrical component naturally occurs in performance, which is evident in Stefan Östersjö 's rendition.[106] Unfortunately, Riehm does not say much on this subject in the directives that come with the score.

When comparing tablature usage among the above-mentioned composers and the Volume 2 studies, where the emphasis is on allowing easily-shifting hand positioning, a system that enables greater flexibility between left- or right-hand movements was sought. Indeed, all that is needed to denote hand separations are fret and string numbers, borne out by Bryars in *The Squirrel And The Ricketty-Racketty Bridge* (1971). (See Chapters 4 and 7, and any of my studies.)

The key issue for developing a new tablature system is to open up a framework for the manipulation of morphological contours from the standpoint of performing consecutive, merged, and combined morphologies; offering guitarists the means to express extended techniques in terms of shaping their inherent sound qualities. (See Chapter 5.) In short, it is an approach to guitar playing that reflects spectral content.

To illustrate further, the following discussion will show that in the notation systems used by key composers who encorporate tablature, integrating similar and contrasting morphologies is an area that needs investigating. For example, conveying spectral relationships in regard to the manipulation of pitch and noise, and awareness of the resonance value of morphologies are not always evident. However, in contrast, the purpose of the new notation used for this research is to capture and depict a complete representation of the musical flow; to present the player with the means to engage in how the sound spectrum changes in time.

2.3.1 Spectral content in the repertoire

We can now have a more detailed look at the significance of spectral content in the repertoire. As Figure 23 (page 80-81) contains a list of works involving sections consisting solely of extended techniques in relation to compositional

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[106] The Youtube link for Stefan Östersjö playing Riehm's *Toccata Orpheus* is: http://www.youtube.com/watch?v=Fy-0JKaCz9g

approach, some of the cited repertoire will form a basis to explore scoring systems employed by key composers. Figure 40 has been devised to bring greater awareness of performance sensibility and production of an appropriate soundworld. It comprises a list of the relevant repertoire sections (in alphabetical order), type of extended techniques used, compositional structures, rhythmic invention, and elements of improvisation; it will be used in conjuction with Figure 23.

Works and sections	Type of extended technique	Compositional structures	Rhythmic invention	Elements of improvisation
Corghi, Azio *Consonancias y Redoubles*, page 3.	Rapid mute	Consecutive variant morphologies. Short phrases.	Irregular rhythms - ad-lib, pulse left to performer.	Similarity: Performer involved in structural outcome. Box-type representations.
Durville, Philippe *Mouvement apparent*, system 24.	Harmonics	Extended archetype: Merged soundhole harmonics with natural, higher, and multiphonic harmonics.	Underlying pulse	Similarity: Sonic outcome has improvisatory nature.
Lachenmann, Helmut *Salut für Caudwell*, page 2, starting bar 39.	Bottleneck	Interrupted archetype: Merging occurs in duo only.	Emphatic pulse	Different: Strict placing of sound events.
Opening section.	Rapid mute	Consecutive variant morphologies. Merging occurs in duo.		
Oehring, Helmut *Foxfire Eins* Opening section, starting bar 5.	Soundhole resonances	Interrupted archetype: Single morphologies	Emphatic pulse	Different: Strict placing of sound events.
Riehm, Rolf *Toccata Orpheus* Opening section.	Bi-tones	Interrupted archetype: Succession of composite resonances.	Emphatic pulse	Different: Strict placing of sound events.

Figure 40: Key composers who employ sections of only extended guitar techniques.

Morphologies from four contrasting types of extended techniques will form the basis of the discussion; harmonics, bottleneck, bi-tones, and rapid mute. Harmonics and bottleneck morphologies are pitch-biased, rapid mute noise-oriented, while bi-tones possess a mixture of pitch and noise. These techniques show the type of spectral variety found in key works from the repertoire.

To give an overview of the sound outcome, the pieces chosen comprise sections from Durville's *Mouvement apparent* (1988), Lachenmann's *Salut für Caudwell* (1977), Corghi's *Consonancias y Redobles* (1974)*,* Oehring's *Foxfire Eins* (1993) and Riehm's *Toccata Orpheus* (1990). As explained above, these works contain specific types of extended techniques that, due to their resulting morphologies, are of special interest to this survey.

Note that for their notation systems Lachenmann, Corghi, and Riehm incorporate tablature, separate the hands, and use two adjoined staves per line. (See section 2.3.) The following investigation will show that only a single line is needed to convey all the necessary musical and instructional information.

Lachenmann's use of bottleneck morphologies in *Salut für Caudwell* is the only mention of this technique in Figure 23. Cited due to the occurrence of merging bottleneck sounds and combining with muted morphologies. However, his musical style does connect to the expressive potential of the Folk/Blues tradition. Lachenmann's usage is predominantly sliding along the strings using the bottleneck in barré style, where each player produces single or consecutive morphologies, therefore merging can only occur in duo playing.

When observing temporal aspects and morphological depiction in *Salut für Caudwell*, Lachenmann provides a mixture of horizontal lines that are either straight, for linear morphologies, or sloping and curvilinear to indicate the trajectory of refracted morphologies, giving a clear impression of the morphological flow throught time.

Lachenmann uses a graphic representation of a bottleneck for his score. Figure 41a is a representative extract from *Salut für Caudwell* (Bruck: 24b, bars 37-47). He employs a mixture of notated pitches on the conventional stave and rhythmic indication on the tablature-based line. The performer strives to articulate the pitch material.[107] Bruck informs us: "The pitch notation here has

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[107] Note that he uses a non-transposed treble clef.

very little in common with what we guitarists are used to" (Bruck 1992: 10a).
As most of Lachenmann's notated pitches are between the soundhole and
bridge, plus they form part of glissandi structures, it is difficult for the
performer to be precise. This is evident when listening to any performance.[108]
However, it does fit with the composers philosophy of, "composing
constellations of sound and movement" (Bruck 1992: 9a). Also of note is that
Lachenmann sometimes exploits a subtle noise element by filtering
morphologies through employing the left hand to dampen the strings. He uses
the letter 'P' to denote this action.

I would argue that it would be is easier to comprehend Lachenmann's score
using a single line. Figure 41b is a rendering of Figure 41a using a timeline-type
score similar to my usage in Volume 2; bars 39-41 are represented. Figure 41b
may be seen as a reduction of 41a, note that there is no need to separate the
hands into two staves to convey the same morphologies or performer actions.
Employing one line helps internalizing at a glance all parameters; pitch
relations, rhythmic and durational apsects, as well as symbols, text indications,
and dynamic levels. This notation also conforms to the tradition of using a
single stave or tablature line whenever possible and thus has the advantage of
conveying complex information in a simpler and (for guitarists) more
immediately readable manner.

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[108] There are a few online performances, for example, listen to -
http://www.youtube.com/watch?v=2fdkEnsizPg

Figure 41a: Relevant extract from Lachenmann's *Salut für Caudwell*.
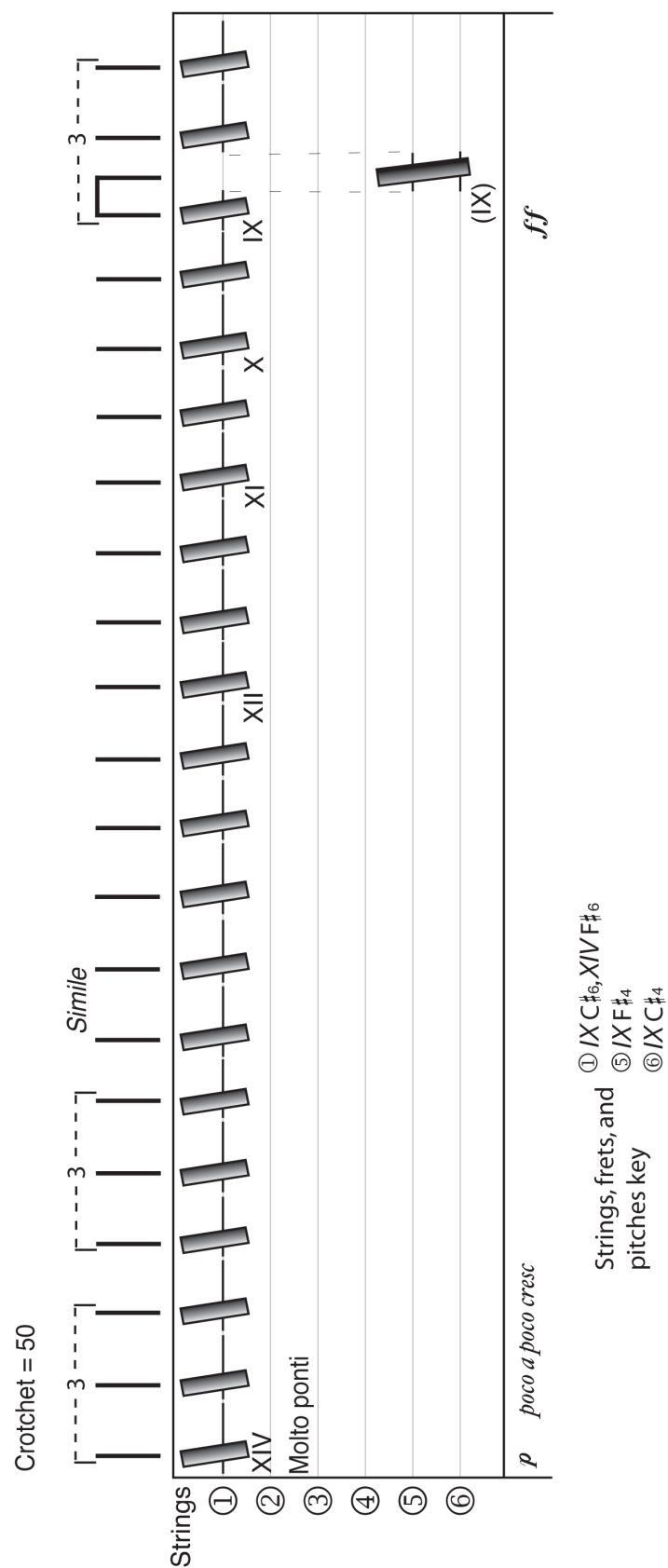
Figure 41b: Simulation of Figure 41a using a the scoring system similar to Volume 2.

From Figure 23 it is evident that Brouwer, Corghi, Durville, Lachenmann, and Ribot all use rapid mute morphologies. In this part of the survey we will concentrate on Corghi's and Lachenmann's use of rapid mute morphologies. (See Figure 40.) The method of rapid mute execution in Lachenmann's *Salut für Caudwell* is for an unfretted sound, where the player rests left-hand fingers lightly on the string(s) without pressing them to the fretboard. In his *Remarks and explanation of signs,* Bruck's performance instruction reads: "Diamond-shaped, blank note heads stopped almost as a harmonics, thus light touch of the strings: a 'stifled' sound should result" (Bruck 1992: 9a).

It is difficult to locate some of the left-hand positions precisely in *Salut für Caudwell*. As most of the directions to play rapid mutes are between the fredboard and bridge, accurate orientation is challenging, especially as the the morphologies are noise-biased. For example, to play the full-barré first bar, Guitar 1 approximates where an octave C3 on string 6 will occur. In effect, the player has to find a way of simulating a barré with the left hand just beyond the soundhole, before plucking the appropriate strings with the right hand.

