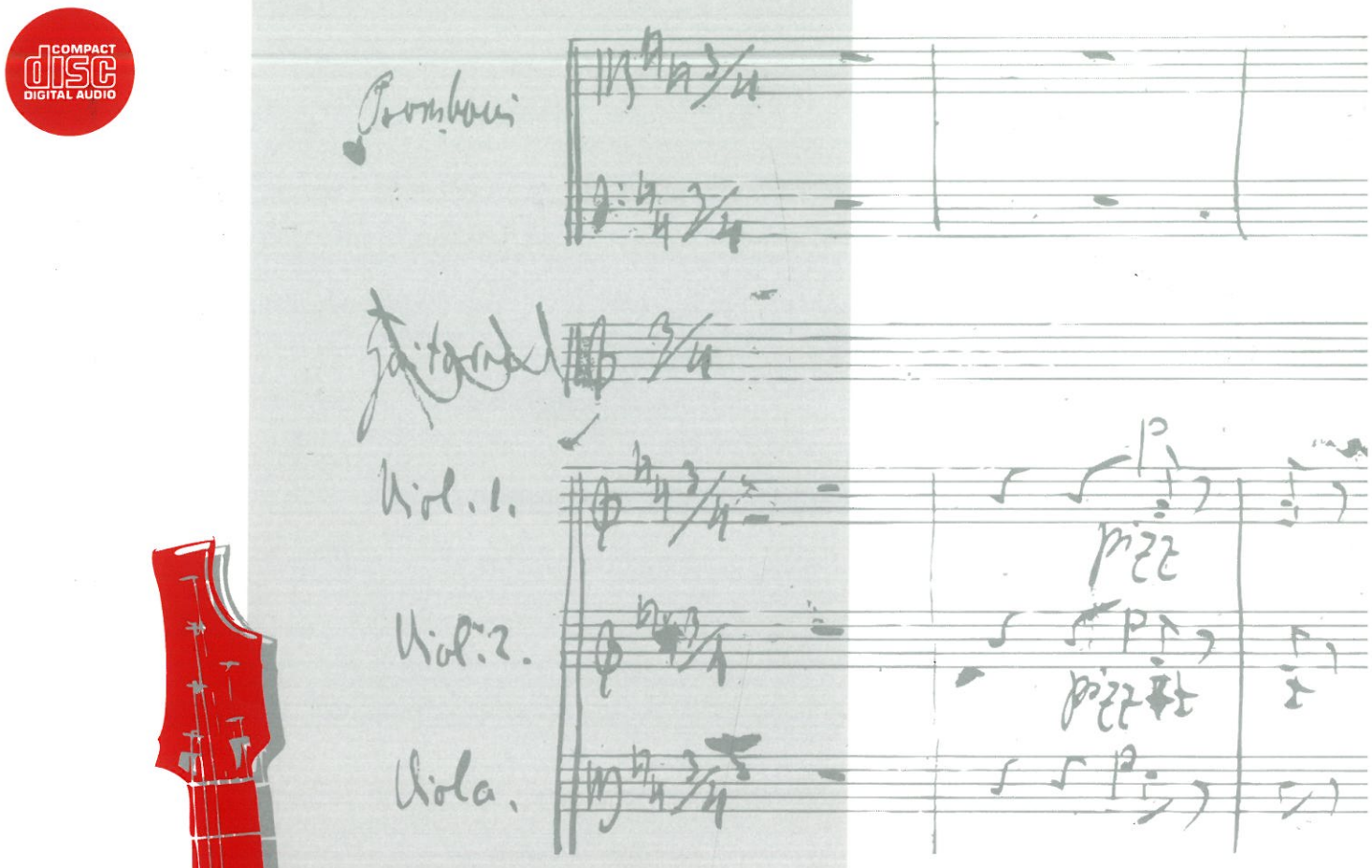


Seth F. Josel
Ming Tsao

The Techniques of Guitar Playing

Bärenreiter

Seth F. Josel
Ming Tsao

The Techniques of Guitar Playing

Seth F. Josel
Ming Tsao

The Techniques of Guitar Playing

Bärenreiter Kassel · Basel · London · New York · Praha

ANADOLU ÜNİ...
Mevlana Kütüphanesi

30370301

MT580
.J69
2014

UNIVERSITY OF GOTHENBURG
ACADEMY OF MUSIC AND DRAMA

Bibliografische Information der Deutschen Nationalbibliothek
Die Deutsche Nationalbibliothek verzeichnet diese Publikation
in der Deutschen Nationalbibliografie;
detaillierte bibliografische Daten sind im Internet
über http://www.dnb.de abrufbar.

© 2014 by Bärenreiter-Verlag Karl Vötterle GmbH & Co. KG, Kassel
Lektorat/Editor: Christiana Nobach
Umschlaggestaltung/Cover: +CHRISTOWZIK SCHEUCH DESIGN, Kassel,
unter Verwendung einer Abbildung einer Gitarre von Gary Southwell (mit freundlicher Genehmigung von Gary Southwell) und eines Ausschnitts aus dem Autograph der 4. Sinfonie op. 120 (Erste Fassung) von Robert Schumann (mit freundlicher Genehmigung des Archivs der Gesellschaft der Musikfreunde Wien)/
using a photograph of an "A-Series" model guitar by Gary Southwell (Photo courtesy of Gary Southwell) and an excerpt of the "4. Sinfonie op. 120 (Erste Fassung)" autograph score by Robert Schumann (with kind permission from the Archiv der Gesellschaft der Musikfreunde Wien)
Innengestaltung und Satz/Layout and Typesetting: Jutta Weis, Pulheim
CD-Aufnahme/CD-Recording: Recorded at Element Studio, Göteborg on 9 March 2014. Engineer: Linus Andersson
Korrektur/Proofreading: Kate Levine
Druck und Bindung/Printing and Binding:
Bräuning & Rudert OHG, Espenau
Alle Rechte vorbehalten/All rights reserved/Printed in Germany
Vervielfältigungen jeglicher Art sind gesetzlich verboten.
Any unauthorized reproduction is prohibited by law.
ISBN 978-3-7618-2243-2
www.baerenreiter.com

Contents

5 Appendices

Foreword

The "Techniques of Guitar Playing" by Seth F. Josel and Ming Tsao is a new instruction manual for guitarists wishing to improve their mastery of the variety of expressive means used in contemporary music and also for composers wanting to write for the guitar. The book is the result of a working project in artistic development with the title "The Guitar as a Vehicle for New Music Performance Practice" financed by the Faculty of Fine, Applied and Performing Arts at the University of Gothenburg.

This book is a fine illustration of the mission of the Academy of Music and Drama itself, balancing as it does in the borderlands between education and research. With courses at the basic level running parallel to advanced studies, development projects and research in several disciplines, the Academy offers a wealth of possibilities for motivating as well as inspiring the creation and practice of new art.

Seth F. Josel is an eminent guitarist with engagements in many countries and with contemporary music as his hallmark. He has given first performances of more than one hundred works and collaborated with many composers. One of them is Ming Tsao, professor of composition at the Academy of Music and Drama and active as a composer in Europe and the United States. Their close collaboration has resulted in several new works for the guitar and now also in this instruction manual for the guitar.

As the Principal of the Academy of Music and Drama, my hope is that this new book will be distributed far and wide. It is an honor to contribute to a project resting on such fine foundations, a book that will indubitably give a great deal of joy to the guitarists and composers of our day.

Gothenburg, June 2013

Staffan Rydén
Principal
Academy of Music and Drama
University of Gothenburg

Preface

Instrumento admirable, tan sobrio como rico, que áspera o dulcemente se adueña del espíritu, y en el que andando el tiempo se concentran los valores esenciales de nobles instrumentos caducados cuya herencia recoge sin pérdida de su propio carácter, de aquel que debe al pueblo por su origen.

This admirable instrument, both sober and sumptuous, seizes the soul sometimes roughly yet sometimes sweetly, having absorbed the essential values of noble bygone instruments whose heritage takes shelter—with no loss of individual character—in the people itself. How can one deny that the guitar, among all plucked-fretted stringed instruments, is the richest and most complete in its harmonic and polyphonic possibilities?

Manuel De Falla, preface to Emilio Pujol's "Escuela Razonada de la Guitarra" (translation Christopher Williams)

The earliest known music for the six-stringed instrument now commonly referred to as the classical guitar was composed in the mid- to late eighteenth century. Guitar music from this period survives in method books such as Federico Moretti's *Principj per la chitarra*, written in 1792.

In the nineteenth century guitarists and composers passionately explored the instrument's nearly boundless potential. Dionisio Aguado dedicates a whole chapter in his *Nuevo método para guitarra* (1837) to the "richness of the guitar" in which he explores the multitudinous timbral possibilities of the instrument: natural and artificial harmonics, vibrato to extend the duration of notes, sounds produced with the left hand only, muffled sounds, sounds imitating an ensemble of violin, viola, and bass (i.e., three-part writing), differences in timbre between different strings and playing with or without fingernails, and even sounds analogous to little bells.[1] Aguado indicates further how "with some degree of propriety the guitar can mimic certain instruments," and proceeds to describe how to approximate the sound of a drum, a trumpet, or a harp.[2] Similarly, in his edition of the guitar method book by Fernando Sor published some years later, Napoléon Coste (1805–83), describes how the guitarist can imitate a horn, a trumpet, an oboe, or a harp.[3]

One of the great innovative orchestrators of the nineteenth century, who in many ways revolutionized the orchestra, was Hector Berlioz, a guitarist. Berlioz included the guitar in such compositions as *Huit Scènes de Faust*, *Benvenuto Cellini*, *Beatrice et Benedict*, and *Roméo et Juliet*. His contemporary Robert Schumann was sufficiently impressed with the guitar that he intended to use it in the "Romanze" of his fourth symphony (1841 version).[4]

The history of twentieth century literature for the classical guitar is as rich as it is diverse. Since the 1920s, the guitar has served an array of very different artistic purposes: composers have employed it (a) to contribute to a particular *Klangfarbe* as in Anton Webern's op. 10; (b) to evoke a folk atmosphere as in Arnold Schönberg's *Serenade*, the "Nachtmusik II" of Gustav Mahler's *7. Sinfonie*,

1 Aguado, *Nuevo método para guitarra*, 42 ff.

2 ibid, 48.

3 Sor, *Méthode pour la guitare*, 14–16.

4 Manuscript facsimile courtesy of the Gesellschaft der Musikfreunde in Wien.

or the *Bühnenmusik* of Alban Berg's *Wozzeck*; (c) to explore the instrument's sound spectrum as in Manuel De Falla's *Homenaje pour le Tombeau de Claude Debussy* and Heitor Villa-Lobos's *Douze Etudes*; and (d) to provide a platform for experimentation (particularly with regard to various tunings) as in early works by Harry Partch and Percy Grainger.

The guitar continues to feature in contemporary works, taking a range of roles in a variety of settings: (a) it produces the very precise "plucked string" timbre integral to the serial or serial-influenced compositions of Pierre Boulez (*Le Marteau sans Maître*), Karlheinz Stockhausen (*Gruppen*), Henri Pousseur (*L'ibericare*), Karel Goeyvaerts (*Nr. 6*) and Milton Babbitt (*Sheer Pluck*); (b) it performs as an equal contributor to the polyphony of the ensemble in works by Elliott Carter (*Syringa*) and Jean Barraqué (*Concerto*); (c) it becomes an instrument of "political protest" in combination with texts by Miguel Barnet and Christopher Caudwell in music by Hans Werner Henze (*El Cimarrón*) and Helmut Lachenmann (*Salut für Caudwell*) respectively; and (d) it generates spectral phenomena specific to the plucked strings of the guitar in works by Tristan Murail (*Tellur*) and Horatio Radulescu (*Subconscious Wave*). The solo guitar in recent years has also become a medium for virtuosic and "polyphonic" works such as Alvaro Company's *Las Seis Cuerdas*, Luciano Berio's *Sequenza XI*, Brian Ferneyhough's *Kurze Schatten II*, Elliott Carter's *Changes*, James Dillon's *Shrouded Mirrors*, Klaus K. Hübler's *Reißwerck* and the many guitar compositions of Maurizio Pisati. Other contemporary composers, among them Rolf Riehm (*Toccata Orpheus*), Helmut Oehring (*Foxfire Eins*), Josh Levine (*Downstream*), and Richard Barrett (*Colloid*) have used the guitar to create a unique and sometimes rarified sound world through the use of extended techniques or the use of elaborate guitar preparations.

The Techniques of Guitar Playing is aimed at musicians, composers, and others involved in creating contemporary art music particularly for the guitar. A thorough, in-depth guide to guitar techniques is long overdue, given the expanding use of the instrument in contemporary classical music. Several factors have contributed to this trend. Small chamber ensembles have become a predominate force in contemporary music, especially in Europe and America, while a number of guitar virtuosos have dedicated themselves to developing the instrument in this context as well as in solo settings. In addition, guitar studies have emerged increasingly as an academic discipline, which in turn has generated greater interest in current guitar literature.

However, writing for and playing the guitar both present special challenges, especially in the context of contemporary music. Established composers as varied as Luciano Berio, Pierre Boulez, Elliott Carter, and Mauricio Kagel have successfully realized major works for or with the instrument largely because they relied on close, painstaking collaborations with particular guitarists. Moreover, even for composers who themselves play the guitar, writing for it often remains problematic. The composer must contend with how to blend and balance the guitar's unique timbre and dynamic qualities with other instruments. They must be aware of the rich variety of sounds that the guitar itself can produce, even from a single plucked string. No less importantly, they must be able to notate an array of such techniques so that the performer can properly interpret them.

Music students and faculty in both Europe and the America have repeatedly asked for an up-to-date book explaining contemporary guitar performance practice. Similarly, young composers throughout the world have requested more information about writing for the guitar but have no access to the necessary repertoire or expertise. Indeed, only three books on extended performance technique for modern classical guitar have appeared to date: Patrizia Rebizzi and Ruggero Tajè's *La Chitarra nella Musica de '900 (tecniche e semiografia nella musica contemporanea)*, published in 1987, John Schneider's *The Contemporary Guitar*, published in 1985, and Jean-Luc Mas' *Sonorités Nouvelles*, published

in 1984. Even in major metropolitan areas, very few guitarists possess the requisite knowledge and experience to successfully address contemporary guitar literature.

There is thus a pressing need for a solid reference book that will facilitate an understanding not only of more extended guitar techniques but also of orchestrating new sounds with the guitar as well as contemporary guitar notations—that is, how best to integrate the guitar into different musical settings, and how, visually, to convey new musical ideas and techniques to guitarists. Through detailed, comprehensive documentation (both graphic and acoustic), *The Techniques of Guitar Playing* will help aspiring composers to expand the literature and performers to better interpret it. The accompanying CD will hope to sonically illuminate many of the timbres and textures discussed throughout. In each of the examples from the literature cited, if the tempo indication is not in the example itself, then we have provided it for the reader below in order to fully appreciate the musical context in which a given technique is executed.

This book addresses as many paths as possible that have been traversed by the contemporary guitar in order to give the reader a sense of the guitar's rich recent history and unlimited future possibilities. Rather than cataloguing techniques for the guitar, our book presents these techniques within the stylistic, aesthetic, and historical contexts from which they are inseparable. We give equal importance to guitar acoustics, literature, history, orchestration and playing techniques. Originally, we intended to also include the electric guitar because of its ever-increasing use in contemporary music. However, the vastness of the electric guitar's sound palette in combination with sophisticated analog and digital technologies, requires that this subject be dealt with in a separate volume.

The Techniques of Guitar Playing aspires to be user friendly, incorporating clear fingering charts, harmonic charts, bi-tone charts, etc., as well as best defining the musical context for each example from the literature cited. Furthermore, over the years, as performer and composer, we have been in a unique position to practically experience what does and does not work with the guitar in a multitude of contexts. Throughout the book, we occasionally offer suggestions both in terms of practical notation of techniques and their orchestration. These suggestions are not meant to delimit the guitar's potential but rather to serve as a springboard for further imaginative speculation with the instrument by young composers and musicians. Indeed, we hope that this book will motivate, inspire, and provoke composers and performers to further explore, experiment and create new works for the classical guitar.