A prime example of Lachenmann's rapid mute treatment happens at the beginning of *Salut für Caudwell;* a passage that includes consecutive and merged rapid mute sounds. The advantage of having a guitar duo is that merging rapid mute can occur through each player performing single and consecutive similar morphologies. As the duration of rapid mute morphologies are very short, merging is not technically possible on one guitar. However, an impression of merging can occur through using quickly played arpeggiated passages, a compositional device used in *Rapid mute study 4: Linear and undulated glissandi.* (See Volume 2, page 382.)[109]

To illustrate further, Figure 42b is a simulation of Figure 42a, formulated on a similar basis to Figures 41a and 41b above. The opening eight bars of *Salut für Caudwell*, Guitar 1, are portrayed. Once again, all the information in Figure 42b is on one musical line. In effect, information on the left-hand five-line stave is superimposed onto the tabluture-based right-hand stave, where one notehead

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[109] For further comments on usage of rapid mute morphologies in relation to the principles outlined in this thesis, see Chaper 5 and chapter section 7.11.5 *Rapid mute (normal) study 1*, and listen to *Sound example, track 84*.

type suffices, rather than two. In short, the notation has been simplified; all performance guidance for the specific events are present.

Figure 42a: Opening eight bars of *Salut für Caudwell* by Lachenmann.

Figure 42b: Rendering of Figure 42a using the scoring system similar to Volume 2.

On page three of the *Consonancias y Redobles* score, Corghi includes a passage that involves rapid mute morphologies and scraping sounds. (See Figure 43a.) He uses contrasting hand movements for this section. The right hand plays rapid mutes on the top three strings *ponticello,* while the left hand forms a lower strings *barré* that produces *undulating glissandi,* frictional noise

arises from movements between frets V and XII. Much freedom is left to the performer, who affects the structural outcome.

The emphasis for the right hand is on constructing freely played asymmetrical rhythms; a mixture of consecutive morphologies (arpeggios) and simultanously plucked morphologies (chords) are interjected between irregular configurations of rapidly played short phrases. Corghi gives a pictorial indication of the gesture lengths that are required. During this right hand activity, the left-hand indication is to use a full-barré for irregularly played glissandi, the player follows the given contours.[110] Corghi's indication is the use of recurring repeat marks. However, no useful textual information is added.[111]

Although at first it appears that Corghi's score is vaguely written, on closer inspection, enough information is given to enable the adventurous guitarist to realise the musical content.[112] However, reconfiguring this section using a box-type system that relates to Corghi and Volume 2 could benefit the performer; it would be easier to decipher. Figures 43a and 43b have been devised as a comparison.

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[110] A similar path is followed for the improvised sections of the rapid mute studies. See Volume 2, pages 381 and 382, and listen to *Sound example, tracks 83* and *84*.
[111] Concise written remarks are employed to help the performer in the studies. (See chapter section 7.11.7.)
[112] Here is a *Youtube* link to a performance of the Corghi work given by the author on 3rd February 2012, Performance Space, City University, London - http://www.youtube.com/watch?v=x63BgbEzTX4
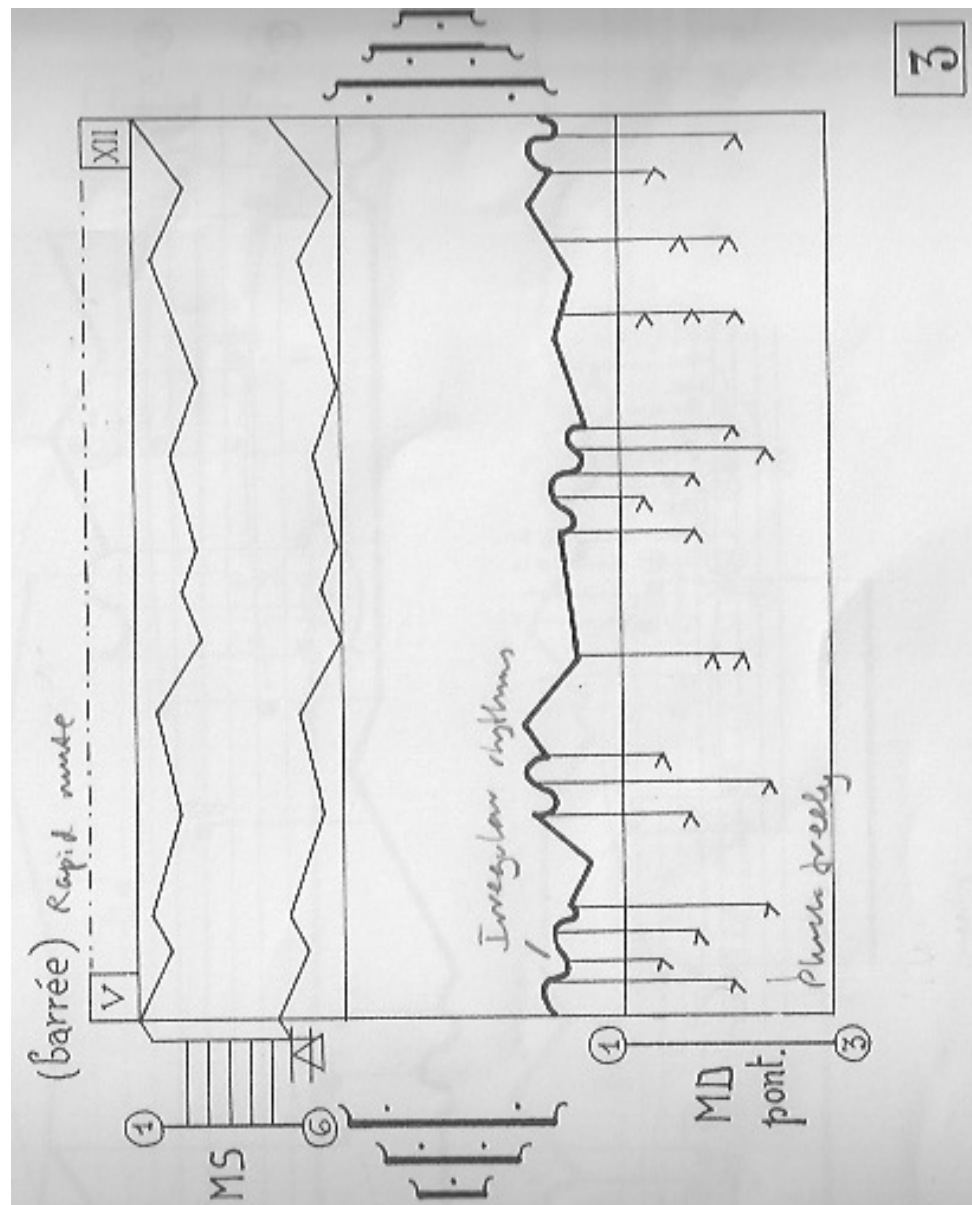
Figure 43a: *Consonancias y Redobles* by Corghi, part of page three.

Timescale = approx. 30 secs

Strings

Pont *Assymetrical rhythms 'ad lib'*

Simile

Improvise using the given material for approximately 20 secs.

Repeat as desired

Irregular glissando

XII

V - - · - · - · - · - · - · - · - · - · - ·

Free dynamic levels

N.B. Directions in italics are taken from Corghi's 'Signs and Symbols' for *Consonancias y Redoubles*

Performance notes:

Rapid mute - across strings one to three, use the right hand thumb to form a barré, then employ other fingers (same hand) to pluck the strings (one to three) between the barreé and bridge, ponti.

Scraping sound - use left hand finger one to form a barré across strings four to six, gliding the barré finger between the given fret positions forming glissandi.

∩ = short pauses

Figure 43b: Simulation of Figure 43a using the box-type system similar to Volume 2.

Similar to the Lachenmann simulation above, all the information is represented on one musical line rather than two staves. Instructions for improvisation are easier to comprehend in Figure 43b, and clearer time boundaries are present. Although a fair amount of text has to be given, it is applied succinctly.

2.3.2 Standard notation relations

For this section, we will look at the problems of reconfiguring tablature usage into a more standard type of notation. Although it is possible to accomplish a reasonable adaptation of some sections, problems arise in key areas. For example, standard notation is often inadequate when conveying information related to the inherent sound in the morphologies, especially when transmiting spectral content is necessary and helpful, and when elements of improvisation are introduced. To illustrate, the discussion will centre on harmonics morphologies.

As harmonics have a strong spectral presence, follow the archetypal model, and possess perceptibly stable and obvious pitch material, the *Natural harmonics studies* are a useful example when explaining the facilitation of morphological information, and observing pedagogical outcome when improvisatory elements are present.[113]

From Figure 23 (pages 80-81) it is clear that the only related harmonics links to consider are found in Durville's *Mouvement apparent* (1988). Durville merges soundhole harmonics with natural and higher harmonics as well as multiphonic harmonics with natural harmonics, always in campanile style. (See Figure 5.) If the opening two phrases of *Natural harmonics study 1* was reconfigured in the Durville style, it would look something like Figure 44; it comprises five pitches.

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[113] See chapter section 7.2 for the main section on *Natural harmonics*.
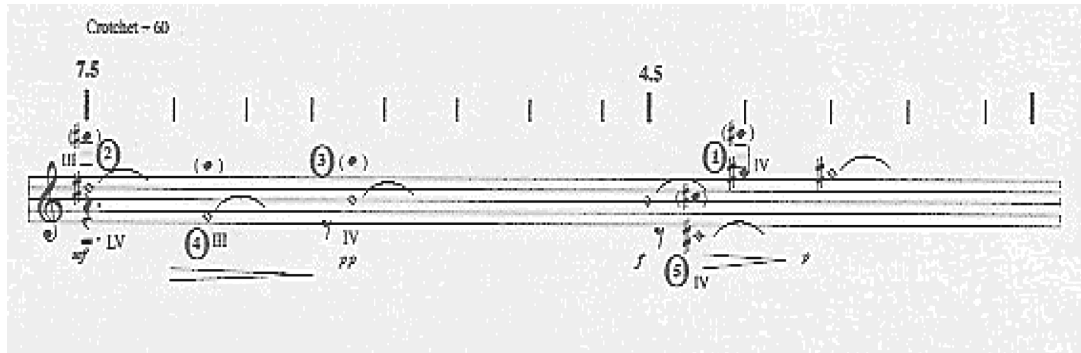
Figure 44: Opening of *Natural harmonics study 1* in the style of Durville.