Acknowledgments

This book owes its existence to many associates, colleagues, and friends. Dr. Michael Töpel and Dr. Christiana Nobach of Bärenreiter Press have supported the project from its outset. Staffan Rydén and Anders Carlsson at the Academy of Music and Drama, University of Gothenburg, helped us to obtain the Artistic Research and Development Grant necessary to carry the work forward to publication. Jean-Baptiste Joly arranged a stay at the Akademie Schloß Solitude where Seth Josel was able to complete a significant portion of the research for the first and third chapters. Guitarists Magnus Andersson, Elena Casoli, Eliot Fisk, Daniel Göritz, Maurizio Grandinetti, Geoffrey Morris, Stefan Östersjö, Helenus de Rijke, Jürgen Ruck, John Schneider, and Alan Thomas, as well as composers Richard Barrett and Maurizio Pisati, all offered important insights into the instrument and its use, while guitar historians Gary Boye, Julio Gimeno, Monica Hall, Richard Long, Matanya Ophee, Kenneth Sparr and Stanley Yates contributed crucial information about the instrument's history. We would like to extend special thanks to guitarist Alexander Dunn and guitar historian Luis Briso de Montiano, both of whom offered unstinting support and assistance at many different stages in the book's research phase. Elmar Juchem, executive director of the Kurt Weill Foundation, kindly assisted with questions regarding the contra-guitar and supplied us with important materials. Barry Ould from Bardic Music provided us with unpublished sketches and materials by Percy Grainger. We would like to thank luthiers Gary Southwell and Christian Koehn for their invaluable answers to our many queries regarding the guitar's construction and acoustics. Marc Sabat proved indispensible in the recording and analysis of the multiphonics featured in Chapter 2 and produced the spectrograms in Appendix A. Rama Gottfried helped develop the bi-tone chart in Chapter 3 and produced the formula that appears in Appendix A. Eliot Fisk, Heather Frasch, Lucia Mense, and Christopher Williams generously assisted with various translations. We are likewise grateful to Sebastian Zidak, Dieter Spies, and Danilo Aurello for their graphics and engraving of musical figures. Mark Parker tirelessly helped to prepare the high-resolution scans; Trevor Babb also provided assistance in securing materials from the Yale University music library. Thanks must also be extended to Luisa Greenfield, Stuart Fisher, Eli Friedmann and Gary Southwell for providing us with photographs for use in the manuscript. Several archives and libraries kindly opened their doors to us, amongst them Biblioteca Nazionale Centrale di Firenze, The Royal Library Copenhagen, The Music and Theatre Library of Sweden, Die Bayerische Staatsbibliothek, Die Gesellschaft der Musikfreunde in Wien, and Gilmore Music Library at Yale University. Behind the scenes at these institutions we received expert guidance from various librarians, in particular Emily Ferrigno in New Haven, Marina Demina in Stockholm, and Francesca Gallori in Florence.

Finally, we are indebted to Geoffrey Morris, Martin Iddon, and Richard Barrett for providing valuable critical commentary on final drafts of the manuscript, and to Kate Levine for her generous assistance in editing and proofreading the final draft.

1

Guitar Basics

1.1 Essential components of the guitar

The classical guitar is comprised of a soundbox, soundboard, fretboard, neck, and six strings. Traditionally, when playing the guitar, the right hand (RH) plucks and strums the strings and the left hand (LH) stops the strings on the fretboard. Figure 1.1 illustrates the basic components of the modern classical guitar.

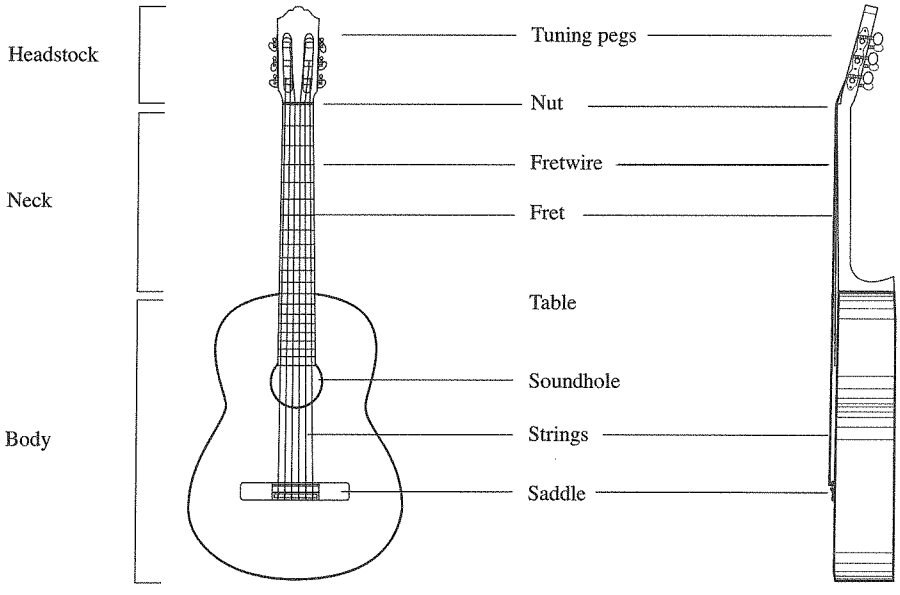


Figure 1.1. Front and side views of the guitar

1.1.1 Strings

Since the 1940s classical guitar strings have been made primarily of nylon, although today the three treble strings may be made of carbon fiber or composite materials.[5] The three bass strings each consist of a core of nylon filaments with either silver or bronze thread wound around it.[6]

5 Rifat Esenbel and Mario Parodi produced the first nylon strings in 1938, but such strings only became available commercially in the 1940s as a result of a collaboration between the luthier Albert Augustine and Andrés Segovia, aided by the DuPont Company. Nylon quickly replaced the gut (mostly made from the dried and twisted intestines of sheep) that had been used prior. Although gut strings were pleasing for their warmth of tone, they were inherently unreliable, for they had trouble holding pitch. Over time, they also became dry and brittle and therefore had a tendency to break easily. With its improved strength and surface texture, the new nylon material appealed to Segovia greatly and soon became the industry standard. McCreadie, *Classical Guitar Companion*, 63.

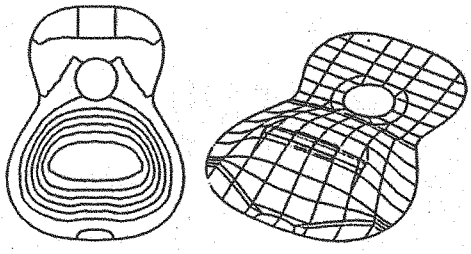
6 The bass strings can be round wound or flat wound. Round-wound strings have a "brighter" tone than flat-wound strings.

The three treble strings are made either with clear or rectified nylon. Clear nylon strings sound brighter in tone whereas rectified nylon strings sound slightly duller. However, rectified strings are slightly coarser in texture thus providing a guitarist with more resistance and consequently a more stable LH grip. Both bass and treble strings are also produced in different tensions, from very light to very high. Vibrating length, mass, and pitch ultimately determine string tension *on* the guitar, but the component materials, construct, and gauge of the string define the string's inherent tensile qualities. Higher tension strings are usually stiffer and thicker and require more finger strength to produce sound. However, a string made of denser material than nylon, such as fluorocarbon, may be as thin or thinner than a nylon string and yet possess equal or higher tension. Similarly, bass strings of the same diameter but with a different ratio of core to wrap could have two different tensions, even when tuned to the same pitch.

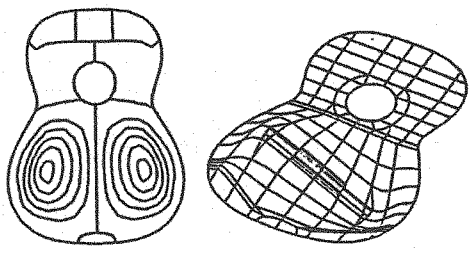
With their greater density, the wound strings have greater sustain and amplitude; however, because of their metal binding, they also produce noise when plucked with the fingernail. The three nylon strings have less sustain and amplitude but also less noise when plucked. Generally, the sustain of a note plucked at a moderate dynamic level on any of the lower three strings lasts twice as long as a note similarly plucked on any of the upper three.

1.1.2 Soundboard

For the strings to resonate at an audible level, their vibrations must be amplified through a *soundboard*, a sheet of wood over which the strings are attached, and which vibrates sympathetically with them. The soundboard, as a surface, vibrates in a number of simple and complex modes simultaneously. The soundboard is thus responsible to a great extent for the instrument's tone and volume. Figure 1.2 depicts the first six ways in which the soundboard resonates.[7]

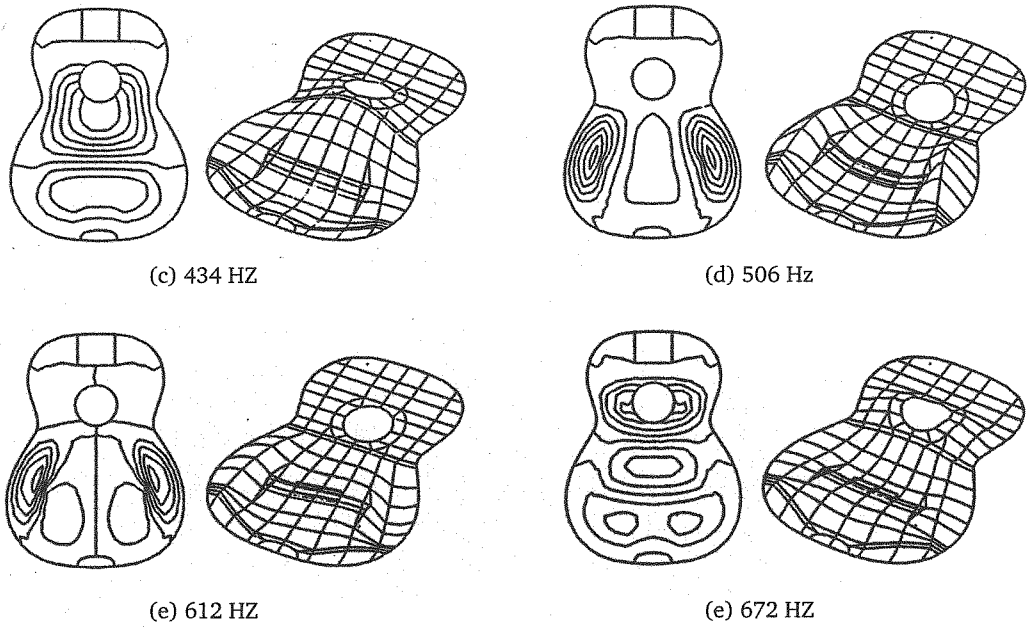


(a) 168 HZ (Fundamental Mode)



(b) 244 HZ

7 "Resonant guitar modes create large vibrations and hence radiate sound efficiently. These modes have a direct effect on the acoustic spectral response. Most guitars tend to have three body resonances in the 100–200 Hz region, due to top/back coupling and the Helmholtz mode by virtue of the soundhole. The fundamental mode (as illustrated in Figure 1.2) usually radiates the greatest sound intensity, and the wavefronts radiate outwards in a roughly spherical manner. The dipole radiates a volume with two large, diametrically opposing lobes. The radiation is less efficient at higher frequencies, and consequently higher frequency modes do not show as strong resonances, although they contribute to the instrumental timbre." Traube, "Timbre of the Classical Guitar," 18–19.



(c) 434 HZ (d) 506 Hz

(e) 612 HZ (e) 672 HZ

Figure 1.2. The soundboard vibrating at some of its resonant frequencies[8]

The outer contours of the soundboard form a figure eight. Its convex curves are called *bouts*. The neck connects to the smaller upper bout, while the bridge attaches to the broader lower bout below. The concavity between the two bouts makes the guitar easy to rest on one's knee.

Generally, the soundboard's *tonewood* is considered the primary defining characteristic of a guitar. For this crucial component, makers of classical guitars employ wood mainly from two genera of trees, spruce or cedar. Of the many species of spruce, the most commonly used by luthiers are the European spruce and the Engelman spruce. These tonewoods tend to be "bright" and "punchy," have a long sustain in the treble strings, and possess excellent tonal differentiation. Of the cedars, Western redcedar is the most popular and is known for its warmth and "mellow" character. The overtones of cedar guitars may tend to be somewhat "murkier" than that of their spruce counterparts.

1.1.3 Soundbox

The top (soundboard), sides, and back of the guitar form a hollow, resonant chamber, which is referred to as the *soundbox*. The resonance depends upon the fluctuation of air at the *soundhole* driven by the air's vibration inside the box. The guitar thus acts almost like a Helmholtz resonator, a device that functions much as an empty bottle does when one blows across the top of it.[9]

Every soundbox has its resonant frequency set at roughly 90–120 hertz, approximately a perfect

8 Brooke, "Numerical Simulation of Guitar Radiation," 28. Adapted from B.E. Richardson, G.P. Walker, and M. Brooke, "Synthesis of guitar tones from fundamental parameters relating to construction," *Proceedings of the Institute of Acoustics*, 12 (1990): 757–764.

9 The classic Helmholtz resonator is a hollow, spherical container with an open hole at the top of the neck or *port* through which gas (usually air) flows in or out. Hermann Von Helmholtz developed the device in the 1850s for his investigations into acoustics. Any vessel with a comparable structure can function similarly. (See 5.1, for a detailed description of the process.)

fifth below the initial resonance of the soundboard. The fundamental frequency has a strong bearing on the character of the guitar. The higher the instrument's fundamental frequency is, the stronger the higher frequencies that emerge in its harmonic spectrum, thus giving it a "brighter" sound. Conversely, the lower its fundamental frequency, the stronger the lower frequencies are that emerge. This imbues the instrument with a "warmer" sound.

In the past, the sides and back of the highest quality guitars were made of Brazilian rosewood. However, due to deforestation and the resulting scarcity of Brazilian rosewood, East Indian rosewood is now more commonly used. It is important to note that, because of its particular material and size, each part of the guitar—soundbox, fretboard, neck—has its own frequency that contributes to the overall resonant frequency of the instrument.

1.1.4 Fretboard

The *fretboard* or *fingerboard*, as it is sometimes called, is a strip of wood that is laminated to the front of the instrument's neck. With rare exceptions, the fretboard is made of ebony (sourced from a variety of species), and the neck is made from either mahogany or Spanish cedar. The strings run above the fretboard between the bridge and the tuning pegs on the headstock. When one presses the string to the fretboard the extent of vibrating string diminishes, causing a change in pitch. This action is referred to as "stopping" the strings. The frets on the guitar consist of raised strips of robust metal, fixed perpendicular to the strings.[10] In theory, frets enable a musician to stop the string consistently in the same place, hence allowing for an acceptable standard of intonation. A fretted surface combined with finger pressure, as opposed to finger pressure alone, also enhances the resonance of stopped notes. Since pitch frequency ascends in a logarithmic manner, the distance between two adjacent frets decreases as one moves up the fretboard toward the soundhole. For example, the distance between the second and third frets is approximately 32.5 mm, whereas the distance between the fourteenth and fifteenth frets, one octave higher, is approximately half that distance. A typical classical guitar fretboard extends to an eighteenth fret for strings 6 through 2, and to a nineteenth fret for the highest E string.[11] Thus, the interval span on a single string is an octave plus a minor sixth, and potentially an octave plus a major sixth on the high E string. Since the late twentieth century, the luthiers Renato Barone, Gregory Byers, Thomas Humphrey, Fritz Mueller, Antoine Pappalardo and Gary Southwell, among others, have been designing guitars that feature elevated fretboards.[12] Inspired by the form of bowed stringed instruments, the chief advantages of this design are that it facilitates LH play on the upper frets and improves resonance in the uppermost range of the instrument.

The guitar's *action*—that is, the vertical distance between the strings and fretboard—can determine how easy or difficult it is to sound notes when the fingers apply pressure. Generally, a low action is considered more playable but carries with it the danger that a fret will impede the vibrating string, causing unwanted buzzing. This phenomenon is known as fret buzz.[13]

Plucked notes that are in a harmonic relationship with the resonant frequency of the guitar will have greater sustain and amplitude. When the resonant frequency of a plucked note and that

10 Frets may consist of nickel (18% nickel-silver), soft nickel, brass, stainless steel, or EVO copper alloy (nickel free).

11 Currently, several luthiers often include an extra fret for the high E string so that a high *C* can be obtained.

12 An earlier rendition of the raised fretboard by the luthier Johann Georg Stauffer (1778–1853) provided easier access to positions beyond the twelfth fret.

13 Fret buzz may also arise from excessive fret wear or from warping of the neck due to extreme weather conditions.

of the guitar body interfere with each other in such a way that noticeably modulates the note's volume, either a *wolf tone* or *dead tone* arises.[14] Wolf and dead tones are, respectively, a result of constructive and destructive waveform interference, such that wolf tones sound amplified and dead tones lack resonance and sustain. Where the wolf and dead tones occur on a fretboard is linked to the fundamental frequency of a guitar and can be altered by a luthier through adjustments to the mass of that particular instrument.

1.2 How a guitar tone is produced

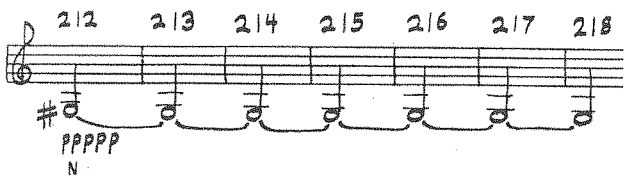
The vibration of the plucked string is transmitted to the soundboard via the *bridge*, the structure to which the strings attach. On the interior of the soundboard is a system of *struts* that at once supports the bridge and counters the tension on it created by the strings, yet also oscillates with the soundboard's vibrations as the strings are plucked. How—and how well—the struts respond to the vibrations will strongly affect an instrument's sound. The back, because it rests against the performer's body, plays a less important role acoustically, as do the sides of the guitar, which do not radiate much sound.

From the moment a note sounds, it rises very quickly to its peak amplitude, after which the amplitude more gradually declines. The first, highly transient phase of the waveform is referred to as the *attack*, while the subsequent, comparatively steady state is called the *decay*. Although the rates of both attack and decay help to distinguish an instrument's typical acoustics, the attack contributes more to a sound's expressive nature. On the guitar, the angle at which a string is depressed as well as the point of attack play important roles in determining a note's amplitude and timbre.

A longer decay means a greater sustain. The sustain of a plucked note can be enhanced through sympathetic vibrations on another string, as these will increase the note's resonance. One way to induce a string to vibrate sympathetically with a plucked note is to silently double the note an octave below.

Wound strings have greater sustain than non-wound strings. Depending on how and where the string is fingered, a wound string can sustain for approximately ten seconds and a non-wound string for approximately five seconds. Typically, because of their more pronounced harmonic spectrum, wound strings sound richer and more resonant than bare nylon strings.

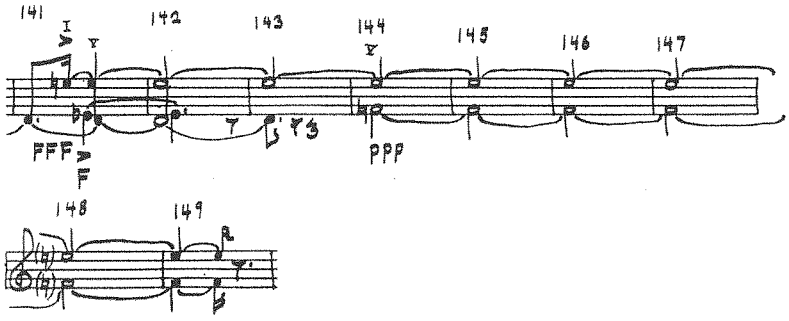
La Monte Young's work *for Guitar* pushes the limits of sustain and thereby challenges the sensitivity of the guitarist's touch. The passages in Examples 1.1 and 1.2 demand that both the softest and loudest sounds audible within the piece be sustained for an almost untenable duration: the guitarist must play a sounding $G^{\sharp 3}$ on string 6 at *ppppp* for nearly nine and one half seconds and sustain *E* on open string 1 at *fff* for nearly ten seconds.[15]



Example 1.1. La Monte Young, *for Guitar*, measures 212–218, Just Eternal Music (♩ = 352; N = with the fingernail)

14 A dead tone is not to be confused with fret buzz, which can also interfere with the sustain of a note.

15 Throughout this volume, the authors follow the Acoustical Society of America's system for designating register in which C^4 = middle *C*.



Example 1.2. La Monte Young, *for Guitar*, measures 141–149, Just Eternal Music (Tempo: ♩ = 92)

1.3 Traditional and nontraditional tunings

Table 1.0 shows the standard tuning for the six strings of a classical guitar. Figure 1.3 depicts the conventional notation for the open strings, with all pitches notated an octave higher than sounding.

String Number	Note Name	Standard tuning frequency
6	*E*	83 HZ
5	*A*	110 HZ
4	*D*	146 HZ
3	*G*	202 HZ
2	*B*	248 HZ
1	*e*	330 HZ

Table 1.0. Standard tuning

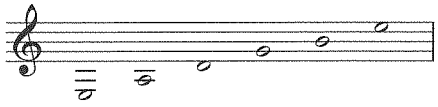


Figure 1.3. Written pitches of the six open strings. The sound is one octave lower than notated.

One way in which composers have explored the manifold musical possibilities of the guitar has been through altering the instrument's tuning. Over the past few decades, in particular, composers have employed variant tunings in many different contexts, no matter what their personal musical style and aesthetics, and with diverse objectives in mind. Some works manifest a keen interest in the guitar's resonance, which can be changed fundamentally by changing the tuning: some tunings reinforce the guitar's resonant frequency while others disrupt it by causing acoustic interference. A tuning can also help maintain a particular harmonic language by—for instance—making certain chords "easier" to grasp on the fretboard. In yet other instances, composers have altered the guitar's tuning to try out alternative temperaments, almost in the manner of Pythagoras's stretched-string experiment. Finally, composers have prescribed diverse tunings such as different quarter-tone tunings that produce quarter-tone fretted notes.

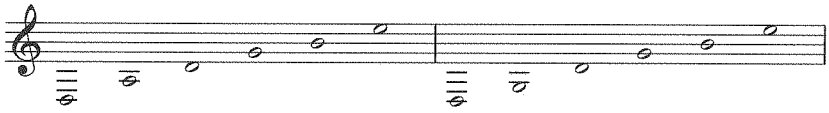
Deviations from the guitar's standard tuning range from so-called drop tunings, in which the sixth string is detuned to a lower pitch, to painstakingly structured microtonal tunings. Sections 3.1–3.5 document five general categories

of tunings for the guitar. The first two groups consist of historical tunings and more recent *scordatura* that reflect the twelve-tone well-tempered system. The primary purposes of these alternative tuning systems is to allow for "an extended range of notes upon the instrument, unusual chord voicings, or particular timbral effect; [they may also reflect] a desire to alter the resonance and attack characteristics of the instrument."[16] The third and fourth groups represent extended tuning systems: *just intonation* and other microtonal tunings. These microtonal tunings offer tremendous sonic potential and alter the resonance of the guitar in truly unique and dramatic ways. The last group consists of tunings that change within a composition and hence during the course of a performance. As mentioned, some variants will support the instrument's resonance while others may interfere with it. It is also important to note that increasing string tension may result in a stiffer soundboard, which in turn will undermine the overall sustain of the instrument.

Generally, when the guitar has a scordatura tuning, it is best to notate the guitar part transposed as if it were set in standard tuning. For obvious reasons, it is also advisable in this context to score the string number on which a note is played. Adding a smaller upper stave for the actual sounding pitches can be very helpful as well. For common drop tunings such as detuning the fifth or sixth strings by a half or whole tone, it is common to notate the guitar part in the actual tuning—i.e., not transposed.

1.3.1 Historical tunings

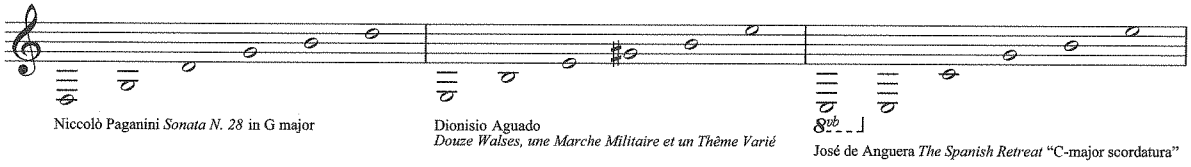
During the nineteenth and early twentieth centuries, guitarists began experimenting with alternate tunings. Of these, the most commonly used today is the *drop D*, in which the sixth string is tuned down a whole step from the usual *E*. The string then resonates with the fifth and fourth strings in such a way that reinforces the fundamental *D*.



Fernando Sor *Troisième Fantasie*, Op. 10

Fernando Sor *Deux Thême Varié et Douze Menuets*, Op. 11
François De Fossa *Douze Divertissements*, Op. 6. No. 5,6,7,8

Figure 1.4. Drop tunings



Niccolò Paganini *Sonata N. 28* in G major

Dionisio Aguado
Douze Walses, une Marche Militaire et un Thême Varié

José de Anguera *The Spanish Retreat* "C-major scordatura"

Figure 1.5. Alternative tunings ca. 1800–1850

16 Morris, "Contemporary Guitar Repertoire," 190.

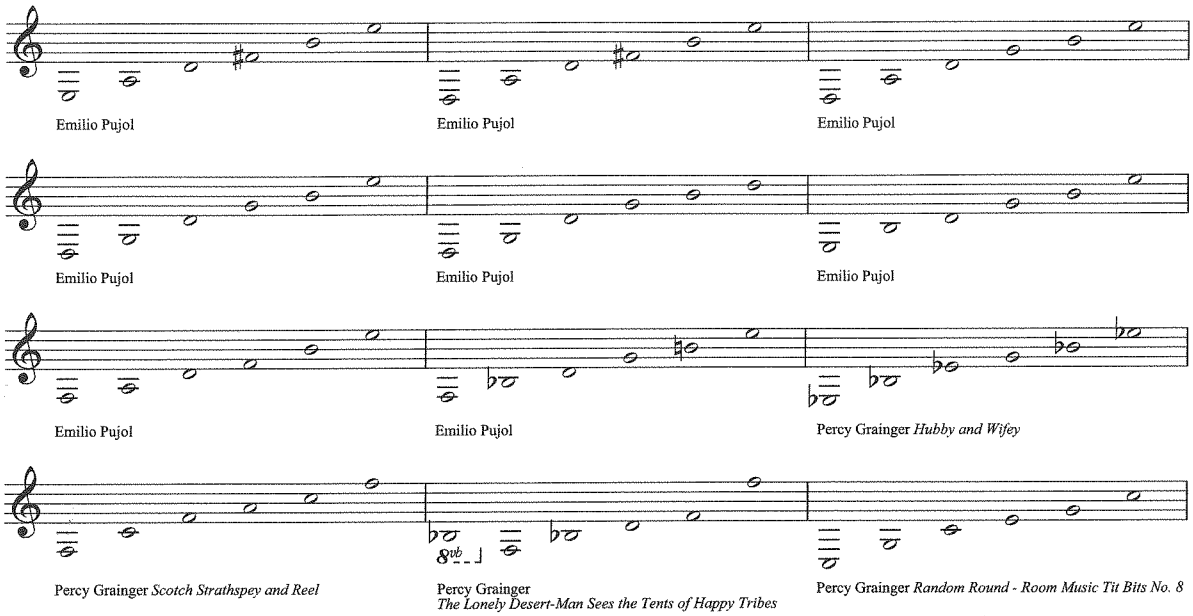


Figure 1.6. Alternative tunings ca. 1900–1960

1.3.2 Equal tempered tunings

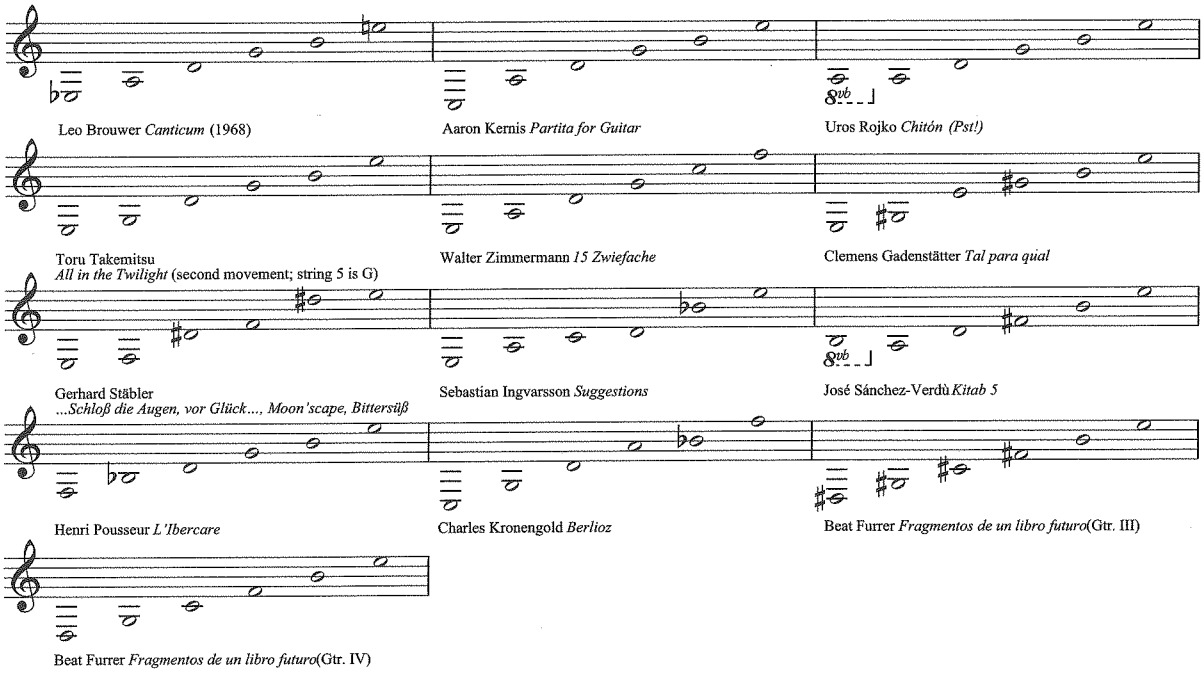


Figure 1.7. Various equal tempered tunings

Percy Grainger's *Shallow Brown* (Figure 1.8), for two guitars, requires that one guitar be strung with six *B* strings tuned down to $B^{\flat}$ while the other guitar is strung with six G strings tuned down to *F*. Yuval Shaked's *einseitig ruhig* requires that one guitar be restrung with six high E strings, all tuned to *E*.