Durville uses a problematic method for conveying natural harmonics information in the score. For example, although he employs a five-line stave, the pitch locations are given as fret positions and string numbers, which is very close to a tablature system; actual pitches are in parenthesis. Moreover, Durville's use of Roman numbers for fret positions could be more accurate.[114] Furthermore, indicating durations with a short curved symbol, akin to a slur without a forward-connecting symbol is more ambiguous and less visually obvious than the system used in my scores.[115]

Natural harmonics studies 1, 2, and 3 could be reconfigured in the style of Figure 44. However, further problems occur when improvisation is included. The final two natural harmonics studies are based on the inclusion of improvisatory elements that centre around certain parameters. (See sections 7.2.4 and 7.2.5.) If the normal bar line or proportional system was employed, using standard notation would be untenable for these musical situation. It would amount to an unsatisfactory form of tablature with long sections of empty stave lines, unless something like the repeat marks similar to the Corghi design is employed. (See Figure 25.) Moreover, additional information would be needed. To illustrate, Figure 45 is a representation of the opening of *Natural harmonics study 4: Improvisation 1.*

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[114] For the method adopted for Volume 2, see chapter section 7.1.3.
[115] In the studies, a horizontal line helps the performer to comprehend temporal relations of resonances. See Chapter section 7.2.1, and compare with my comments in Volume 1, chapter section 2.3.2.
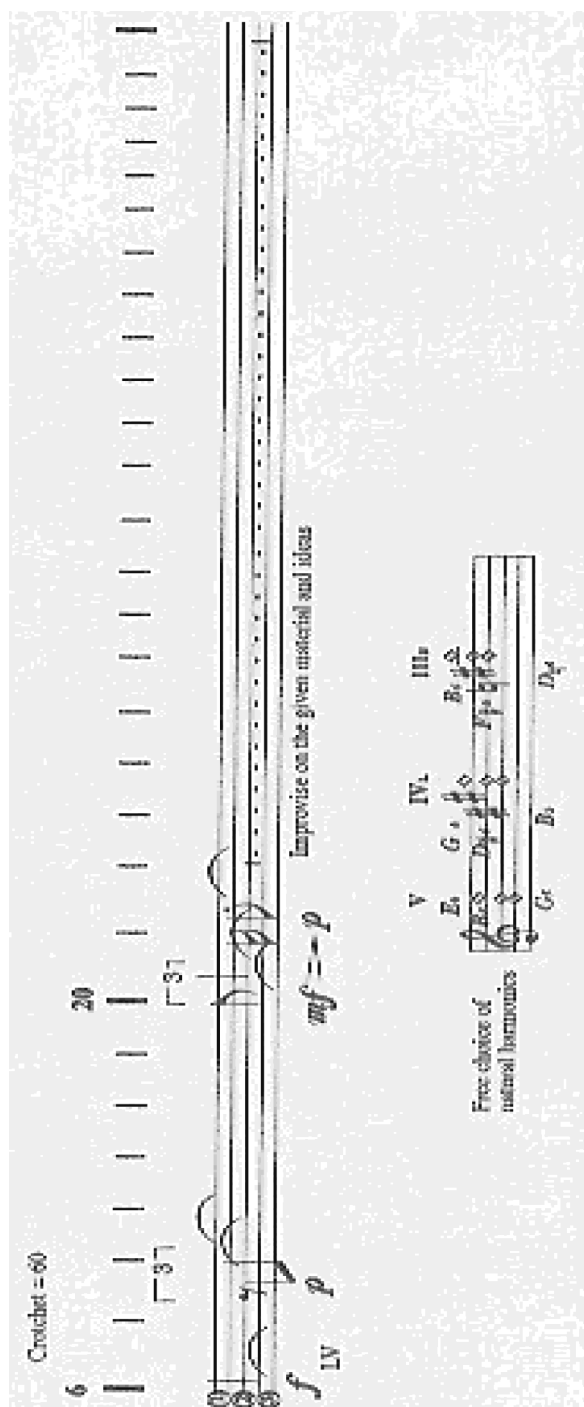
Figure 45: Opening of *Natural harmonics study 4: Improvisation 1* using a more standard notation (similar to Figure 44).

Taking free choice of frets to illustrate further, and to make Figure 45 feasible, string numbers are used instead of a treble clef. This type of notational action is similar to that taken by Riehm in *Toccata Orpheus* (1990) for left hand usage (note how confusing Riehm's score appears). (See Figure 39.) Now stems without noteheads and tails can be used to denote natural harmonics pitches.

However, the performer will need instruction, pertinent to both hands, on the array pitches available; hence the inclusion of a table of pitches. Moreover, we are moving closer to a notation that resembles tablature.

Due to the close relationship between natural and multiphonic harmonics, similar problems occur when dealing with multiphonic harmonics morphologies, which would be intensified by the complexity of pitch information. (See section 7.3.) In Durville's *Mouvement apparent* there is a lack of accurate pitch information. (See Figure 5.) For example, he indicates only one of the resultant simultaneous pitches from multiphonic harmonics morphologies. To expand and systematize the spectral options inherent in this technique, a harmonics chart that has been devised to help guitarists learn the specific spectral detail. Each natural and multiphonic harmonic as well as their locations are given in standard tuning. (See Figure 61 in Volume 2, page 226.)

It is unclear why Durville, a meticulous notator, has avoided a system that would indicate all of the multiphonic harmonics pitches. Indeed, there is no added information about precise multiphonic harmonics pitches even in the performance notes. It is possible that Durville wanted to avoid piling more information on the printed page for arpeggiated configurations that are already difficult to read. A less cluttered tablature-based system would solve such problems, and - I would argue - is more comprehensive and easier to comprehend at the same time. Moreover, being based on spectral content, the approach adopted for learning multiphonic harmonics pitches in this work is more accurate. (See 7.1.3 Locating harmonics, and 7.3 Multiphonic harmonics.)

2.3.3 Compositional structures

Melodic structures in the repertoire may be viewed in relation to the morphological structuring principles developed in this research. Musical contours derived from manipulating consecutive, merged, and combined morphologies allied to shaping phrases formed by using archetypal or variant morphologies. (See Chapter 5.)

When perceiving pitch-based designs, sonic outcome is immediately apparent. However, when the interaction involves noise-biased morphologies, apprehending the contours of pitch content become a subtle experience; the noisier the morphology, the more understated the melodic shape. This sound-

based dichotomy of capturing and maneuvering spectral content in respect to pitch and noise is used as a compositional tool in my studies. Many references to melodic and pedagogical aspects may be found in Chapter's 7 and 8.

To illustrate melodic structures, here are some examples from relevant key repertoire. In *Mouvement apparent* (1988), Durville includes configurations that may be considered as pitch-based extended archetypal structures; the composite resonances from a group of merged harmonics in system 24, for instance. (See Figure 5.)[116]

Oehring is the only composer cited in Figure 40 for Soundhole resonances usage. Although he employs consecutive morphologies in *Foxfire Eins* (1993), there is no exploitation of their resonance value. They function as interrupted archetypal morphologies that are integrated with either bi-tones or mute taps. In contrast, the interrelationships that occur when consecutive and merged resonances from *palm, fist, or thumb,* and *buzz* morphologies are exploited in the studies. (See chapter section 1.7.1, and Volume 2, pages 364 and 366.)

Most noise-biased extended techniques always contain some amount of pitch content. The spectral components can be used to create melodic structures that integrate the archetypal, variant, and deviant models. Various manifestations occur, allowing the guitarist to engage in interpreting melodic shapes embedded in noise-based morphologies. For example, in the opening section of *Mute tapping study 1: Consecutive and merged morphologies,* a mixture of melodic devices are present; including merged and interrupted archetypal morphologies, composite resonances, and phrase shapes derived from the archetypal structure. (See section 7.9.5 for more detail.)

No merged mute taps are cited in Figure 40; only the consecutive usage in *Consonancias y Redobles* (1974) is mentioned. Here Corghi leaves much to the performers discretion. Improvisational aspects include, moveable fret positions, guidance on which strings to choose, horizontal beaming that represents irregular rhythms - ad-lib, phrase or gestural shapes, dynamic levels, and duration of the section. (See Figure 43a.) In performance, the sonic outcome

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[116] Extended archetypal structures also take place in the Volume 2 studies, the *Soundhole resonances (palm, fist or thumb) study,* for instance. (See 7.8.3 Palm, fist, or thumb study for more detail.)

results in the shaping of groups of single or consecutive short variant morphologies. Listen to *Sound examples, track 70,* and *71*.

In Figure 40, Corghi and Riehm combine similar morphologies to fashion melodic shapes. Corghi combines rapid mute and mute taps, while Riehm mixes bi-tone and nut-side morphologies. Taking the opening section of *Toccata Orpheus* (1990) as an example, although Riehm scores sound events on most quaver pulses and the configurations are grouped in threes, the sonic result is a relentless but compelling succession of composite resonances that are interrupted. He builds the soundworld of an extended section around using the left or right hand to intervene in the resultant morphologies from extended techniques. See Figure 29, and listen to *sound example, track 12*. In short, Riehm employs interrupted archetypal morphologies. The first morphology that is left to decay is not presented until the end of page 5 of the score, at approximately 2.40".

To create melodic interest in their pieces, we have seen that Durville uses pitch-based extended archetypal structures, and Oehring interrupted archetypal morphologies with Soundhole resonances that possess a mixture of noise and pitch. When melodic content that is more difficult to discern is considered, Corghi employs consecutive noise-oriented mute taps, and Riehm combines the closely related bi-tone and nut-side morphologies as interrupted archetypal sounds.

Manipulating archetypal structures, using noise-biased consecutive morphologies, and combining related sounds are all compositional approaches that impacted on my work. Corghi's design for the combined rapid mute and bi-tone passage on page 6 of his score is the most melodically significant. Here we find a layering of contrasting types of extended techniques, a key method adopted in the music composed for this dissertation. However, this one section of *Consonancias y Redobles* will last approximately 10" to 15". (See Figure 25, and Chapter 8 for further information.)

2.3.4 Rhythmic strategies

In this section we will look at rhythm and pulse usage in relevant repertoire, and relate to connected aspects. For composers, the emphasis is on creating an efficient means to involve the player with temporal aspects, helping with the

placement of stresses within rhythmic patterns. For an example, J. S. Bach's complex Lute music was written in tablature; the symbols are employed to convey rhythmic activity that runs concurrently and sympathetically with fret indications placed on the tablature lines.[117] This is similar to the rhythmic indication method used in my studies, where the strategies are connected not only standard Western contemporary usage but also traditional tablature.[118]

In order to understand and interpret pertinent scores, ideas around rhythm and pulse need to connect with consecutive, merged, and combined morphologies. Clive Titmuss reminds us: "Careful observance of the way he transposed and reworked earlier material with the lute in mind gives us a clear picture of Bach's understanding of the lute's capacity for a mix of contrapuntal and free-voiced textures, and rhythms" (Titmuss 2009: 5). In other words, Bach used a tablature system to convey conventionally-played consecutive and merged morphological information for the Lute players of his time. Figure 46 shows two extracts from *The Big Bach Lutebook* by Clive Titmuss (Titmuss 2009: 9 and 25). In the Prelude, single lines are predominant - consecutive morphologies, whereas counterpoint is prevalent in the Fuga - merged morphologies.

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[117] See also the design by Fuenllana, Figure 38.
[118] When needed, rhythmic devices employed for the studies are firmly rooted in normal usage, inspired by standard notation and conventional tablature. (See chapter section 7.1.) The first example is *Bi-tone tapping study 2: Improvisation*. (See Volume 2, page 371.)

Figure 46: Two extracts of Bach's Lute tablature.

The types of metrical structures used by Dench, Kampela, Ferneyhough, and Hayden, which are based on standard usage, form the foundation of some of the rhythmic representations used in my studies.[119] (See section 1.5.3.) Stems and beams are aligned to the temporal markings that track along the top horizontal line; compare this to Kampela's rhythmic structures in Figure 17 (page 63), for instance.