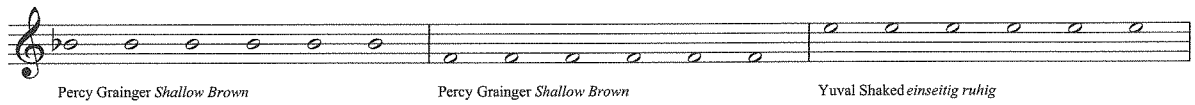


Figure 1.8. Restrung guitars in equal tempered tuning

1.3.3 Microtonal tunings[17]

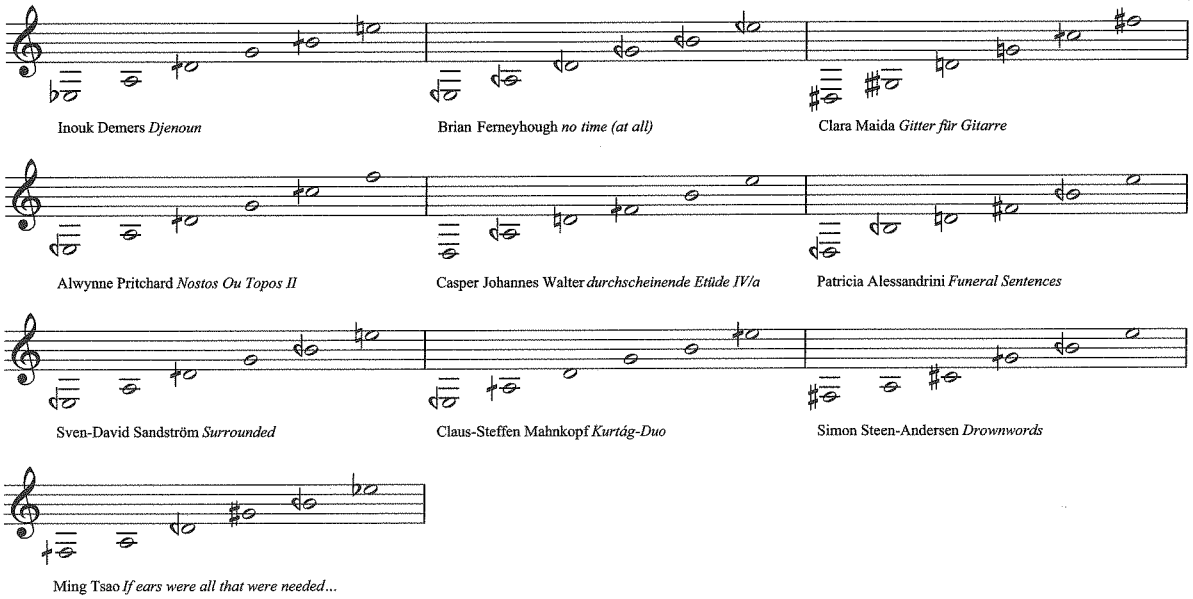


Figure 1.9. Various microtonal tunings

Figure 1.10 illustrates three microtonal tunings developed by two different composers. Klaus Huber's *Luminescenza* requires restringing the guitar with six high E strings, while his *Plainte-Lieber spaltet mein Herz I* specifies restringing with three high E (strings 1–3) and three B strings (strings 4–6), with the instrument in each piece tuned as indicated. Claus-Steffen Mahnkopf's *Kurtág-Duo*, for two guitars, requires that one guitar be restrung with six B strings, which are then also specially tuned. Here, the single arrow indicates raising or lowering by an eighth tone and the double arrow indicates raising or lowering by a sixth.

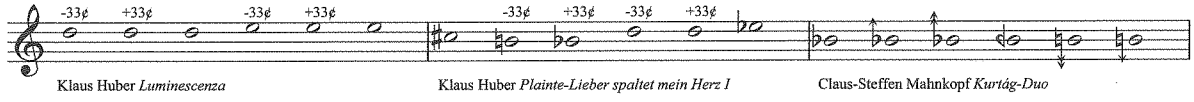


Figure 1.10. Restrung guitars in microtonal tuning

17 Ferneyhough's *no time (at all)*, for two guitars, requires that one of the guitars be tuned a quarter-tone lower on all six strings.

ANADOLU ÜNİVERSİTESİ
Merkez Kütüphanesi

1.3.4 Tunings based on the harmonic series or just intonation

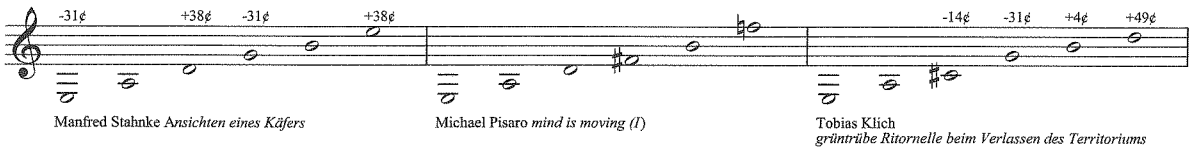


Figure 1.11. Various tunings based on the harmonic series

In the tuning of Michael Pisaro's *mind is moving (I)* (Figure 1.11), the *A* is tuned to the eleventh partial of *E*, the *D* is tuned to the natural seventh of *E*, the $F^{\sharp}$ is tuned to the ninth partial of *E*, and the *F* is tuned to the seventeenth partial of *E*. Similarly, in the tuning of Tobias Klich's *grüntrübe Ritornelle beim Verlassen des Territoriums*, the $C^{\sharp}$ is tuned to the fifth partial of *A*, the *G* is tuned to the seventh partial of *A*, the *B* is tuned to the ninth partial of *A*, and the *D* is tuned to the eleventh partial of *A*.

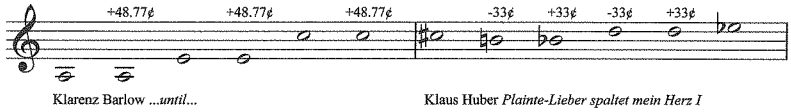


Figure 1.12. Restrung guitars in just intonation

Klarenz Barlow's *...until...* requires that the guitar be restrung with two A, two D, and two B strings and tuned to the tuning above (where each second string is tuned 48.77 cents higher). Each pair of strings approximates the interval ratio of 35:36.

1.3.5 Tunings changed during a performance

Some compositions demand that the guitarist change tunings during the course of a performance. Even a slight adjustment of a single string can affect the entire tuning of the guitar. In some cases, therefore, altering the strings will modify the guitar's intonation. In Figure 1.13, for example, Brian Ferneyhough begins with the initial tuning but before each odd numbered movement, retunes first string 6 and then later string 5. The last alteration will most likely affect intonation.

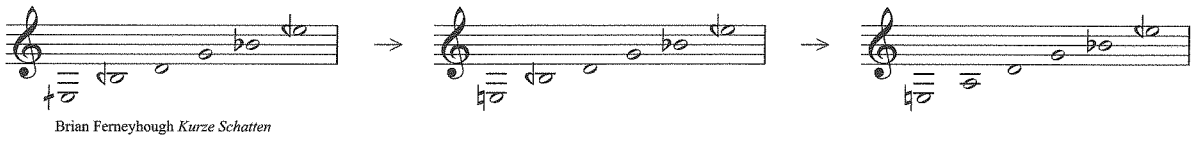


Figure 1.13.

Leaves (Figure 1.14) by Michael Pisaro, consists of twenty-four miniatures in which the guitarist alternates between the following two tunings throughout the piece:

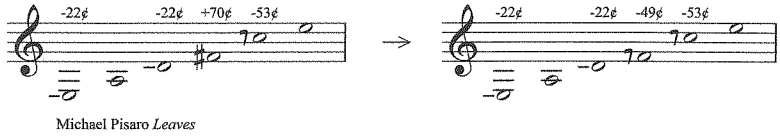


Figure 1.14.

The first tuning is later adjusted by lowering the $F^{\sharp}$ to and $F^{\natural}$ tuned to the seventh partial of a *G* fundamental (itself lowered by 22 cents) in the accompanying violin part.

In Tristan Murail's *Tellur*, the guitarist begins with the first tuning and gradually retunes to the second:

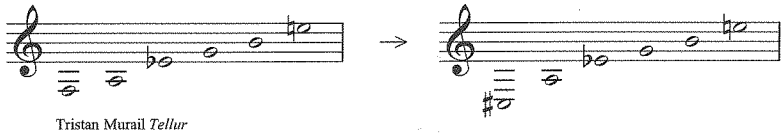
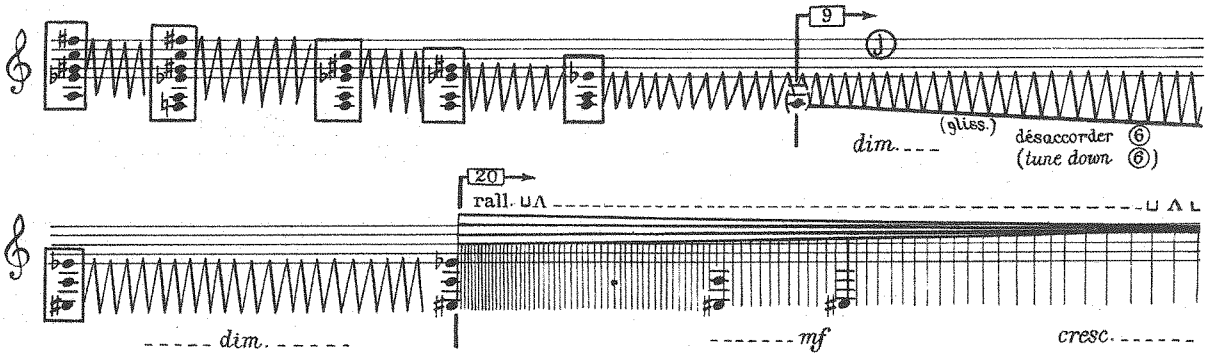


Figure 1.15.

Here the low F is gradually detuned to a $C^{\sharp}$ (a diminished fourth below it) with the LH while the RH performs a continuous *rasgueado* over the open strings (as Example 1.3 demonstrates).



Example 1.3. Tristan Murail, *Tellur*, page 5, systems 6–7, Éditions musicales transatlantique
No specific tempo indication given: approximate durations of entire sections in seconds are given at the beginning of each new section. The sections are marked by a capital letter.

In Mark Applebaum's *DNA*, the guitarist is to retune a string with the LH at the end of each section while the RH continues playing. In Example 1.4, the RH plucks the open strings, which have been detuned to *E*–$A^{\sharp}$–$C^{\sharp}$–*G*–*B*–$D^{\sharp}$ (Figure 1.16), as the LH detunes the B string up to a *C*.

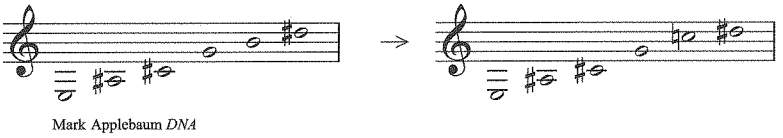
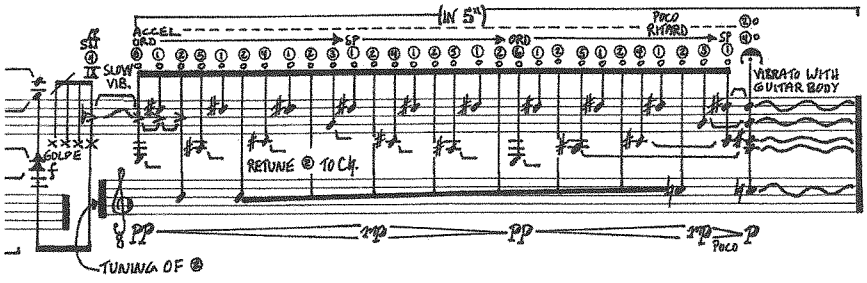


Figure 1.16.

Again, this kind of detuning can alter the guitar's intonation during a performance.



Example 1.4. Mark Applebaum, *DNA*, page 4, system 4, manuscript (Tempo: ♪ = 60)

1.4 Abbreviations and symbols for fingers and fingering positions

Figure 1.17 shows the standard numeric and alphabetic labels for the fingers of the left and the exception of the "e," the letters derive from the Spanish words for the fingers.

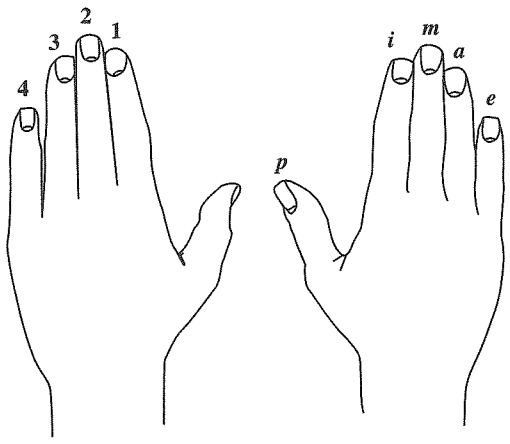


Figure 1.17. Right and left hand finger designations

Table 1.2, below, documents the conventional systems for designating fingering and position. It is often the case that the string and position numbers are left to the performer to decide. However, if a non-standard scordatura is employed (one other than a typical drop tuning, for example), then it is essential for the composer to indicate the appropriate string number.

A. **LH numbering system:**
Index—1
middle—2
ring—3
little finger —4

B. **RH lettering system, after the Spanish:**
Thumb—**p** (*pulgar*)
index —**i** (*índice*)
middle—**m** (*medeo*)
ring—**a** (*anular*)
little finger —**e** or **u** or **c** (*meñique*)

C. **String number is indicated by a circled Arabic numeral**
(*not* a Roman numeral as in bowed string writing).
⑥ = E
⑤ = A
④ = D
③ = G
② = B
① = E

D. **Fretboard position is indicated by a Roman numeral.** These correspond to the fret numbers, which rise consecutively starting from the nut, with the nut as 0 (zero). For example, the third position (III) signals one to stop the string directly to the left (or right before) the third fret/fret 3. Since the position system generally originates in the barré, the position number is always determined by the position of the LH *index* finger (as the extension of the nut). Whichever note is stopped on the fretboard, the position number is determined by the relation of the index finger to that stopped note. If the string designations are provided, fretboard positions need not be specified.

Table 1.2. Standard nomenclature

1.5 Notation basics

Traditionally, scoring for the guitar is done on a single system using a treble (or G) clef, notated an octave higher than the sounding pitch. Often, a treble clef with a small *8* underneath is used as a reminder that written pitch sounds an octave lower (Figure 1.18).

Figure 1.18.

1.5.1 Traditional Expressive Markings

The use of traditional expressive markings requires that the guitarist must interpret the musical context and apply the most appropriate mode of attack. Such expressive symbols – for example *marcato* or *martellato* – potentially suggest to a guitarist variation in either the amount of nail used, angle at which a string is depressed into the soundboard, or the position of the RH. In his *Drei Lieder* op. 18, Anton Webern notates nineteen articulation markings for the guitar, some of which suggest subtle differences in RH tone production and others differences in LH stopped actions (Figure 1.19).

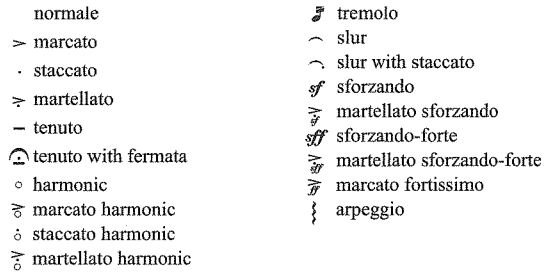
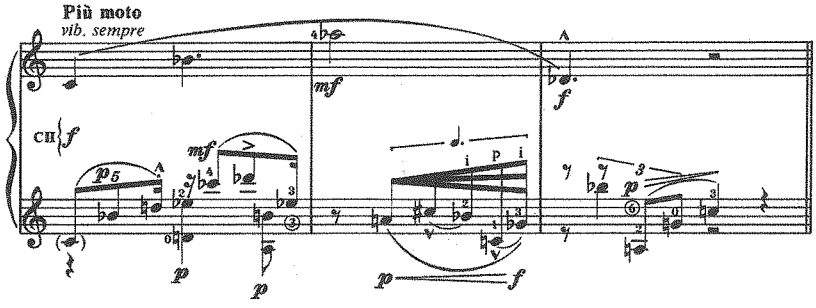


Figure 1.19. Articulation markings in Webern's *Drei Lieder*, op. 18[18]

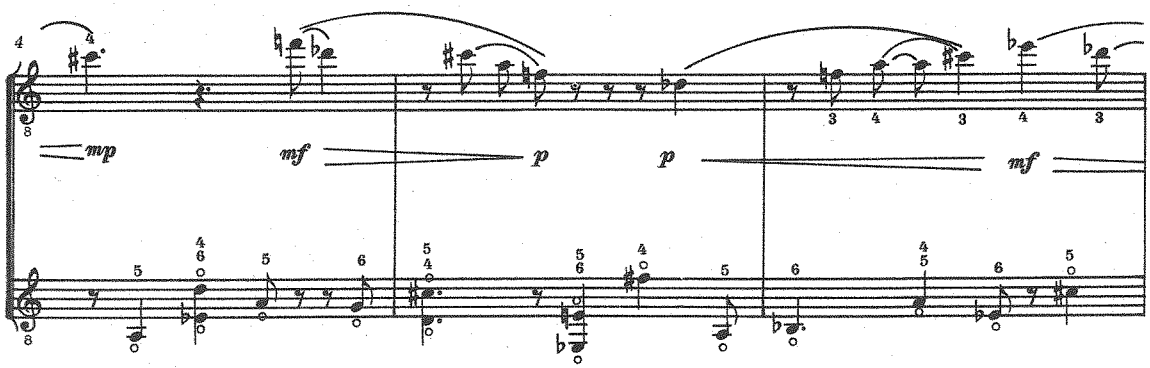
1.5.2 Multiple staves

At times, a composer may want to delineate individual voices more clearly. In such instances, it is not only acceptable but also strongly advisable to use a second system as an aid. This supplementary system can be notated using a G clef as well. Peter Maxwell Davies employs two staves in the second movement of *Lullaby* (Example 1.5) in order to emphasize a melodic line with sustained notes and to distinguish it from a more active accompanying voice.



Example 1.5. Peter Maxwell Davies, *Lullaby (for Ilian Rainbow)*, 2. Double, measures 1–3, Boosey & Hawkes (Tempo: left to the performer)

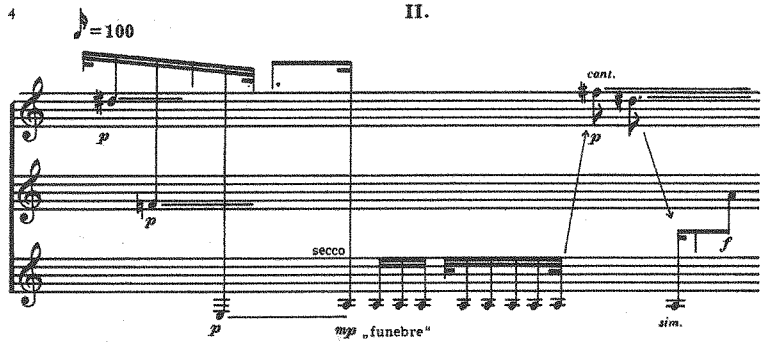
18 Marriott, *Contemporary Guitar Composition*, 46.



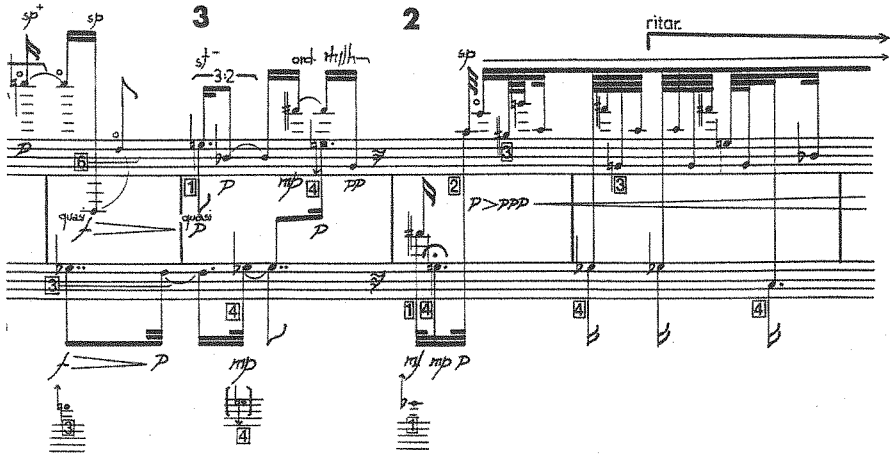
Example 1.6. Sidney Corbett, *Arien IV: Solo Music for Guitar,* Discant, measures 4–6, Moeck Verlag (Tempo: ♪= 92)

Sidney Corbett (Example 1.6) uses two staves to distinguish between natural harmonics (bottom stave) and normally fingered notes (upper stave) thus emphasizing the textural difference. Note that the sixth string is detuned to $E^{\flat}$ and that the harmonics are notated at sounding pitch.[19]

In Example 1.7, Klaus K. Hübler employs three staves to differentiate three contrasting timbres: *scharf, normal,* and *dumpf* (i.e., *sul pont*, normal, and *sul tasto*).



Example 1.7. Klaus K. Hübler, *Zwei Skizzen*, Skizze II, page 4, system 1, Moeck Verlag (Tempo: ♪= 100)



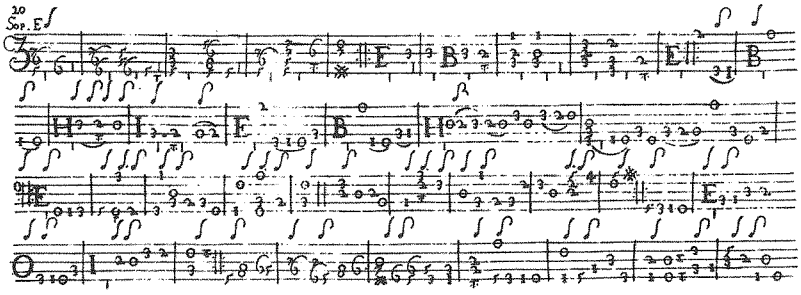
Example 1.8. Juan Campoverde, *topographies: circular fragmentations*, page 3, end of system 2, manuscript (Tempo: ♪= 76)

19 The "8" on the bottom of the treble clef in the lower system is incorrect and should be removed.

In Juan Campoverde's *topographies*, two main staves help differentiate between those notes generated by plucking with the RH (upper stave) and those notes produced by LH *hammer-ons*—i.e., vigorously striking the string against the fretboard with a left hand finger (bottom stave). The square notehead in the upper stave (notated as a slightly flat $E^{\natural}$ with the 4 below) indicates the sounding pitch of a bi-tone that is made by plucking the string towards the nut behind the fingered $E^{\flat}$ that appears in the preceding bottom stave. Campoverde occasionally adds a smaller, third stave at the very bottom, which gives the sounding pitch of the bi-tones produced by the LH hammer-ons.

1.5.3 Tablature notation

Until the beginning of the eighteenth century, music for plucked instruments was scored in tablature, of which there were a rich variety of styles depending on the specific instrument and country. In some tablature systems, numbers or letters were used to indicate fretboard position and the lowest string was notated either on the top or bottom line. All lutenists read tablature notation as part of their role as continuo players. Moreover, tablature facilitated moving between various tunings on both the guitar and the lute, thus supporting the acoustic flexibility of the instruments. Example 1.9 shows a mid-seventeenth century French Baroque guitar tablature from Francesco Corbetta.[20]

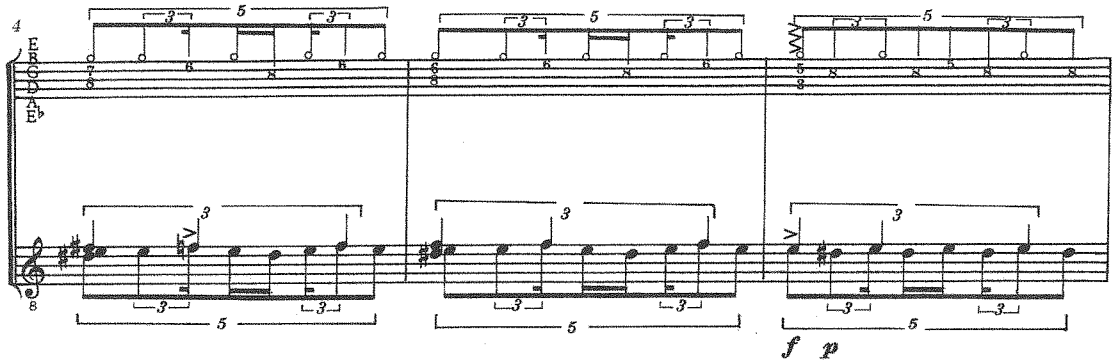


Example 1.9. Francesco Corbetta, *Passachali* in D Minor (1643), facsimile, Studio per Edizioni Scelte

The transition toward staff notation began sometime after 1700 and, by the middle of the century, tablature notation had disappeared altogether for the guitar.[21] During the last few decades, however, tablature has enjoyed a slight resurgence in use. It generally appears coupled with a normal staff notation to indicate a sounding pitch. In some instances, its presence can be very helpful to the interpreter, as it enhances the legibility of the music. In Example 1.10, Corbett uses a tablature notation to clarify visually which fingers of the LH move away from a held unison note *E*, as a symmetrical chromatic "fanning-out" ensues. The presence of a tablature above the main stave obviates the need to place a string number over each pitch.

20 This segment exemplifies the *mixed style* notation (called *battute e pizzicate* in Italian) that appeared in print during the 1630s and combined strummed chords (the capital letters with the small vertical dashes) and individually plucked notes (the numbers). For discussion of the *alfabeto* style of tablature, see Section 6.0 of this chapter.

21 In the eighteenth century a central argument made in support of the transition to staff notation was that tablature encouraged an "ignorant, mechanical playing, without a proper understanding of the music." Stenstadvold, "Evolution of Guitar Notation, 1750–1830," 13.



Example 1.10. Sidney Corbett, *Arien IV: Solo Music for Guitar*, Tarantella, measures 4–6, Moeck Verlag (Tempo: ♪ = 88)

1.5.3 Action stave for the RH position

One extension of tablature notation is an action stave on which the composer notates *how* and *where* something is to be executed rather than its acoustic result. Composers sometimes utilize an upper stave exclusively to indicate areas along the guitar for RH actions, since this affords them a way to show the full range of timbres that RH actions can contribute. The most common of the action staves abstracts the guitar's form from the outer end of the fretboard to the bridge (Figure 1.20): it thus enables the composer to depict quite graphically any RH positions from molto sul tasto to molto sul ponticello.

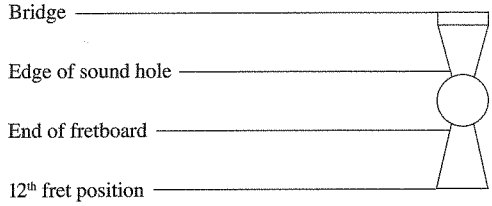
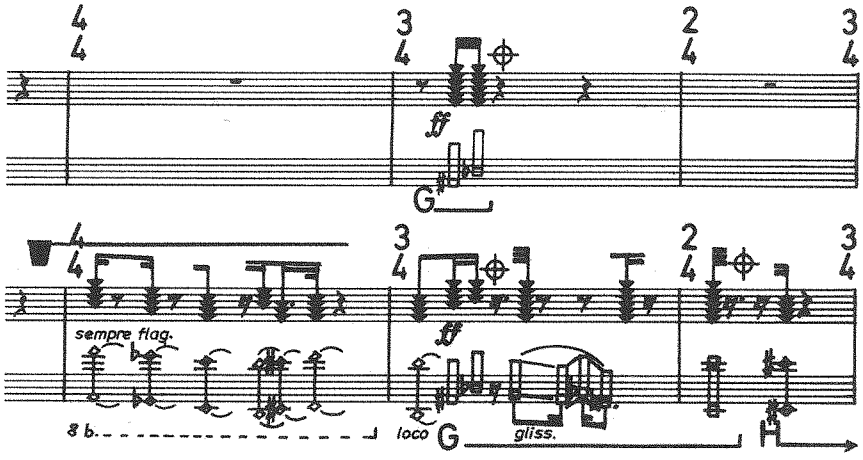


Figure 1.20. Action clef

Helmut Lachenmann's *Salut für Caudwell*, a piece for two guitars, employs a tablature and a standard stave to indicate the actions of the right and left hands, respectively, within each guitar part (Figure 1.21): the upper system is a tablature where each line indicates a string number from 6 to 1. The lower system is the usual staff for LH fingering.

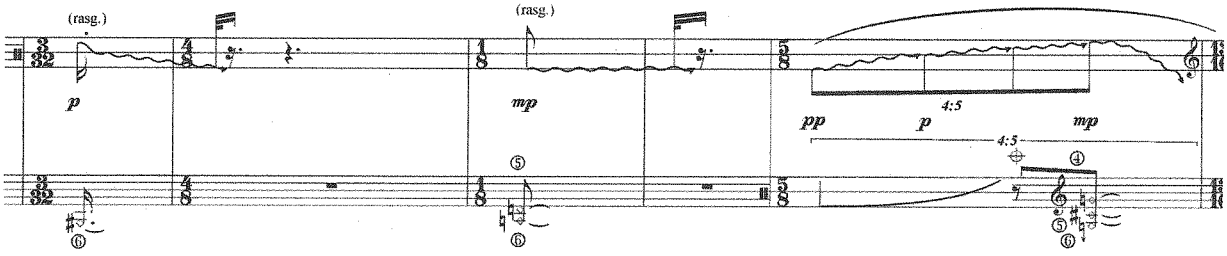
Figure 1.21. Staff system from Lachenmann's *Salut für Caudwell*

An example of Lachenmann's two-stave notation system in context can be found below (Example 1.11). Within each of the two parts, the downward pointing triangles in the upper staves indicate the use of a plectrum while their loci between the lines of the stave indicate which strings to pluck with it. In the third measure of this excerpt, therefore, the guitarist playing the upper part is to pluck all six strings. The bottom staves, on the other hand, indicate both *barré* harmonic chords and barré chords produced by a *Gleitstahl* (a rectangular, solid metal bar slide discussed in Chapter 3).



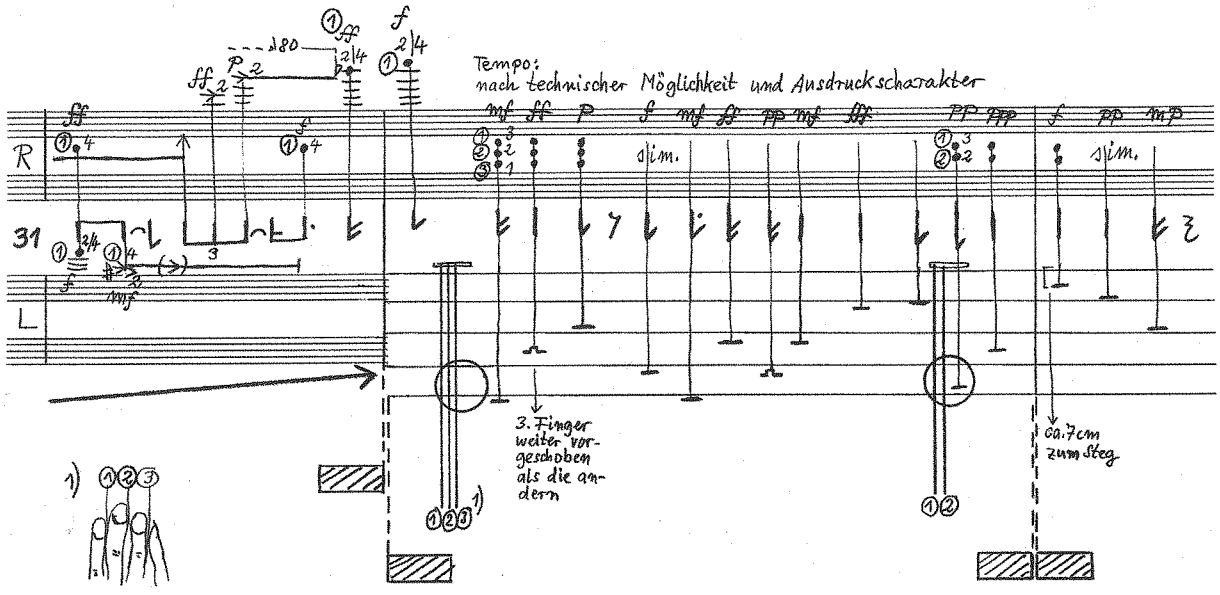
Example 1.11. Helmut Lachenmann, *Salut für Caudwell*, system 34, measures 250–252, Breitkopf & Härtel (Tempo: ♪= 100)

The composer Ming Tsao uses an upper action clef to indicate the location of the RH with respect to the soundhole as it performs gentle, *rasgueado* strumming across all strings (Example 1.12). When the action called for is close to the bridge, then the clef is extended to include it.



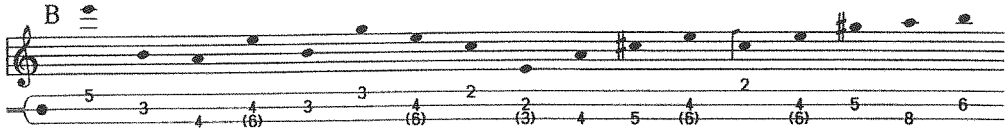
Example 1.12. Ming Tsao, *Not Reconciled*, measures 51–55, Edition Peters (Tempo: ♪= 63)

Although composers tend to use an action stave more often for the RH, they may use it to extend the notational boundaries for the LH instead (as depicted in the last measure of Example 1.12 lower stave). In Example 1.13, Rolf Riehm uses an action stave to show LH positions relative to the left side of the soundhole and the bridge, since the LH fingering extends well past the fretboard. To perform this segment, the LH fingers clamp the upper three strings between them, as shown at the lower left of the score. The RH plucks chords over the soundhole behind the LH toward the fretboard.