To expand understanding, the player considers rhythmic activity in terms of *underlying* or *emphatic pulse;* devices employed by the author to convey rhythmic information.[120] An underlying pulse may be defined as a recurring

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[119] *Rapid mute study 4: Linear and undulated glissandi* is an example. (See Volume 2, page 382.)

[120] Refer to chapter section 1.5.1 for the opening discussion on pulse-based activity.

measurement of time that is present and important but not immediately obvious. A concept that is mainly compliant to composers who use scoring systems that include numerical proportions to convey sonic occurrences. On the other hand, an emphatic pulse is tied to a strict tempo where the composer employs rhythmic indications that leave the performer in no doubt about where to place every sound event. This is more connected to a composer asking the performer to be as exact as possible with timings.

There follows an explanation of how these principles may be applied to existing repertoire.[121] The compositions cited in Figure 40 may be observed in relation to underlying or emphatic pulse, as well as connections to elements of improvisation. Therefore, by examining the works by Corghi, Durville, Lachenmann, Oehring and Riehm, we can acquire greater insight into their compositional style, especially in the area of rhythm.

Durville uses an underlying pulse in *Mouvement apparent* (1988), for instance. His proportionally-notated score is marked in groups of seconds. The performer learns to interpret the music engaging with a temporal awareness, placing the sound events as accurately as possible in the time continuum. See Figure 5, and listen to *sound example, track 2.*

Although *Mouvement apparent* is mostly meticulously scored, the sonic outcome is of an improvisatory nature. There are further similarities to my timeline scores. For example, both utilize seconds to indicate the temporal aspect. Furthermore, we are reminded that use of a timeline with concurrent rhythmic indications is a construct of conventional tablature. In contrast, an emphatic pulse is evident in three of the pieces from Figure 40 - Lachenmann's *Salut für Caudwell* (1977)*,* Oehring's *Foxfire Eins* (1993), and Riehm's *Toccata Orpheus* (1990).[122]

In *Consonancias y Redobles* (1974)*,* Corghi asks potential performers to create their own feeling of pulse, the opportunity to express rhythm freely. For example, he uses textual instructions by suggesting irregular rhythms and speeds of varying velocity, ad-lib. Corghi uses box-type sections, where

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[121] For further explanation of underlying or emphatic pulse in relation to the studies, see Chapter 7.
[122] Note that emphatic pulse is used in my studies as a contrast to nurturing an improvisatory character.

tablature-based notation is used to convey information on extended techniques that relate to elements of freedom.

2.3.5 Signs and symbols

This research shows that there is a lack of standardisation for extended guitar technique symbols usage; inevitably leading to a requirement for guitarists to develop an awareness of the varying use of representations in the repertoire. Composers often employ different symbols to denote the same morphological outcome; the signs are either inspired by existing ones or newly invented.

This work is littered with examples. To illustrate, four composers use three types of noteheads for bi-tones morphologies. As early as 1963 Halffter used a cross-shape in *Codex I* (1963). (See Figure 8.) Whereas in 1993, Oehring employed a cross-shape turned forty-five degrees, an x-shape, in *Foxfire Eins*. (See Figure 26.) However, in 1974 Corghi used a circle with a diagonal line running through in *Consonancias y Redobles,* in contrast Kampela utilized an arrow-shape for his *Percussion Study* in 1995. (See Figures 13 and 17.)

Furthermore, ambiguity also exists when the relatively standard diamond-shaped noteheads are used for natural harmonics. For example, Durville uses this regular shape as part of his method to convey production of the usual pitch-based archetypal morphology. (See Figure 5.) However, we have seen above that Lachenmann employs diamond-shaped noteheads as part of an instruction for playing harmonics and rapid mute morphologies; laying a finger on a string lightly at a fret where there is no harmonic will produce a filtered and muted sound. (See section 2.3.1.)

It is also evident that an abundance of graphic representations exists when tablature-based systems are used in the repertoire. This may be verified by observing the performers notes of the many examples cited in this thesis, Corghi's and Lachenmann's from Figure 40, for example. Figure 47 comprises copies of the 'Signs and symbols' from *Consonancias y Redobles,* and the list of symbols from Bruck's 'General remarks' for *Salut für Caudwell*.

Consonancias y Redobles by Azio Corghi

Simmetria ritmica "ad libitum" costituita da valori eguali
Regular rhythms, "ad lib.", using equal note-values.

Asimmetria ritmica "ad libitum" costituita da valori ineguali.
Irregular rhythms "ad lib.", using different note-values.

"Ad libitum" più o meno veloce.
"Ad lib." more or less fast.

Rapido come acciaccatura.
Fast, like acciaccaturas.

Durata del suono in rapporto alla lunghezza della linea.
Duration of the sound in proportion to the length of the time.

Ripetere a piacere.
Repeat as desired.

L'alterazione vale soltanto per la nota davanti alla quale è posta.
Accidentals are only valid for the notes indicated.

Glissando con la MD sulla stessa corda in senso orizzontale (verso la tast.).
Glissando with the right hand on the same string horizontally towards the fingerboard.

Sfregando la corda in senso orizzontale.
Scratching the string horizontally.

NAIL SIZZLE

RAPID MOTE GLISSANDO

(•) Senza pizzicare.
Without plucking.

∧ Pizzicando liberamente.
Plucking freely.

⌀ Battere col dito.
Striking with the finger.

△ Sfiorando senza suonare.
Stroking without sounding the strings.

◇ Armonico naturale.
Natural harmonic.

□ Armonico ottavato.
Octave (artificial) harmonic.

✕ Sulla cassa.
On the body of the instrument.

a) Sul piano armonico.
On the sounding board

b) Sulla fascia.
On the side.

pont. Ponticello
At the bridge

tast. Tastiera
At the fingerboard

MS Mano sinistra
Left hand

MD Mano destra
Right hand

Con la mano aperta.
With the open hand.

Col pollice della mano sinistra.
With the thumb of the left hand.

Lgato MS.
Left-hand legato

Lasciar vibrare.
Let the sound continue.

Tremolo irregolare.
Irregular tremolo.

Vibrato
Vibrato

Vibrato ampio (ad interv. di 1/4 di tono).
Strong vibrato covering the range of a 1/4 tone.

Gliss. irregolarmente.
Irregular glissando.

Sollevare la corda e farla sbattere sulla tast.
Lift the string and let it rebound against the fingerboard.

Corde incrociate col dito MS (sovrapporre la più bassa) e premute con lo stesso dito all'altezza indicata.
Strings crossed by the LH (the lower string on top) and pressed by the same finger where indicated

Scrap pizz.
Scrape () Drum () Col..

Smorzando col gomito destro.
Damping the strings with the right elbow.

Ambito
In the area shown.

Barrée parziale o totale.
Half and full barrée.

Ribattuto rapido.
Rapid strokes repeated.

La linea verticale che unisce i numeri di due diverse corde, sta ad indicare tutte le corde comprese in tale estensione:
The vertical line between two numbered strings indicates also all the strings between them:

Es. significa:
Ex. *indicates*

① ② ③ ④ ⑤ ⑥

La linea tratteggiata orizzontale che unisce i numeri di due posizioni, indica lo spazio in cui la mano si trova liberamente ad agire:
The dotted line between two positions indicates the area in which the hand can move freely:

Es. [I] - - - - - [XII]
Ex.

(significa che la mano può liberamente spostarsi su qualsiasi posizione compresa fra la I e la XII).
(this indicates that the hand may move freely between the 1st and 12th positions).

Quando non sono indicate le altezze dei suoni, l'esecutore è libero di realizzare il passo su qualsiasi punto della tastiera.
When pitches are not shown, the player may play the passage at any point on the fingerboard.

Per il resto valgono le consuetudini della notazione tradizionale.
Other signs and symbols used are those established by convention.

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Figure 47: Signs and symbols from *Consonancias y Redobles* and *Salut für Caudwell*.

Contemporary composers often ask their performers to learn new symbols. It is inevitable and unavoidable in innovative contemporary guitar music, and plain to comprehend from the argument above. In line with other composers, this will also naturally occur for guitarists interested in performing my studies.

2.4 Summary

In this *Notation in the repertoire* section, key repertoire connected to Figure 40 was used for the purpose of making appropriate morphological comparisons to existing notational possibilities. For example, one issue was centered around how composers use tablature to portray hand movements when instructing the

performer; Lachenmann's utilization of a two-stave system and Bryars use of text, for example. (See sections 1.7.1 and 2.1.) Another point of discussion focused on spectral relationship comparisons in regard to comprehending principles and methods mooted in this research; especially the treatment of pitch and noise in relation to spectral components, and responses to resonances. (See section 2.3.1.) Furthermore, for representations of extended techniques in notation form, tablature can be useful tool for communicating morphological detail as well as elements of improvisation; as shown in the comparison betweens my scores and those by Durville and Corghi.

The processes applied to melodic and rhythmic aspects mentioned above - developing musical models based on the archetype and variations to the archetype, and awareness of temporal qualities - will help musicians to expand their knowledge of existing repertoire. Moreover, engagment with the morphological structuring principles will help bring attention to the morphological types, awareness of sound in relation to pitch- and noise-based morphologies, and the array of rhythmic aspects that influence contemporary guitar playing. For example, use of underlying pulse, emphatic pulse, freely improvised rhythms, and conventional rhythmic indications.

3 Conclusions

The purpose of this volume was to examine contemporary guitar repertoire from a morphological standpoint. This was achieved by surveying composer's usage of extended techniques in relation to the impact on pedagogy, performance, and notation.

The study into significant research revealed that although various aspects of contemporary music have been covered and common ground sometimes occurs, there is much future work to be done. Each book or dissertation has a very different pedagogical focus. To give two examples, Lehner-Wieternik compares composers' notational symbology to technique in *Neue Notationsformen* (1991). In *Kitharologus* (1997) Iznaola provides thorough training in technique, covering many forms of performance pocedures. However, for both books there is no critical overview and review of the literature, where even a short summary could be extremely helpful. It would be useful to have a wider variety of scholarly view, such as the scope found in *The Contemporary Guitar* (1985). Schneider's work is more thorough, encompassing repertoire, extended techniques, and constructional expansions. For example, in the guitar harmonics section he takes us from antiquity to the twentieth century. Moreover, it appears that no books of a similar range have been been written since the mid nineteen-eighties.

Apart from being the only books found to date that fulfil their particular function to a high level, and taking into account the amount of new repertoire to explore into the new millennium, academic examinations on recent notational representations and uncommon techniques would be a useful area of further study into guitar pedagogy. Shende's notation for scordatura 'on the fly' in *Suite in Raag Marva* (2010), movement 1 *Alap*, Edgerton's depiction of a 'sponge' being applied in Variation 5 of *Tempo Mental Rap* (2005), and Hayden's symbol for a 'half-harmonic' in *Axes(s)* (2008-9) may provide an interesting staring point.

Observing composer and performer relationships is important when looking into how key works in the repertoire came into existence. Composers will make their unique creative choices as guitarist-composers or in collaborations with sympathetic guitarists. Although some musicians will work alone, like the guitarist-composer Leo Brouwer (section 1.3.), there is evidence in this survey

to suggest that much of the contemporary repertoire is built on collaborations. For example, Stefan Östersjö has worked together with quite a few composers. (Again, see section 1.3.) Moreover, his observations have manifested as important academic work. (See section 1.2.)

From reading Chapter 1, *Historical links,* it is evident that composers manipulate extended techniques as successive, composite, or superimposed sounds; the inherent possibilities of this soundworld are further developed Volume 2. The repertoire of most interest is found in section 1.7, as it deals with exclusive usage of extended techniques. In section 1.7.1 we note that Brouwer, Corghi, Durville, Olofsson, Oehring, and Ribot use consecutive morphologies. For example, in *Mouvement apparent* (1988) Durville employs an extended passage of fast rapid mute morphologies, and Olofsson has a 20" section of merged and consecutive bi-tones. Also, in section 1.7.2 it is evident that Corghi combines rapid mutes with mute tap morphologies, which have much in common.

In section 1.6 *Improvisatory passages,* the focus was on extended techniques usege for improvisational purposes. For example, it is apparent from my appraisal that rapid mute is the most frequently employed when elements of freedom occur.[123] The vibrant acoustic properties of these noise-oriented short morphologies have captured the imagination of many contemporary musicians. Works by seven composers are listed in this section. However, although quite a few composers include elements of improvisation, insights into this practice are limited, and a much-needed extensive study that centres on the classical guitar appears to be absent.

Special attention was given to the guitar compositions of Bryars, Corghi, Lachenmann, and Riehm. It is these musicians who, in their own way, have solved some of the musical problems inevitably encountered when playing passages comprising only extended techniques. (See sections 1.7.1 and 1.7.2.) The compositional methodologies of these musicians have influenced or affirmed the content of Volume 2. To clarify, my critical reaction to these works has positive and negative aspects, as is evident from the critique in Volime 1,

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[123] Rapid mute is one of the eight extended techniques common to the repertoire and Volume 2 (see page 77), extensively employed for passages where elements of freedom are present. (See section 7.11.7.)

and that both aspects were important for the creative work in Volume 2. Figure 48 comprises the names and titles of the works, extended techniques from a spectral perspective, compositional elements used, and relevant aspects of notation.

Composer and title	Extended techniques usage, and attributes	Compositional elements	Notational aspects
Bryars *The Squirrel on the Ricketty-Racketty Bridge*	Exclusively Bi-tones - percussive attack, decaying spectral activity	Consecutive and merged similar morphologies	Textual instruction only (instructions can be viewed as a form of tablature)
Corghi *Consonancias y Redoubles*	Rapid mute - short spectral activity, and Bi-tones - percussive attack, decaying spectral activity	Consecutive, simultaneously played, merged, and combined contrasting morphologies	Consistant use of tablature
Lachenmann *Salut für Caudwell*	Rapid mute - short spectral activity, and Bottleneck - percussive attack, decaying spectral activity, refacted motion	Merged, and combined contrasting morphologies (in duo)	Consistant use of tablature
Riehm *Toccata Orpheus*	Bi-tones - percussive attack, decaying spectral activity, Soundhole resonances - percussive noise attack, decaying spectral activity, Rapid mute - short spectral activity, Nut-side - percussive attack, decaying spectral activity	Consecutive, merged, combined similar morphologies	Includes some, but not all of the features of tablature (notation can be viewed as quasi tablature)

Figure 48: Productive characteristics of significant works by Bryars, Corghi, Lachenmann, and Riehm.

The Squirrel on the Ricketty-Racketty Bridge (1971) by Gavin Bryars confirmed my notion that producing such music is possible. Listen to *sound example no. 11* (for Bryars) *and 65-68* (for my studies), for example. Although he utilizes consecutive and merged similar bi-tone morphologies throughout, and incorporates improvisational elements, there is a restricted use of dynamic levels. However, the incessant nature of the morphologies form part of the works character. (See sections 1.7.1 and 2.1 for more details.)

In *Consonancias y Redobles* (1974) Corghi employs a considerable amount of performer freedom, and regular use of tablature to convey combinations of extended techniques morphologies. However, his use of graphics is cumbersome, and meaningful textual instruction is somewhat limited. For *Salut für Caudwell* (1977), Lachenmann has a consistent use of tablature for the right hand. The tablature line is utilized to highlight rhythmic actions using graphic symbols rather than fret indications, which occur on the concurrent five-line stave employed for the left hand. In this work, merged and combined morphologies occur in duo, the possibilities for layering similar or contrasting sounds further are not explored. (See sections 2.1, 2.3, and 2.3.1.) To paraphrase Riehm, in *Toccata Orpheus* (1990) the notation is like tablature, designed to specify hand strokes, mostly hammer-on actions. Most of Riehm's soundworld is built on morphological interruption; therefore, resonances possibilities are not explored to the full. (See sections 2.3 and 2.3.1.)

Through concentrating on studying the guitar music of Corghi, Lachenmann, and Riehm, we have gained enough information through understanding and listening to focus on didactic aspects. Moreover, as a result of examining the compositional and performative facets of extended techniques usage in the repertoire, the pedagogical tools needed to comprehend and apprehend guitar morphologies can be discussed.

By manipulating the selected techniques and focusing on practical musical issues, the process of creating a soundworld made up entirely of extended techniques morphologies can now be contemplated. My intention is to challenge traditional modes of analysis by emphasizing the importance of the resulting sound; my method prioritizes the interaction of sounds based on the embodiment of performer actions over using formal models of notation and reading from the classical period. This also requires a change of perspective

from twentieth century formal interpretational ideals, connected to the theoretical, to the notion that performer and score may be equally interlinked.

Changing the perception and notation of this music may be challenging, but from the survey offered here it is clearly not impossible. Indeed, one could argue that extended techniques are all about such fundamental changes, and a never-ending critique of tradition, including contemporary traditions. Some ideas from the surveyed composers can and should be further developed, therefore, and new morphologically based notational solutions can further enhance the perception and execution of this soundworld. This is exactly what I set out to achieve in the more pedagogical second volume. The series of studies consistently respond to the critique contained in this volume, which also sets the limits of Volume 2. It may not offer a final or even definitive solution to all of the issues covered in volume 1, but my hope is that it will succeed in inspiring researchers, performers and composers to search and find more answers of their own.

This brings us to consider some observations on pedagogical and morphological issues further by linking certain areas of historical content and notation. In particular, raising awareness for guitarists and composers on aspects of symbol usage, perceiving melodic content, scoring methodology, and composers' manipulation of extended techniques.

The varying models used in the repertoire for representing similar morphologies impacts on the learning process. For example, notehead ambiguity was discussed in section 2.3.5, showing three differing symbols for bi-tones and two for harmonics morphologies. Moreover, Lachenmann's graphic representation of a bottleneck bears similarity to the symbol used by myself before I came to know the score of *Salut für Caudwell* (1977), which indicates our similar yet independent solutions are based on the same underlying logic. (See section 2.3.2, and Figures 41a and 71.)

In section 2.3.4 the subject of perceiving melodic content afresh was considered, especially the significance of comprehending relevant compositional constructions from the repertoire. For example, supported by the morphological structuring principles developed in this research, and with the intension of provoking further discussion, the relationships within musical contours were examined by showing how pitch and dynamic levels impact on

melodic contours. There is a link to traditional musical paradigms, as melody is explained through pitch contour and harmonic content as a consequence of layering sounds. However, when noise-based morphologies are included, learning to hear a subtle amount of pitch within a contour becomes a pedagogical and perfomative matter. In the Volume 2 studies, for instance, the guitarist is encouraged to engage with the notion of streamed movements of sound, shifting morphologies that create varying degrees of tension.

It is apparent that composers could adopt a more straightforward approach to scoring than is sometimes the case. There are situations, for example, where a single line of instruction rather than two would benefit performer comprehension. To ellucidate, in section 2.3.1 three scores that have ties to my studies formed part of the discussion, Lachenmann's *Salut für Caudwell*, Corghi's *Consonancias y Redobles* (1974)*,* and Riehm's *Toccata Orpheus* (1990). Lachenmann and Riehm use two adjoining staves per line to convey musical information, one standard notation the other tablature; the hands are separated. However, section 2.3.1 also showed that by employing existing fingering conventions all the necessary information could be included in a more concise fashion. This principle is also exhibited in Volume 2, for example, section 7.9.2.

Figure 40 reveals that it is contemporary non guitarist-composers who appear to have experimented with incorporating tablature for extended sections of only extended techniques.[124] By contrast, guitarist-composers tend to employ graphic symbols within a five-line stave system to depict extended techniques morphologies, for example the bi-tones in Brouwer's *La Espiral Eterna* (1971). (See Figure 27.) Why are contemporary composers working in the area of sound-based music are more willing to experiment with alternative notational possibilities than guitarist-composers? This question calls for some speculation (a more thorough research in pursuit of an answer is impossible here). I have two initial thoughts in the matter. First, it is quite possible that the non-guitarists have not gone through the pedagogical rigours of learning to read regular guitar repertoire from stave notation; therefore, they are not so attached to the five-line

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[124] Figure 40 is a chart that brings about better understanding of responsiveness when producing an appropriate soundworld.

stave. Or to put it the other way round: the guitarist-composers are more attached to what they are used to from regular practice.

Secondly, in comparison with piano and string instruments scoring systems, which have long standing traditions, the expected common knowledge among composers of how to score for the guitar is not always evident; they are not only less attached to such notation, they may simply be less familiar with it.[125] Marlon Titre reminds us that there is, 'a general lack of familiarity in the composition world with the classical guitar and its scoring potential' (Titre 1982: i). For composers, writing music for the guitar is a challenging task. They must find a balance between the specific possibilities and limitations that the guitar presents, and simultaneously use it as a means of artistic expression. We have seen that extended techniques morphologies within the boundaries posed in this research provide a context for composers who consider a tablature-based solution. (See sections 1.7.1, 2.1, 2.1, and 2.4.)

Corghi is the only composer who combines two contrasting morphologies in Con*sonancias y Redobles*. (See section 2.3.3.) Although it is quite possible to achieve on one six-string classical guitar, there is no evidence of composers fusing three extended techniques for extended sections. From Figure 2 (page 22-29) we can see that a couple of composers employ short or fleeting passages of contrasting techniques, *Tellur* (1977) by Murail and *Toccata Orpheus* by Riehm. However, when it comes to longer sections, there is a gap in the repertoire for passages of 15 seconds or more. This is difficult to account for, and any thoughts must be pure conjecture. Perhaps the answer is in thinking about compositional strategies from a morphological standpoint; for example, creating and imagining the integration of three techniques, as well as composite resonances that involve contrasting morphologies. My hope is that the contents of this dissertation will provide the means of future expansion in the area of combining contrasting morphologies, especially as the studies in Volume 2 reveal some of the many possibilities of exploring compositional structures that

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[125] In compositions by well-known composers, unplayable or impossible passages sometimes occur. For example, the published version of Rodrigo's *Invocacion y Danza* is an edited version by Pepe Romero (Rodrigo, 1997) full of *ossia* solutions proposed by the editor in the arpeggiated chord section.

can extend beyond 15 seconds.[126] For example, the duration of my Soundhole harmonics, bi-tones, and nut-side combined study is approximately 2'15". (See section 8.2.4.)