Example 1.13. Rolf Riehm, *Toccata Orpheus*, system 31, G. Ricordi & Co (In the tablature section, the tempo is determined by the speed at which the techniques can speak clearly and expressively [author's translation])

At times a composer may place an additional stave below the normal stave simply to indicate further information. In Example 1.14, Barlow uses three lines to designate three pairs of strings, in which each string within a pair is tuned a quartertone apart. The number indicates the harmonic partial on an open string, while the situation of the number relative to the line shows on which of the two strings to execute the action: numbers on a line involve the lower strings whereas those numbers above, involve the upper strings. The normal stave indicates the sounding pitches.



Example 1.14. Klarenz Barlow, *...until...*, system B, feedback studio verlag (Tempo: left to the performer)

1.6 Fretboard chart

In Baroque guitar music, specific permutations of LH fingerings provided a player with the basic harmonic vocabulary of a composition. Figure 1.22 illustrates the twelve different numbered chords in major keys (marked with an *n.* for *naturales*) and the twelve in minor keys (marked with a *b.* for *b molados*) that were possible to play. This system of LH chordal shapes developed from an earlier *alfabeto* system in which "a special tablature enabled composers to notate full chords without having to write out each individual note."[22] Each letter signified a specific harmony and position as well as an inversion of that harmony on the fretboard.[23] The *alfabeto* system helped to counteract the vagaries of open string tuning on Baroque guitars, whose *scale lengths* tended to differ from one another, an idiosyncrasy evinced by the instruments that have survived. In short, no standard tuning existed as it does for the modern guitar.

22 Tyler, *Guide to Playing the Baroque Guitar*, 10.

23 ibid, 10.

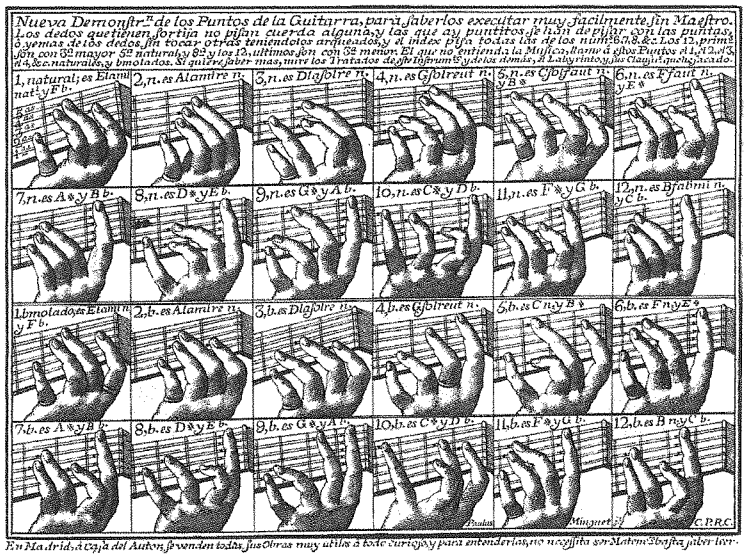


Figure 1.22. "Grifas" chart from Pablo Minguet y Yrol's *Reglas y advertencies generals para tañer la guitarra, tiple, y vandola, con varicdad de sones* ... (c. 1774), pl. 2–2, Minkoff Reprint. The use of numbers instead of letters to denote the chord configurations reflects the Spanish notational system in this era.

Figure 1.23 is a diagram of a typical modern classical guitar fretboard extended to the 19th position. This standard originated with guitars made by the Spanish guitarist and luthier, Antonio de Torres Jurado in the latter half of the nineteenth century. Notable exceptions are guitars based on the Ramírez model, most of which only extend to the 19th position for strings 6 and 1 and the 18th position for the remaining strings. It is also common to find newer classical guitars whose first, second, and third strings are extended by an additional fret to the 20th position. Again, the notated pitches in the diagram sound an octave lower than written.

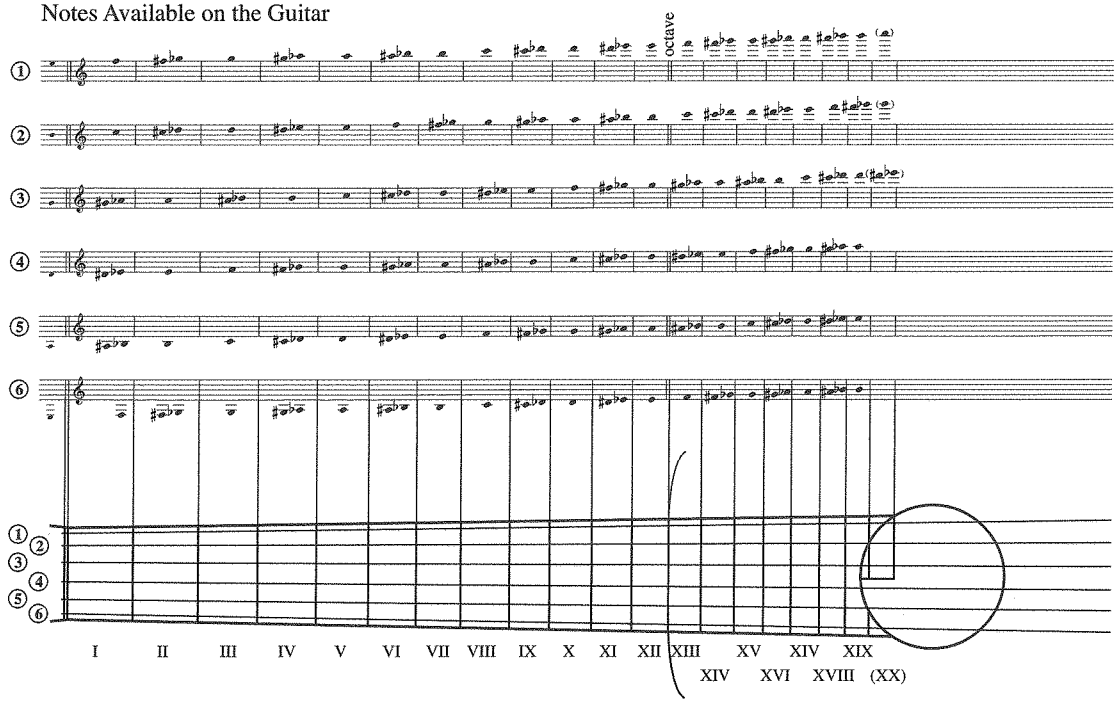


Figure 1.23. Fretboard chart

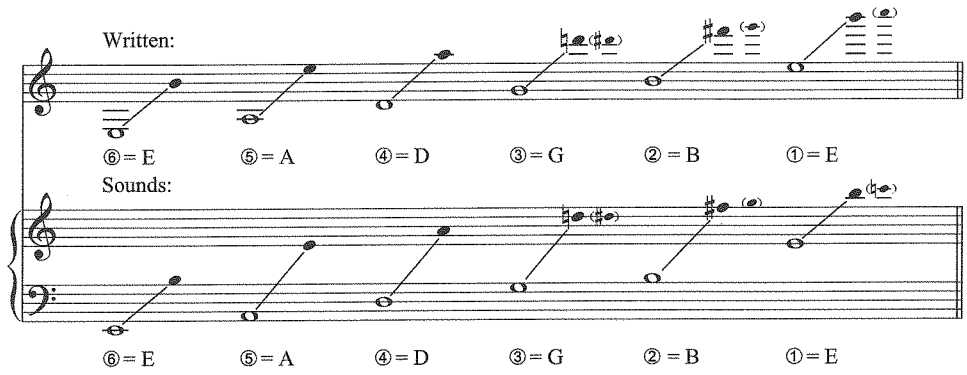


Figure 1.24. Ranges of individual strings

The written and sounding pitch ranges for each string appear in Figure 1.24. The ranges demonstrate that a single passage of notes can be realized in many different positions. For example, Figure 1.25 presents five alternative fingerings for an excerpt from *L'encouragement,* op. 34 (pub. 1828) for two guitars by Fernando Sor.[24] These different fingerings of the same passage can elicit subtle variations in both timbral shading and emphasis through phrasing: the different string qualities, the LH positions on the neck, and the slurring possibilities with the LH across strings (allowing more than one string to momentarily sound simultaneously) can all contribute to slight but suggestive modifications in sound.

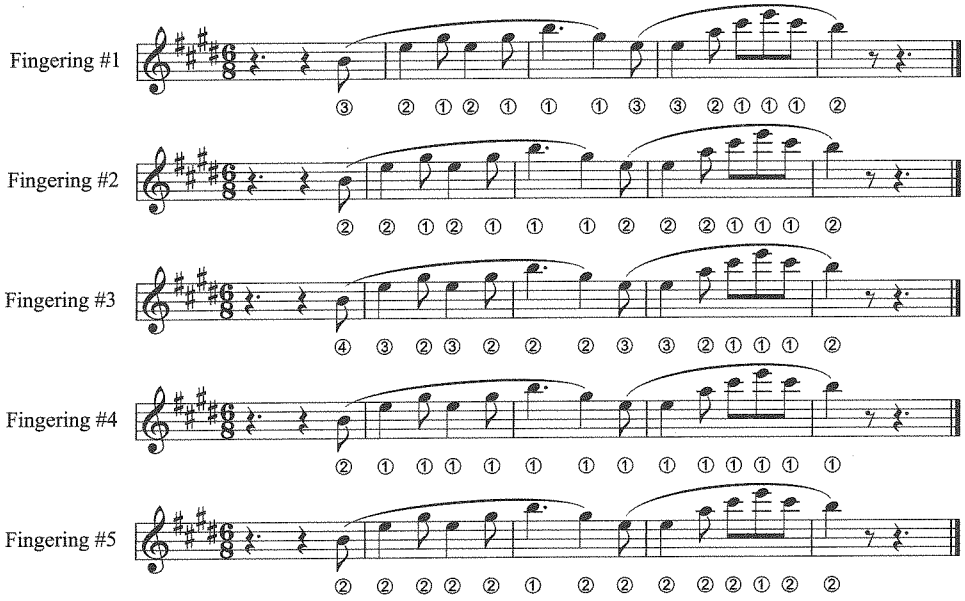


Figure 1.25. Various realizations of a melodic figure by Sor

24 Traube, "Timbre of the Classical Guitar," 24. These fingerings were conceived by Peter McCutcheon.

1.6.1 Negotiating the fretboard

Every composer needs to develop a thorough knowledge of the fretboard before writing for the guitar. Either a sturdy cardboard replica of the fretboard that precisely reproduces the spacing between the frets or, more effectively, an actual guitar, are indispensable for building familiarity with the overall dimensions of the fretboard, as well as the standard idiosyncratic spacing of the frets upon it. Furthermore, having a fretboard at one's disposal is crucial for determining to what extent certain finger stretches or movements in either direction will work. In the lower position of the fretboard, the LH can stretch a distance of at least four frets; in higher positions this distance increases.

Certain modern compositions for the guitar treat the fretboard rather like a Rubik's Cube, in that they manipulate it as a means of exploring the instrument's acoustic potential. Henri Pousseur's *L'ibericare* epitomizes this use of the fretboard. In it, Pousseur combines and permutes a virtual catalogue of four-fingered fretboard configurations in order to generate the composition's harmonic and melodic material.

Figure 1.26. Henri Pousseur, *L'ibericare*, legend, page 2, CeBeDEM. Tuning for the guitar.

Figure 1.27 lists twelve of the twenty-four total configurations on the fretboard. These fingerings or "shapes" are to be interpreted according to the rules specified in Table 1.3.

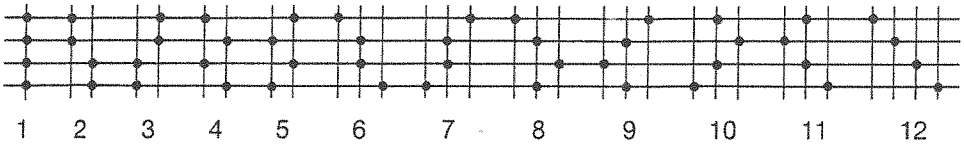


Figure 1.27. Henri Pousseur, *L'ibericare*, legend, page 2, CeBeDEM. Tuning for the guitar.

Rules for interpreting *L'ibericare*

1. Each figure can be read either horizontally or vertically so that a vertical line can be interpreted either as a fret or as a string.

2. When a vertical line is interpreted as a fret, then the four horizontal lines are to be interpreted as four consecutive strings ordered from lowest to highest. The guitarist has the option to skip one string between consecutive strings, so that four horizontal lines can be read as strings 6–5–3–2 or 6–4–3–2 or 6–4–3–1, etc. In this interpretation, the vertical lines represent consecutive frets.

3. When a vertical line is interpreted as a string, then the four horizontal lines are to be read as four consecutive frets. The guitarist has the option to skip one fret between consecutive frets. In this interpretation, the vertical lines refer to consecutive strings.

4. The configurations can begin at any place along the fretboard. If the vertical lines are read as strings, then the configurations can begin on any string, provided that the rightmost vertical line of a configuration does not exceed the top string. If the vertical lines are read as frets, then the configurations must begin on either string 6, 5, or 4.

Table 1.3

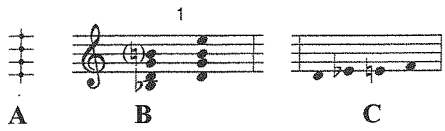


Figure 1.28. Henri Pousseur, *L'ibericare*, legend, pages 2–3, CeBeDEM

In Figure 1.28, reading the vertical line in configuration **A** as the nut (fret zero) yields the chords in **B**, but only when starting on either string 5 or 4, and playing only four open strings. However, by reading the vertical line as a string, and by beginning on open string 4 and moving up chromatically, the guitarist produces melodic line **C**.[25]

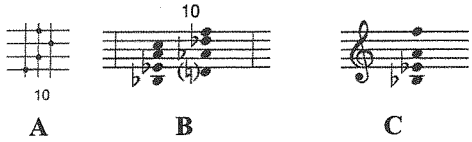


Figure 1.29. Henri Pousseur, *L'ibericare*, legend, page 2, CeBeDEM

By interpreting the vertical lines as frets, configuration **A** can yield the chords in **B** (Figure 1.29). If the first point to the left in configuration **A** is the nut or open string 5 and the points to its right represent the first and second frets on higher strings, then the first chord begins on the open string 5 (tuned to $B^{\flat}$) and builds on strings 5, 4, 3, and 2. The second chord is simply a transposition of the first chord beginning on string 4, the open *D* string. The chord in **C** requires the same fretboard position as the first chord in **B**, also beginning with the open string 5, but skipping string 2 and using string 1 instead.

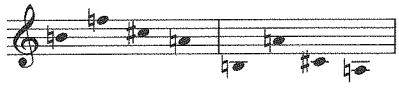
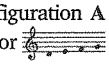


Figure 1.30. Henri Pousseur, *L'ibericare*, legend, possible realization

Interpreting the vertical lines in configuration **A** as *strings* produces the melodic figures pictured in Figure 1.30. The first sequence of notes results from reading the top horizontal line as the nut and the first vertical line as an open string 3, with the lines to its right as strings 2 and 1. Thus, the first note would lie on the third fret of string 3. The second melodic figure ensues when reading the top horizontal line in **A** as the first fret and the first vertical line as string 6. The vertical lines to its right then refer to strings 5 and 3. In this instance, the first note would lie on the fourth fret of string 6.

The flexibility of the basic fingering configurations of *L'ibericare* lends the work a distinctively open structure. Any configuration can be read—and realized—in several ways, so long as they conform to the established parameters. For example, taking the vertical lines as frets and the leftmost vertical line as the second fret, one reading of configuration **A** in Figure 1.31 would begin on the second fret of string 6. The first three points from left to right would then yield *G*, $C^{\sharp}$, and *F* on strings 6, 5, and 4. Meanwhile, selecting the bottom two points along with the top point would give *G*, $C^{\sharp}$, and *B* on strings 6, 5, and 3, respectively.