Given the quality of the composers who have worked with extended techniques, it is surprising that composer-guitarist collaborations have not led to exploring the many combinatorial possibilities. From the author's perspective, this unfilled space reinforces a central research issue made in the *Introduction* section. In short, that there is a requirement to examine all aspects of guitar morphology, covering performing, teaching and composing. In particular, one way of intensifying the spectral possibilities in contemporary guitar music is to examine contrasting extended techniques and layering morphologies, processes that occur in the studies.

We can learn more about the complexities around performance techniques by observing composers working in sound-based music and recent pedagogical research into instruments other than guitar. For example, by studying consecutive, merged, and superimposed sounds in string music from a morphological perspective, we can take note of how composers achieve successful results. From my assessment below, it is evident that a comparative analysis of extended techniques morphologies between related instruments is needed.

In *Pression for Cello* (1969) the main focus in Lachenmann's score is on depicting actions by bringing the musical ideas into a tangible form through usage of extended techniques. The resulting morphologies from bowing, plucking and hitting the body produce a mixture of single, consecutive, and merged similar morphologies that are mostly noise oriented. However, the occasional bowed harmonic does create a contrasting pitched sound, but these are short-lived. It is in ensemble situations that we find examples of contrasting morphologies from extended techniques. For example, in *no one both* Sdraulig explores interactions between the three players through examining the roles of physicality and perception in human performance, often at the threshold of

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[126] The studies in Volume 2 demonstrate some of this unexploited potential, but they do not explain, of course, why these possibilities have been unexplored to date.

audibility.[127] The sound outcome is predominantly merged noise-biased morphologies. Pitch material is added when the players pass harmonics node points, part of performance note four *Finger pressure* reads: 'When contact does occur it should be at a harmonic pressure' (Sdraulig 2013: 6).[128] Therefore, contrasting morphologies are interwoven into the compositional fabric.

In the dissertation *Cello Map: A Handbook of Cello Technique for Performers and Composers* (2009), Fallowfield endeavours to apply a scientific approach to technique applied to the cello. She tells us: 'In this handbook, new techniques are presented alongside traditional methods and a 'global technique' is defined, within which every possible sound-modifying action is considered as a continuous scale, upon which as yet undiscovered techniques can also be slotted. The 'map' of the title is meant in the scientific sense of the word' (Fallowfield 2009: 3).

Fallowfield makes connections between actions that a cellist makes and sounds that a cello can produce, developing a schema where there are no special effects, rather a range of actions with a clear relationship to sound. However, we find that existing scientific theory is sometimes insufficient to back up these connections, and original empirical research has to be undertaken. Interestingly, Fallowfield explores many cello techniques that are common to the guitar, nut-side, scordatura, muting, bi-tones, snap pizzicato, bottleneck, and multiphonic harmonics, for instance. She also includes two external implements - hammer, and knife. Future research that explores commonality between instruments with an emphasis on extended techniques, and serves performers' interests, can provide a continual path of developmental literature bringing about an important historical line of resource sharing.

As musicians collaborate, and guitarist-composers as well as musicologists explore, new repertoire and research related to the guitar will undoubtedly occur in solo or ensemble settings. Here are some predictions and facts based upon the author's knowledge. The alliance between composer Natasha Barrett and guitarist Stefan Östersjö will hopefully flourish, especially after the success of

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[127] *Pression* and *no one both* also make an appearance in Volume 2 on the subject of tablature-based notation. (See section 4.1.)

[128] *String Quartet No. 1* (1965) by Mauricio Kagel is another example of a string ensemble piece that incorporates contrasting morphologies from extended techniques.

her *Deconstructing Dowland, for guitar and interactive live electronics* (2008-2009). In this work based on *Can she excuse my wrongs?* Barrett uses deconstruction as a process for 'dismantling to create something new'.[129] This refers to Dowland's song, which is in the antique form of a galliard. For a composer, breaking down existing music into smaller components and then rebuilding can be a process to produce something fresh and vital; in this case connecting old to new. Her concern for sensing music through sound and temporal structure connects to my work. Barrett is interested in 'listeners hearing and feeling music', rather than explaining the complexities of techniques.[130]

I eagerly await two books due to be published very soon. An updated edition of *The Contemporary Guitar* by John Schneider, as well as Seth Josel and Ming Tsao's new *The Techniques of Guitar Playing.* Schneider's updated second edition will contain CDs as well has well over one hundred pages of additions, including large sections on so-called Microtonality, which has been the major focus of his recording, performing, and compositional activities for the past three decades. He will be including the symbol and sound of my *Soundhole resonance (buzz)* technique, which he finds 'most sonically interesting'.[131] Josel and Tsao's book is 'expected to be ca. 230 pages long, will feature ca. 300 musical examples and figures and will include an accompanying CD'.[132]

As a guitar teacher, I am always looking for ways of connecting the more able students to contemporary repertoire, and so-called 'percussive guitar' has provided an effective introduction to extended techniques. This style of playing is very popular, and Methods are starting to appear; *Acoustic Artistry: Tapping, Slapping, and Percussion Techniques for Classical and Fingerstyle Guitar* (2011) by Evan Hirschelman, and the new *Percussive Acoustic Guitar* (2014) by Chris Woods, for instance. Declan Zapala is among a new generation of guitarists interested in the further development of extended techniques. He claims to have had a quarter of a million followers on the on the Internet

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[129] See http://www.natashabarrett.org/live_electronics.html
[130] See http://www.natashabarrett.org/about.html
[131] Taken from an email correspondences on 13th June and 30th Oct 2012.
[132] Taken from an email correspondences on 23th March 2014.

(Zapala 2014).[133] As guitarist-composer he uses a classical guitar, and is among a group of musicians inspired by pioneering American singer-songwriter Michael Hedges.[134] This style of playing incorporates sharp string attacks and hitting the strings and guitar body with the hand for percussive effect. In short, a predominance of bi-tone, soundhole resonance, and golpé morphologies. Percussive guitar playing is associated with the popular culture arena; therefore, these extended techniques are of particular interest because they are used innovatively across pop music and contemporary sound-based music.

Zapala's use of extended techniques and technical ability is impressive, and reminiscent of Arthur Kempala's music. However, Zapala's rhythmic activity is simpler in conception. In his *Percussion Studies* (1995-7) Kampela fuses popular and vernacular styles with contemporary textural techniques, deconstructing samba, jazz, and musical theater. He uses extended guitar techniques to create a hybrid genre by employing tapping and golpé techniques to exploit timbre, pitch, texture and complex rhythmic designs where ergonomic considerations take a prominent thematic role. (See section 1.5.3.) Breaking down barriers between musical forms is now glaringly apparent in contemporary guitar music. Many examples and inferences can be found in this volume. For example, Lachenmann's use of a bottleneck in *Salut für Caudwell* (1977) connects to folk art, and rapid mute and sounhole resonance techniques link to Flamenco and Latin styles. (See sections 2.3.1, 1.5.4, and 1.9.1.)[135]

In the music of Zapala, and other younger musicians working in a similar field,[136] perhaps we are seeing the consequences from postmodern trends in music education. In her case study *'From the Western classics to the world: secondary music teachers' changing attitudes in England 1982 and 1998'* (2002) Lucy Green relates to teachers' responses, evaluations, and uses of twentieth and pre-twentieth century Western classical music, folk music,

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[133] Declan Zapala (1985-), *Crystal* 2012 - See http://declanzapala.com/nearly-14-million-views-for-crystal/
[134] Michael Hedges (1953–1997) was an acoustic guitarist and singer-songwriter began to use percussive techniques in the early 1980s.
[135] In the Coda section of Volume 2 there is an example of using harmonics morphologies to introduce a jazz ballad. (See chapter section 9.2.)
[136] Newton Faulkner is of the same generation as Declan Zapala. (See http://www.newtonfaulkner.com.) Other notable percussion-style guitarists are Preston Reed, and Andy McKee. (See http://prestonreed.com and http://www.andymckee.com.)

popular music, jazz and 'world' music. She tells us: "large numbers of teachers indicated cross-stylistic links. Many said that they aimed to bring out universals in their teaching, often referred to as elements, commonalities, concepts, or connections, and they often indicated that they used these across topics" (Green 2002: 23). This broad view of connecting many styles is borne out in my teaching work.[137]

With the broad mix of styles influencing musicians today, educators will inevitably work to a broader agenda, fostering and recognising many modes of educating and training musicians. It is my hope that the emphasis for guitarists will be on preparing with an awareness of the changing role of the musician in various cultures and societies. In creating the Volume 2 music, my intention has been to reflect on the past, enrich the present, and imagine the future.

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[137] Two contrasting examples, a teenager (having regular classical guitar lessons), under her own volition, is learning a well-known 60s popular song from an Internet site, and an older male (now a successful professional after a long period of study and self-reflection) working as a classical guitarist and composer, as well as Rock, Blues, and Gypsy Swing.

Indexes

Index I

Index 1 is a chronological list of notable pedagogical works - treatises, methods, and study resources - from the early 16th century to the mid-20th century.[138]

Vihuela

Luys Milán (c. 1500 – 1561): *Libro de Música de Vihuela de Mano*, intitulado El Maestro, Valencia, 1536.

Four-course Guitar

Miguel de Fuenllana. (c. 1500-1579): *Orphenica Lyra.* Published in Seville, 1554.

Alonso Mudarra (c. 1510-1580): *Tres libros de musica,* Seville, 1546.

Adrien le Roy (c. 1520-1598): *Briefve et facile instruction pour apprendre la tablature, a bien accorder, conduire et disposer la main sur la guiterne*, France 1551, further edition 1578, translated into English 1568, published by James Rowbotham under the title *The breffe and plaine instruction for to learne the tablatuer to conduct and dispose the hand unto the gitterne.*

Robert Ballard (c. 1527-1588) with Adrien le Roy, published five books for four-course guitar, between 1551 and 1555.

Pierre Phalése (c. 1510-c. 1575): *Selectissima... in guiterna ludenda carmina* (Louvain, 1570), a collection containing instructions (in Latin) for amateurs wishing to play the guitar, together with 115 pieces for that instrument.

Paolo Virchi (1551-1610): *Libro de tabolatura de chitarra,* 1574.

Five-course Guitar

Luis de Briceño (dates unknown): *Metodo mui facilissiom para epreender a tañer la guitarra a lo Español*, Paris, 1626.

Juan Carlos Amat (1572-1642): *Guitarra Espanõla de cinco órdenes,* (Spain), 1639. Copied later (1784) by Andrés de Sotos *in Arte para aprender con facilidad y sin maestro . . . la guitarra de cinco órdenes.*

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[138] Note that all lists and indexes are intended as a starting point for further personal research, they are not exhaustive.

Nicolao Doizi de Velasco (c. 1590-c. 1659): *Nuevo modo de cifra para tañer la guitarra,* Naples, c.1640.

Giovanni Ambrosia Colonna (dates unknown): *Intavolatura du Chitarra Spagnola*, 1673.

Gaspar Sanz (1640-1710): *Instrucción de Música sobre la Guitarra Espanõla*. Transcription by Ralf Jarchow. Glinde: Edition Jarchow. Originally published in Zaragoza 1674/5.

Lucas Ruiz de Ribayaz (1626-1667): *Luz y norte musical,* 1677.

Nicola Matteis (c. 1670-c. 1698): *The false consonances of musick or Instruction for the playing of a true Base upon the Guitarre*, London, 1682.

Francesco Guerau (1649-1717/1722): *Poema harmonico,* 1694.

Santiago de Murcia (1673-1739): *Resumen de acompañar la parte con la guitarra,* 1714.

Pablo Nassarre (1654-1730): *Escuela musica,* 1724.

Pablo Minguet y Irol (1700-died after 1775): *Modo de tañer los instrumentos mejores,* 1754.

Michel Corrette (1707-1795)*: Les dons d'apolon: methode pour apprendre facilement* à *jouer de la Guitarre*, Paris, 1763.

Andrés de Sotos (dates unknown): *Arte para aprender con facilidad, y sin maestro, a templar rasgado la Guitarra de cinco órdenes, o cuerdas; y también la de cuatro, o seis órdenes, llamadas Guitarra Española, Bandurria, y Vandola, y también el Tiple*. This book first appeared in Madrid in 1764.

Five and six-course Guitar

Felice Chabran (dates unknown): *Compleat instruction for the Spanish guitar,* London, 1795.

Antonio Abreu and Victor Priet (dates unknown): *Escuela para tocar con perfeccion la guitarra de cinco/seis ordenes,* Salamanca, 1799.

Six-course Guitar

Antonio Ballesteros (dates unknown): *Obra para guitarra de seis órdenes,* (Spain), 1780 (now lost).

A. Lemoine (dates unknown): *Nouvelle Méthode*, Paris, 1790.

F. Chabran (dates unknown): *Complete Instructions for the Spanish Guitar*,
   London, 1795.

Fernando Ferrandière (1771-1816): *Arte de para tocar la guitarra por musica,*
   Madrid: Tecla Editions. Originally published in 1799.

Federico Moretti (1760-1838): *Principios para tocar la guitarra de seis
   órdenes*, (Spain), 1799.

Juan Manuel Garcia Rubio (dates unknown): *Arte de tocar la guitarra Española
   por musica,* Madrid, 1799.

Charles Doisy (date unknown -c.1807)*: Principes généraux de la guitarre* à
   cinq et à *six cordes et de la lyre*, Paris, 1801.

Six-string Guitar

Ferdinando Carulli (1770-1841): *Method*, Paris: Ricordi, 1810.

C. Sola (dates unknown): *Instructions for the Spanish Guitar,* London, 1819.

P. Rosquellas (dates unknown): *A Complete Tutor for the Spanish Guitar,*
   London, 1820.

Alfred Bennett (dates unknown): *Instructions for the Spanish Guitar,* (no date).

Hector Berlioz (1803-69): *A Treatise on Modern Instrumentation and
   Orchestration*, 1858 tr. Mary Cowden Clarke, London (1809-1898).

Dionisio Aguado (1784-1849): *Escuela de Guitarra.* UK: Tecla. Originally
   published in 1825.[139]

George Henry Derwort (dates unknown): *New Method of Learning the Guitar*,
   England, 1825.

James Taylor (dates unknown): *A Course of Preceptive Lessons for the Spanish
   Guitar designed for the assistance of Master and Pupil*, London, 1827.

Dionisio Aguado (1784-1849): *Méthode compléte pour la guitare.* Paris:
   Richault, 1827.

George T. May (dates unknown): *Instructions for the Spanish Guitar*,
   (Dublin), 1830.

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[139] Aguado revised his *Escuela de Guitarra* in 1843, calling it *Nuevo Metodo para Guitarra*.

Ferdinand Pelzer (1801-1861): *Instructions for the Spanish Guitar,* 1830.

François Molino (1775-1847): *Grande méthode complette pour la guitare, Op. 46,* Paris: L'Auteur, 183?.

Johann Kaspar Mertz (1806-1856): *Schule fur die Guitarre,* publ Haslinger, 1846.

Ernest Shand (1868-1924): *Improved Method for the Guitar, op. 100,* (original publisher Barnes and Mullins) 1896, republished by Mel Bay Publications.

Pascual Roch (1860-1921): *Method,* New York: G Schirmer Inc, 1921.

Julio S. Sagreras (1879-1942): *Técnica Superior de Guitarra,* Buenos Aires: Ricordi Americana, 1922.

Emilio Pujol (1886-1980): *La Guitare, Escuela Razonada de la Guitarra,* 1956, Buenos Aires: Edition Orphee. Originally published in 1927.

Frederick Noad (1929-2001): *Solo Guitar Playing.* New York: Schirmer Books. 1968.

Biscaldi, Luigi (b. 1962): *Esecizi Speciali di Virtuosismo per chitarra Volume 1*, 1988, and *Volume 3*, 1991. Italia: Edizioni Bèrben Ancona.

Bogdanovic, Dusan (b. 1955): *Polyrhythmic and Polymetric Studies for Guitar.* Italia: Edizioni Bèrben Ancona. 1991.

Charles Duncan (b. date unknown): *Classical Guitar 2000.* Summy-Birchard Inc.1993.

Nathaniel Gunod. (b. date unknown): *Classical Guitar for Beginners.* CA: Alfred Publishing Co. 1996.

Gilardino, Angelo (b. 1941): *La Grammatica Della Chitarra Volume 3.* Italia: Edizioni Bèrben Ancona. 1999.

Fernandez, Eduardo (b. 1952): *Technique, Mechanism, Learning.* USA: Mel Bay Publications MO. 2001.

Evan Hirschelman (1976): *Acoustic Artistry.* Music Sales. 2011.

Index II

This is a selected list of conventionally played solo works written in standard notation. Composers are listed in alphabetical order of surname, works in chronological order. However, in these works there is little that relates to the music in Volume 2 in terms of use of extended techniques and non-standard notation. (See chapter section 1.9.2.)

ApIvor, Denis (1916-2004): *Variations* 1959, *Discanti* 1970, *Saeta* 1970, *Seranade* 1980, and *Nocturne* 1984.

Arnold, Malcolm Henry (1921-2006): *Fantasy Op. 107* 1971.

Babbit, Milton (1916-2011): *Composition for Guitar* 1980.

Britten, Benjamin (1913-1976): *Nocturnal after John Dowland* 1963

Brouwer, Leo (b. 1939): *Elogio de la Danza* 1964, *Canticum* 1968, *Un Dia de Noviembre* 1968, *Paisaje Cubano con Tristeza* 1996, and *Paisaje Cubano con Fiesta* (2008).

Dirié, Gerardo (b. 1958): *The Weightless Pillow* 1991, and *Il radio feriva il tempo* 1991.

Dodgson, Stephen (b. 1924): *Partita No. 1* 1963, and *Studies* 1965, *Fantasy-Divisions* 1969, *Partita No. 2* 1976, *Legend* 1977, *Merlin* 1978, *Etude-Caprice* 1980, *Partita No. 3* 1981, *Stemma* 1988, *Three Attic Dances* 1989, *Partita No. 4* 1990, and *The Midst of Life* 1994.

Frengel, Mike (b. 1972): *Blaze of Glory* 2008.

Fricker, Peter Racine (1920-1990): *Paseo* 1969.

Goss, Stephen (b. 1964): *Looking Glass Ties* 2000-01.

Harris, Albert (1916-2005): *Homage to Unamuno* 1972.

Haug, Hans (1900-1967): *Alba* 1970.

Henze, Hans Werner (b. 1926): *Drei Tentos* 1958.

Hunt, Oliver (1934-1998): *Garuda, Ballade for Guitar* 1977, *Leviathan, Sonata for guitar* 1979.

Kolb, Barbara (b. 1939): *Three lullabies: Falling, As sleep falls, and In the innocent air* 1980.

Lennon, John Anthony (b. 1950): *Another's Fandango* 1981.

Martin, Frank (1890-1974): *Quatre piéces brèves* 1959.

McCabe, John (b. 1939): *Canto* 1968.

Nørgård, Per (b. 1932): *In Memory Of...* 1978, *Papalagi* 1981, *In The Mood Of Spades Suite No.1* 1985, *Tales from a Hand* 1985-2001, *Early Morn* 1997-98, and *Rondino Amorino* 1999.

Rodney Bennett, Richard (b. 1936): *Impromptus* 1968, and *Sonata* 1983.

Rodrigo, Joaquin (1901-1999): *En los Trigales* 1938, and *Invocación y danza* 1961.

Searle, Humphrey (1915-1982): *Five* 1974.

Smith Brindle, Reginald (1917-2003): *El Polifemo de Oro* 1949.

Stoker, Richard (b. 1938): *Pastoral* 1966, *Improvisation* 1972, *Sonatina* 1974, *Pieces for Polita (6)* 1979, and *Dance Movements* 1984.

Tippett, Michael (1905-1998): *The Blue Guitar* 1982-83.

Villa Lobos, Heitor (1887-1959): *5 Preludes* 1940, *12 Studies* 1929, revised 1948-53, and *Suite Popular Brasileña* 1928, revised 1947-48.

Wills, Arthur (b. 1926): *Moods and Diversions* 1975, and *Sonata* 1975.

Wuorinen, Charles (b. 1938): *Guitar Variations* 1996.

Index III

Index III is made up of solo and ensemble works that involve extended techniques. Composers are listed in alphabetical order.

Six-string classical guitar

Behrend, Siegfried (1933-1991): *Rhythmische Studien Heft* 1975.

Berg, Gunnar (1909-1989): *Fresques* 1976-1978.

Bergman, Erik (1911-2006): *Midnight Op. 83* 1977.

Berio, Luciano (1925–2003): *Sequenza XI* 1988.

Brouwer, Leo (b. 1939): *Tarantos* 1977, and *Elogia de la Danza* 1964.

Carter, Elliot (b. 1908): *Changes* 1983.

Company, Alvaro (b. 1931): Las Seis Cuerdos op. 8 1963.

Dench, Chris (b.1953): *Asymptotic Freedom* 1999.

Dillon, James (b. 1942): *Shrouded Mirrors* 1988.

Emsley, Richard (b. 1951): *For Guitar* 1998.

Epstein, Nomi (b. 1978): *Blueprint* 2006.

Füting, Reiko (b. 1970): *Red Wall* 2006.

Haigh, Howard (b. 1959): *Three Pieces for Guitar* 1987.

Henze, Hans Werner (b. 1926): *Royal Winter Music - First Sonata* 1976, and
  Royal Winter Music - Second Sonata 1983.

Kleynjans, Francis (b. 1951): *A L'aube du dernier jour* 1988.

Kratochwil, Heinz (b. 1951): *Gruselgeschichten* 1988.

Lehmann, Hans Ulrich (b. 1937): Etwas Klang von meiner, Oberfläche 1991.

Lerous, Philippe (b. 1959): *Histoires anciennes* 1987.

Lorentzen, Bent (b. 1953): *Umbra* 1973.

Luque, Francisco (1927-1991): *Cadencia No. 2* 1988, and *Cadencia No. 3.*
  1990.

Maderna, Bruno (1920-1973): *Y Después* 1971.[140]

Maier, Florian (b. 1973) Crystal Vermin 1999.

McGuire, Edward (b. 1948): *Night Song* and *Day Song* 1973.[141]

Nørgård, Per (b. 1932): *Early Morn (from 5 Preludes and a Serenade)* 1988.