25 Pousseur also allows for an extension of the horizontal reading by interpreting consecutive points in a configuration as either a half or whole step apart. For example, configuration **A** can also yield the horizontal arrangement:  or 

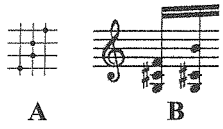


Figure 1.31. Henri Pousseur, *L'ibericare*, legend, page 4, CeBeDEM

Pousseur also twice transposes configuration **A** up one string and up one fret. These transpositions give the configurations in **C** (Figure 1.32), which, when interpreted in the same manner as described for **A**/**B** (Figure 1.31), produce the next four trichords: the guitarist now plays the transposed configuration **A** first on strings 6, 5, 4 by selecting the three points farthest to the left, and then proceeds to a second realization on strings 6, 5, 3 by selecting the bottom two and top points.[26]

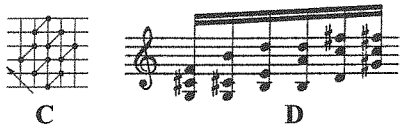


Figure 1.32. Henri Pousseur, *L'ibericare*, legend, page 4, CeBeDEM

In Figure 1.33, configurations **A** followed by **B** can yield the configurations in **C**, which will generate first the chord in **D**, and then the two consecutive tritones constituting the glissando. This sequence results when the vertical line in **A** is read to represent the nut, and the points, the lower four open strings, while the vertical lines in **B** are read as frets 2, 3, 4, and 5, and the horizontal lines as strings 1 and 2. As is evident from these several examples, the possibilities for interpreting configurations on the fretboard to yield ever-changing pitch combinations are practically limitless.

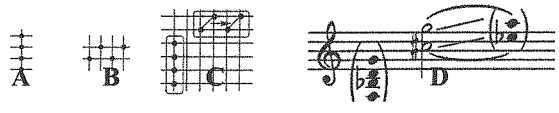


Figure 1.33. Henri Pousseur, *L'ibericare*, legend, page 4, CeBeDEM

1.7 LH techniques

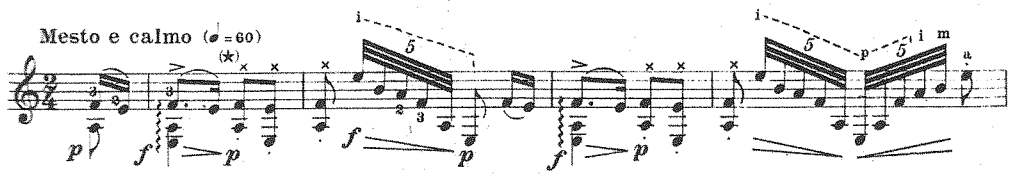
Early six-string guitar music featured extensive use of the open strings—particularly the lower three—in order to firmly establish a work's harmonic underpinning. As a result, a majority of the repertoire of the late eighteenth and early nineteenth centuries features the key areas E major/E minor as well as A major/A minor. D major and to a lesser extent D minor were also prevalent and were often facilitated by the drop *D* tuning. In addition to articulating a clear tonic (or dominant), the open strings provided a fundamental resonance that enabled the guitar to speak sonorously. There is indeed a notable difference between the resonant qualities of any given open string as opposed to a stopped one.[27]

26 The remaining chords are realized on strings 5, 4, 2, then on 5, 3, 2, then on 4, 2, 1, and finally on 3, 2, 1. These string combinations are derived by transposing configuration **A** across the strings toward string 1 and downward towards the nut.

27 Fernando Sor's *Étude* op. 29 no. 13, a study in barré, is a good case in point, where the use of full barré on the first and seventh frets ostensibly filters out many of the guitar's central resonant frequencies, leaving the listener with a somewhat compressed sound.

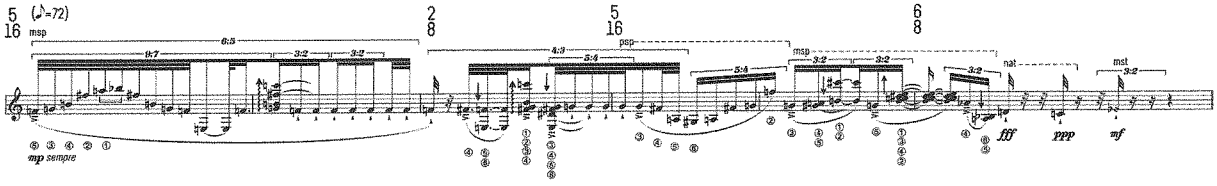
1.7.1 Stopped notes and open strings

While composers are generally cautioned to avoid making too much use of the open strings in writing for instruments such as the violin, it is a different case with the guitar. Much of the music that best elicits the resonant qualities of the guitar is work that judiciously and creatively integrates the instrument's open strings. With its harp-like gestures, Manuel De Falla's use of the open strings in *Homenaje* (Example 1.15) beautifully exemplifies this.



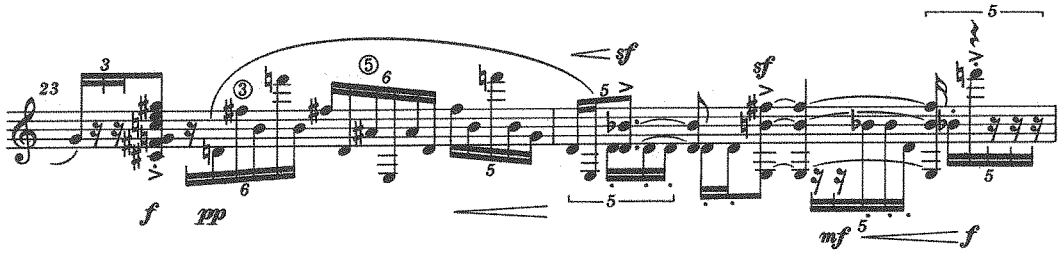
Example 1.15. Manuel De Falla, *Homenaje Pour Le Tombeau de Claude Debussy*, page 1, system 1, J. & W. Chester

Example 1.16, a passage from Richard Barrett's *Unter Wasser*, consists of heavily arpeggiated, highly virtuosic lines, which create a texture vaguely reminiscent of the Baroque *stile brisé* (see 1.8.1). Through careful navigation of the fretboard's topography, Barrett uses the open G string not unlike a pedal point, lending the irregular fabric a constant tone that accentuates the guitar's resonance.



Example 1.16. Richard Barrett, *Unter Wasser*, Act 4, measures 79–84, United Music Publishers (Tempo: ♪ = 72)

As stated previously, the most successful guitar music underscores the instrument's resonant qualities. It does this largely by balancing stopped notes with open strings, regardless of surface texture. Elliott Carter elegantly interweaves open strings with stopped notes, as Example 1.17 illustrates:



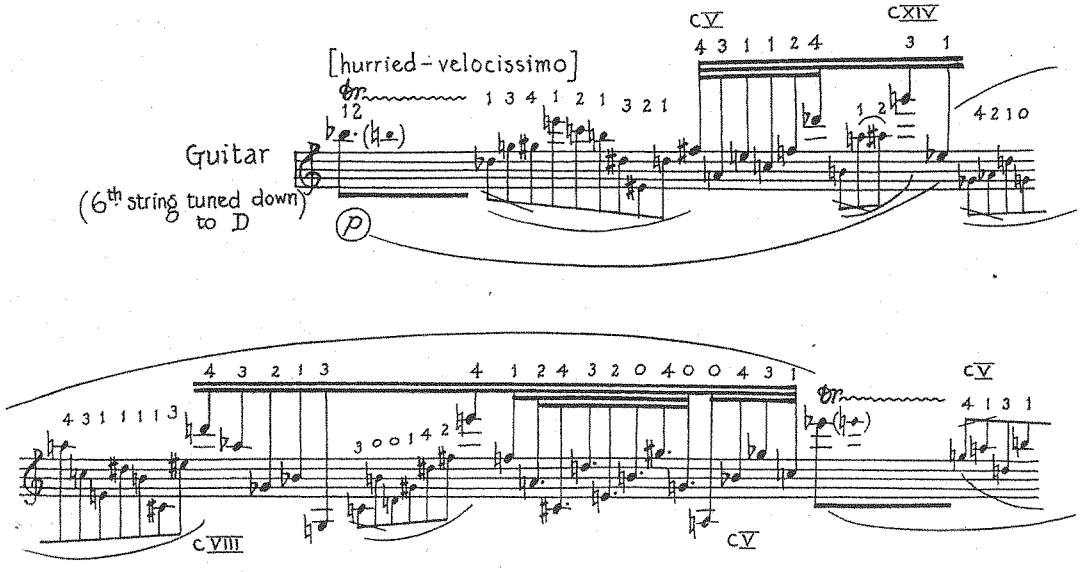
Example 1.17. Elliott Carter, *Changes*, measures 23–24, Boosey & Hawkes (Tempo: ♩ = 100 ca.)

1.7.2 Single notes to chords

The guitar can project a variety of textures through melodic strands, chords, and counterpoint. The chords themselves may be of various degrees of richness, including three-note clusters, and counterpoint may consist of two, three or four parts. In order to develop a sense of the diversity of textures available, a number of historical examples are worth considering. Collectively, the Renaissance literature for the lute and for the vihuela offers a veritable treasure chest of material. Encompassing works by Dowland, Da Milano, Milan and Narvaez, among others, it stands

in many ways as the crowning achievement of Western music for plucked fretted instruments. In addition, one would do well to examine the six-string guitar literature of the early nineteenth century (e.g., works of Sor, Giuliani, and Carulli), as well as the highly effective idiomatic guitar writing of the Romantics, especially that of Tárrega and Villa-Lobos.

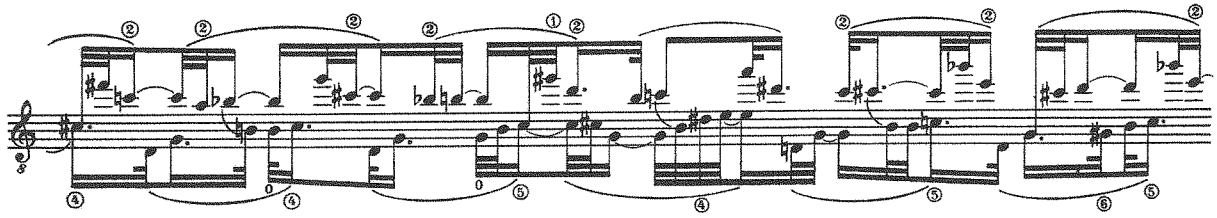
Of course, all of these composers were themselves virtuosi guitar players, a fact which no doubt enhanced their intimacy with the instrument and thereby (presumably) their music. As Hector Berlioz remarks in his treatise on orchestration, "I must emphasize again that one cannot write guitar pieces in several parts, full of passagework and using all the instrument's capabilities without playing it oneself." Nevertheless, and contrary to what Berlioz asserts, intricate and convincing passagework has been composed by non-guitarists who have thoroughly researched the instrument. Michael Finnissy is one such composer (Example 1.18).



Example 1.18. Michael Finnissy, *Song 17*, systems 1–2, British Music Information Centre (Tempo: left to the performer)

Generally, composers writing for the guitar have confined their focus to the fretboard area below the twelfth fret due to the so-called break in the neck at the point where it is joined to the body. Double and triple stops as well as single lines beyond the twelfth fret have sometimes proven to be effective, while at other times problematic. Regardless, a certain amount of caution is advised when breaching that border since beyond it the spacing between frets is much narrower, the action of the strings is slightly higher and, because of the shortness of string, the notes have less sustain.

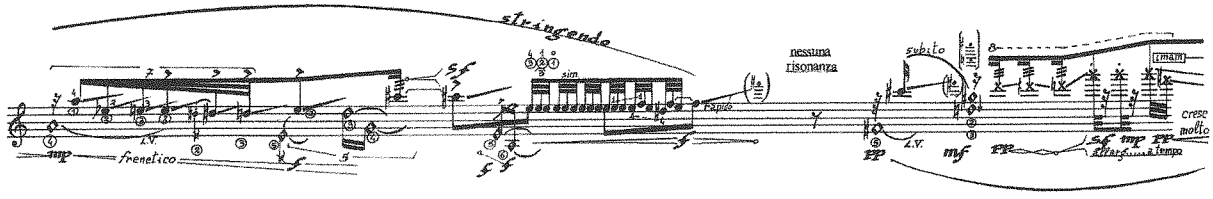
Despite these inherent complexities, some composers do traverse the break. Example 1.19 shows a passage from Luciano Berio's *Sequenza XI*, featuring sequential intervallic motion in two voices, in which the LH action extends beyond the break of the guitar neck, remaining just within the fretboard.



Example 1.19. Luciano Berio, *Sequenza XI*, page 9, system 7, Universal Edition (Tempo: ♩ = 60)

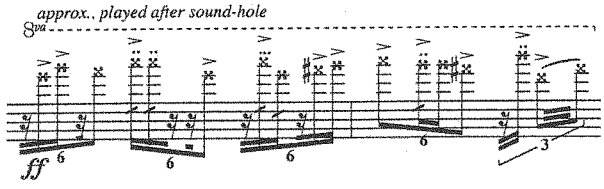
1.7.3 Beyond the fretboard

On occasion the LH is asked to stop pitches beyond the fretboard, a technique similar to that used in playing bowed string instruments. At this juncture, the distance between notes is often quite small, a factor that, taken in combination with their rapid decay, makes the technique very challenging to perform. In certain cases, accuracy of pitch is vital since there are no frets stopping the pitch. The absence of frets also causes any stopped note to sound muted and dampened, bordering on the percussive.



Example 1.20. Maurizio Pisati, *Sette Studi, Studio 1*, page 2, system 3, Ricordi Milano (Tempo: ♩ = 60–66)

In Example 1.20, stopped notes above the range of the fretboard are notated with an *x-notehead* an octave higher than sounding. In Example 1.21, *x*-noteheads are also used to denote angular rhythmic figures executed beyond the fretboard.



Example 1.21. Ruben Seroussi, *Vueltas y Revueltas*, movement II, rehearsal 150, Israel Music Institute (Tempo: ♩ = 72)

1.7.4 Clusters

Assuming standard tuning, it is possible to play a variety of three-note chromatic clusters on the guitar by using the open string. Figure 1.34 illustrates two fingerings that can actually produce a four-note chromatic cluster. These two fingerings require a difficult stretch and need some time to prepare.

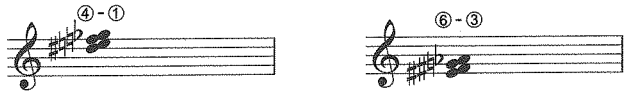
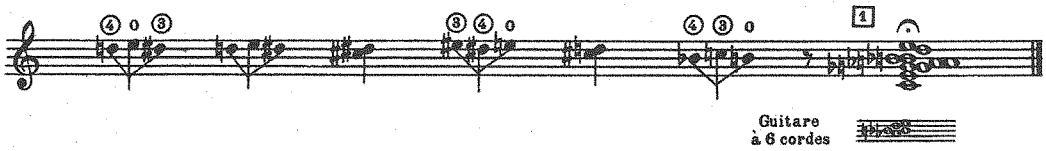


Figure 1.34.

In Example 1.22, Maurice Ohana juxtaposes various two- and three-note clusters for contrast.