Ohana, Maurice (1913-1992): *Si le jour paraît…* 1963.

Pearson, Stephen Funk (b. 1954): *Mummychogs (le monde)* c. 1989, and *Pongue*
  c. 1991.[142]

Polansky, Larry (b. 1954): *Getting Rid of the Glue* 1978, and
  Schneidertood 2005.

Pritchard, Alwynne (b. 1968): *Nostos Ou Topos II* 2000.

Rak, Štěpán (b. 1945): *The Last Disco* 1985, and *Sonata Mongoliana* 1994.

Reynolds, Roger (b. 1934): *The Behavior of Mirrors* 1986.

Sammoutis, Evis (b. 1979): *Alter Ego I* for solo guitar 2002.

Suh, Soonjung (b. 1971): *Garak* 2003.

Thomas, Augusta Read (b. 1964): *Dialogs* 2003.

Verdery, Benjamin (b. 1969): *Some Towns and Cities,* written 1992, published
  1994.

Vescova, Ganesh (b. 1959): *Sei Studi* 2001.

Villa Lobos, Heitor (1887-1959): *Etude no. 2* 1929.

Webb, Orianna (b. 1974): *Mirrored Spaces* 2008.

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[140] Six-string version, originally for ten-string guitar and composed for Narciso Yepes.
[141] This piece has an optional second guitar part.
[142] The Stephen Funk Pearson dates may not be precise. As these pieces are in manuscript, I asked him to confirm composition dates. He responded: "I really don't know the dates I wrote the music" - from email correspondence of 11th July 2011.

10-string classical guitar

Balada, Leonardo (b.1933): *Analogias* 1967.

Barrett, Richard (b.1953): *Colloid* 1988-91.

Dench, Chris (b.1953): *Fundamental Processes* 2008.

Maderna, Bruno (1920-1973): *Y Despues* (Original version was for ten-string guitar) 1971.

Malloy, Chris (b. 1965): *Millions of Mischiefs* 2006.

Reverdy, Michele (b. 1943): *Number One* 1977.

Electric guitar

Frengel, Mike (b. 1972): *Blaze of Glory* 2008.

Harrison, Bryn (b. 1969): *Return* 2005.

Jolas, Betsy (b. 1926): *Episode septième 'night away'* 1984.

Polansky, Larry (b. 1954): *34 Chords* 1995.

Zorn, John (b. 1953): *Book of Heads* 1978.

Guitar (classical and electric) and electroacoustic sounds (tape/computer)

Bolaños, César (b. 1931): *Interpolaciones* 1966 Electric guitar and four track magnetic tape.

Chasalow, Eric (b. 1955): *Scuse Me!* 1998 Electric guitar and computer generated sound.

Davidovsky, Mario (b. 1934): *Synchronisms No. 10* 1992 Guitar and electronic sounds.

Fox, Christopher (b. 1955): *The Grain of Abstraction* 1997-9 Electric guitar and tape.

Lauwers, Kristof (b. date unknown): *Waiters at a Gallop* 2009 Slide guitar and laptop, *Glycyrrhizin* 2004 Guitar (electric or classical) and computer.

Lippe, Cort (b. 1953): *Music for Guitar and Tape* 1991.

Roy, Stéphane (b. 1959): *Mimetismo* 1992 Guitar and electroaoustic sounds.

Michael, Doug (b. date unknown): *Extensions #1* 1996 Electric guitar and tape.

Miyama, Chikashi (b. 1979): *On the Grid* 2008 Guitar and computer.

Olofsson, Kent (b. 1962): *Il Liuto d'Orfeo* 1998-99Guitar and tape.

Pisati, Maurizio (b. 1959): *Poema della Luce* 2002 Guitar and audio track, *OER-OverEndlessResonances* 2007 Guitar, Double bass recorder, and audio video track

Pritchard, Alwynne (b. 1968): *Flutterby* 2009 Electric guitar and 2 computers.

Reich, Steve (b. 1936): *Electric Counterpoint* 1987 Electric guitar or amplified acoustic guitar and tape, amplified guitar soloist and tape, or guitar ensemble (ensemble consists of 12 guitars and 2 electric bass guitars), *Electric Guitar Phase* 2000 Electric guitar and pre-recorded tape.

Sigal, Rodrigo (b. 1971): *Dolor en Mi* 1998 Guitar and tape.

Guitar and live electronics (including electric)

Barrett, Richard (b. 1959): *Transmission* 1996-99 Electric guitar and electronics.

Bartetzki, Andre (b. 1062): *Traces* 2007 Acoustic guitar and live-electronics.

Bürck, Rainer (b. 1953): *Abbys* 2002-2008 Guitar and electronics.

Frengel, Mike (b. 1972): *'And Then, Romina...'* 2000 Prepared electric guitar and fixed electronics, and *Slinky* 2004 Steel string acoustic guitar and electronics.

Gilbert, Peter (b. 1975): *Baptizing the Loop Station* 2008, and *Ricochet* 2002.

Karpen, Richard (b. 1957): *Strand Lines* 2007 Amplified guitar and live computer interaction.

Miyama, Chikashi (b. 1979): *Mutation* 2002 Classical guitar and interactive multimedia system.

Sammoutis, Evis (b. 1979): *Alter Ego IV* 2010 Guitar and for electronics.

Smith, Ronald Bruce (1922-2004): *Five Pieces 1) Echoes*; 2) *Lachrymal*; 3) *Brunete*; 4) *Saudade*; 5) *Stèle* 2007 Guitar and Live Electronics.

Welch, Chapman (b. 1963): *Cyclic Math Shred* 2005 Electric guitar and live-electronics.

Prepared electric guitars

Frengel, Mike (b. 1972) *Ten Strings* 4 1991 Prepared electric guitars.

Guitar duo (including electric)

Brouwer, Leo (b. 1939): *Per suonare à due* 1973.

Dodgson, Stephen (b. 1924): *Studies in Duo* 1986.

Lauwers, Kristof (b. date unknown): *Doskordianistick* 2010.

Polansky, Larry (b. 1954): *Ivtoo, Guitar Canon* 2002 Two guitarists, one guitarist and tape (same player), or any number of guitarists (in combination with tape or not). It may be played on electric or classical guitars, or with care, some mix of the two.

Riehm, Rolf (b. 1937): *KlageTrauerSehnsucht* 1977.

Guitar and voice/instrument duo

Bacio, Ignacio (b. date unknown): *La Lógica de los Sueños* 2010 Voice and guitar.

Ferneyhough, Brian (b. 1943): *Renvoi/Shards* 2008 Quarter-tone guitar and vibraphone.

Gilbert, Peter (b. 1975): *Nenia* 2005 Soprano and guitar.

Nørgård, Per (b. 1932): *Libra* 1973 Tenor and guitar.

Polansky, Larry (b. 1954): *Songs and Toods* 2006 Voice and guitar.

Stoker, Richard (b. 1938): *Four Shakespeare Songs* 1988 Voice and guitar.

Takemitsu, Toru (1930-1996): *Toward the sea; three mvts - The night, Moby Dick, and Cape Cod* 1981 Flute and Guitar.

Tippett, Michael (1905-1998): *Songs for Achilles* 1961 Tenor and guitar.

Ensemble (including electric guitar)

Brouwer, Leo (b. 1939): *Suonare Due* 1978 Guitar, viola, and flute.

Burnell, Paul (b. 1960): *Forty* 1999 Guitars and optional ensemble, *Ember* 2006 Soprano, recorder and guitar, and *Kindle* 2006 Tenor recorder and guitar.

Davidovsky, Mario (b. 1934): *Festino* 1994 Guitar, viola, violoncello, and contrabass.

Dench, Chris (b.1953): *Blood music* 2005 Clarinet in B flat, quarter-tone vibraphone, and seven-string electric guitar.

Epstein, Nomi (b. 1978): *Untitled* 2007 Flute, violin, guitar, piano, and percussion.

Fox, Christopher (b. 1955): *ZONE (Zeit-Ort-Name*) 2002-4 Clarinet, trombone, tuba, accordion, electric guitar, violin, viola, cello, double bass and pre-recorded electronic drones, *Partition* 2004 Three male voices and three electric guitars, *Schwebende Zeit* 2005-6 Clarinet, electric guitar, viola, cello, *At the edge of time* 2007 Bass drum, prepared piano, guitar, and bowed string instrument (all amplified), *Extended play* 2008-9 Flute, clarinet, trombone, piano, percussion, electric guitar, violin, viola, cello, double-bass

Unreasonable Strains 2008-9 Six (or multiples of six) wind instruments and electric guitar with e-bow, and *Something to do with belief* 2008-10 Clarinet, trombone, electric guitar, percussion, cello.

Frengel, Mike (b. 1972): *Monochords* 1998 for four one-string guitars, and *With a sparkle in his eye* 2006 one to three electric guitars.

Gilbert, Peter (b. 1975): *Awake & Shine: Three Hymns of New England* 2005 Guitar and string quartet.

Lauwers, Kristof (b. date unknown): *Processing #1* 1999 Flute, guitar and accordion, and *For 9 Guitars* 2000 Classical guitars.

Manoury, Philippe (b. 1952): *Cruel Spirals* 2007 Solo soprano, string quartet, flute, clarinet, guitar and percussion.

Olofsson, Kent (b. 1962): *Tarpeian Rock* 1996-7 Chamber ensemble and electronics, and *Liuto d'Orfeo* 1998-9 Charango, 6- and 10-string guitars, and tape.

Pearson, Stephen Funk (b. 1954): *Elassomorph* 1994 Four guitars.

Pinto, Paul (b. date unknown): *Shone* 2007 Electric guitar, oscillating fan and three portable radios.

Polansky, Larry (b. 1954): *For Jim, Ben and Lou* 1995 Three pieces for guitar, harp and percussion.

Pritchard, Alwynne (b. 1968): *Geometry of Pain I* 2002 Voice, cello, guitar, and amplification.

Ruders, Poul (b. 1949): *Psalmodies* 1989 Guitar and mixed ensemble.

Saariaho, Kaija (b. 1952): *Adjö* 2008 Voice, flute, and guitar.

Saunders, Rebecca (b. 1967): *Molly's Song* 1995-96 Steel string guitar with ebow and slide, flute, viola, am/fm radio.

Sharp, Elliott (b. 1951): *Saturate* 1993 Guitar, baritone sax, piano, and percussion, and *Syndakit* 1998 12 players.

Concerti

Arnold, Sir Malcolm Henry (1921-2006): *Serenade Op. 50* 1955 Guitar and strings, and *Guitar Concerto Op. 67* 1959.

ApIvor, Denis (1916-2004): *Concertino* 1958 Guitar and orchestra, and *El Silencio Ondulado Op.51* 1972 Guitar and orchestra.

Dirié, Gerardo (b. 1958): *Concerto for Guitar and Orchestra: Subluna* 1997

Olofsson, Kent (b. 1962): *The Garden of Earthly Delights* 1998 Guitar and chamber ensemble, and *Corde* 2006 Guitar and orchestra.

Miscellaneous

Kampela, Arthur (b. 1960): TEXTÓRIAS 1994 Tape (computer-"generated" guitar).