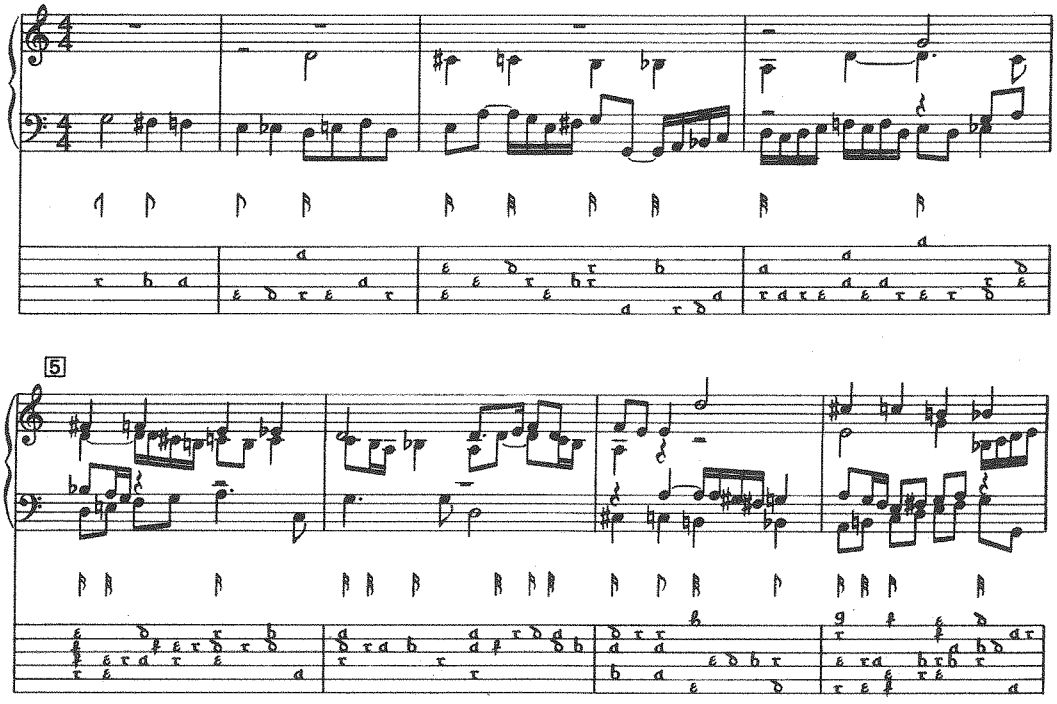
Example 1.22. Maurice Ohana, "Aube," *Si le jour parait*, system 6, Gérard Billaudot éd. (Tempo: ♩ = 50)

1.7.5 Polyphonic textures or "impressionistic polyphony"

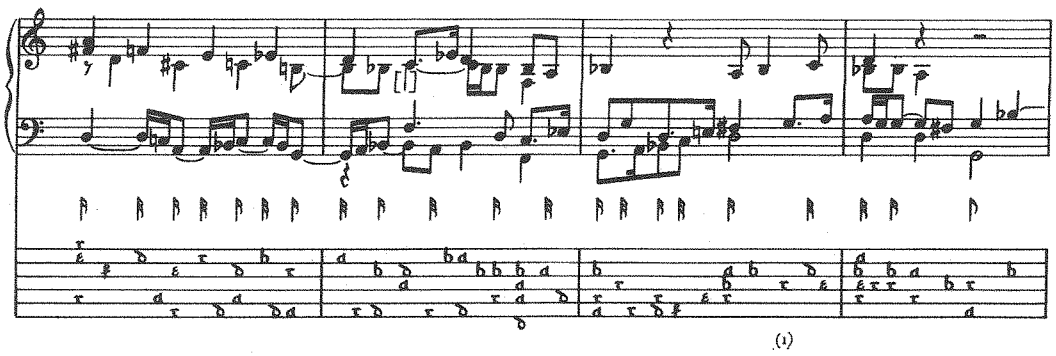
Writing polyphonically for the guitar carries inherent difficulties that are more easily surmounted in music for a keyboard instrument because of the greater independence of the two hands. The late Ralph Kirkpatrick, a leading American harpsichordist and Scarlatti scholar, describes polyphonic writing for the guitar as "impressionistic polyphony."

> In a web of sound dominated by vertical harmony, the movement of voices and the entrances of subjects and imitations are indicated, but not fully carried out. No strict conduct of horizontal parts can be maintained. The sharpness of musical outline is blurred by the necessary breakings of chords and by the impossibility of sound in all the voices simultaneously at the vertical points of consonance or dissonance at which they coincide. A whole technique of upwards and downwards and irregularly broken arpeggiation had to be developed in order to give the impression that parts are sounding simultaneously whereas really they are seldom together.[28]

Owing to the rapid decay of notes and "blurred" musical outline, extremely dense, contrapuntal writing for the solo guitar can indeed result in such impressionistic polyphony. Example 1.23 presents the lute tablature and transcription of a segment of John Dowland's masterwork, *Forlorn Hope Fancy* (ca. 1613), where a four-voice texture unfolds gradually within the context of a strikingly dense chromatic field.

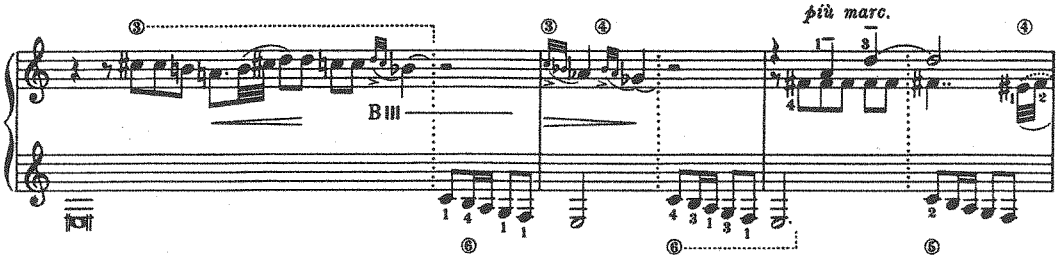


28 Kirkpatrick, *Domenico Scarlatti*, 196.



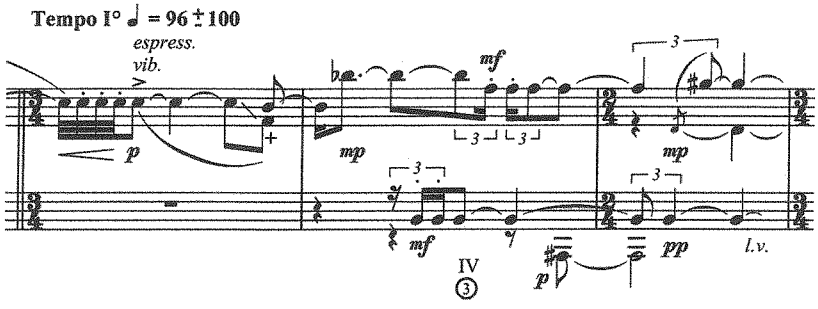
Example 1.23. Transcription of John Dowland's *Forlorn Hope Fancy* (1615), measures 1–12, Faber Music, 1978.

In Benjamin Britten's eighth variation of *Nocturnal* (Example 1.24), a work based on Dowland's *Come Heavy Sleep* (from the *The First Booke of Songes or Ayres*), polyphonic writing for the guitar is notated with two separate staves to lend clarity to the independence of the lines.



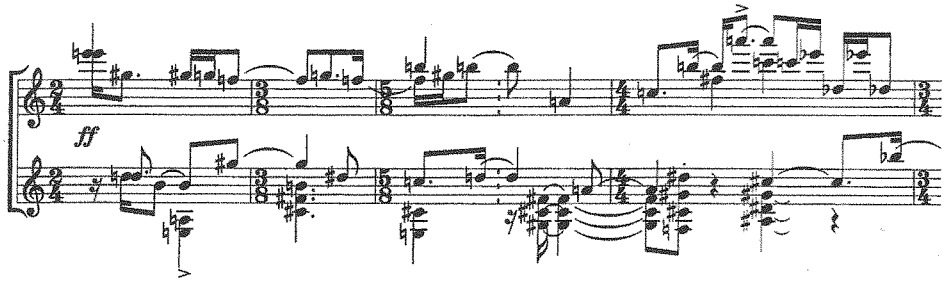
Example 1.24. Benjamin Britten, *Nocturnal*, op. 70, VIII Passacaglia, measures 4–6, Faber Music (Tempo: "measured," no metronome marking)

Mario Davidovsky employs a similar technique in *Synchronisms No. 10* (Example 1.25):



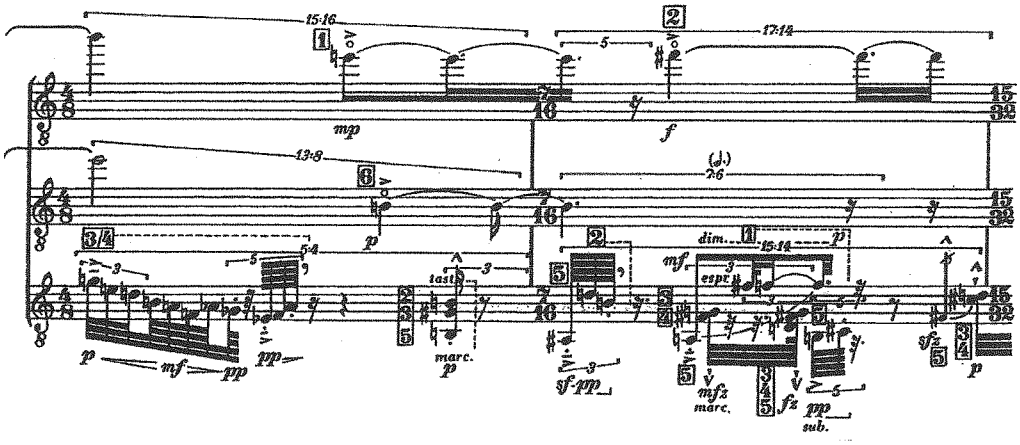
Example 1.25. Mario Davidovsky, *Synchronisms No. 10*, measures 43–45, Edition Peters

In Example 1.26, Charles Wuorinen uses two staves to filter the complexity of the guitar part's texture:



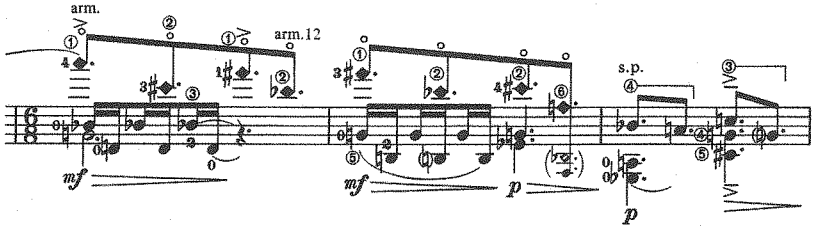
Example 1.26. Charles Wuorinen, *Guitar Variations*, page 17, system 3, Edition Peters (Tempo: ♩ = 76–80)

The idea of using separate staves to clarify the independence of musical lines is furthered by Ferneyhough's *Kurze Schatten II*, where all three lines are to be performed by a solo performer (Example 1.27).



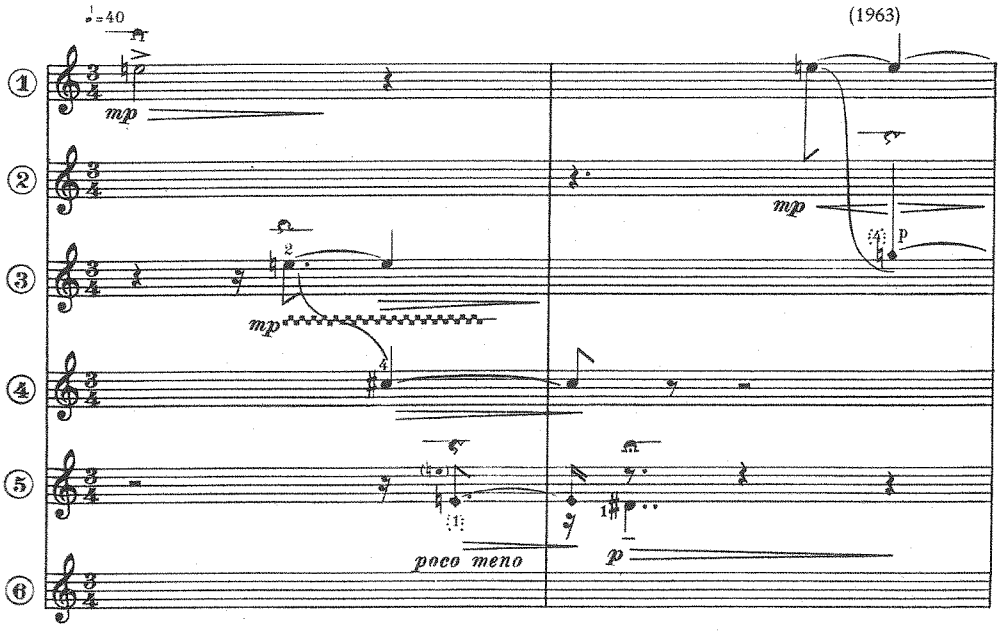
Example 1.27. Brian Ferneyhough, *Kurze Schatten II*, measures 3–4, Edition Peters (Tempo: ♪= 44 ca.)

Composers have also constructed "polyphony" by differentiating individual lines on the basis of timbre, as in the Takemitsu example below (Example 1.28). Here the presence of two simultaneous lines is made manifest through the distinction between harmonics (shaded diamond noteheads) and normally plucked notes.



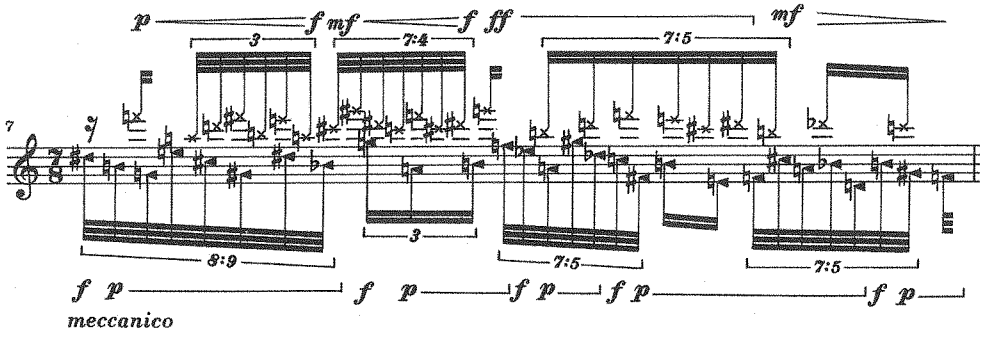
Example 1.28. Toru Takemitsu, *Equinox*, measures 17–19, Schott Japan (Tempo: ♩. = ± 48)

Written in 1963 by Alvaro Company, a former Segovia pupil, *Las Seis Cuerdas* (Example 1.29) is a work of striking originality that takes the idea of such timbral polyphony to its extreme. In this piece, Company brings different modes of RH timbral production into conflict with one another and reinforces the sense of opposition by using a separate stave for each string. These modes are indicated by the various symbols above the notes that will be explained in further detail in Section 8.5 of this chapter.



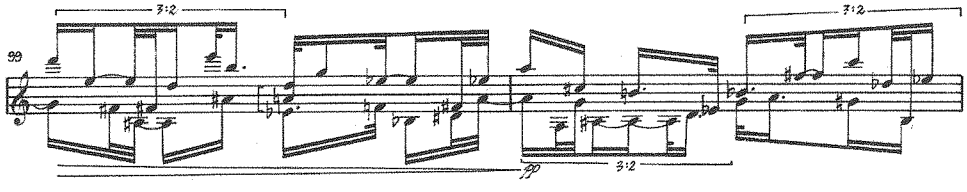
Example 1.29. Alvaro Company, *Las Seis Cuerdas*, measures 1–2, Edizioni Suvini Zerboni

The clearly delineated polyphonic lines of Hübler's *Reißwerck* (Example 1.30) pose rhythmic challenges for the performer. Hübler's use of distinctive noteheads for LH and RH actions both underscores the music's complexity and facilitates its execution. Here, the *x*-noteheads signal LH finger tapping, and the "beak" noteheads indicate notes to be stopped with the RH index finger with half harmonic pressure while plucking behind with the thumb (resulting in a dampened sound).



Example 1.30. Klaus K. Hübler, *Reißwerck*, measure 7, Breitkopf & Härtel (Tempo: ♪= 30 ca.)

James Dillon's *Shrouded Mirrors* at times pushes the guitarist's LH to the limits of its capacity. The sudden leaps that are occasionally required to attain the notated pitches force the performer to abandon notes prematurely, thereby attenuating their sound. In measure 99 (Example 1.31), the guitarist must abbreviate the low $A^{\sharp 3}$ in order to reach the following high G^{6}.



Example 1.31. James Dillon, *Shrouded Mirrors*, measures 99–100, Edition Peters (Tempo: ♪= 56)

1.7.6 Other ways of stopping notes on the fretboard

The history of the guitar has been fraught with disagreements about performance techniques, some of them very specific. One such debate, which reached its height at the beginning of the nineteenth century, centered on the use of the LH thumb as a means of stopping notes on the sixth string from above and behind the neck.[29]

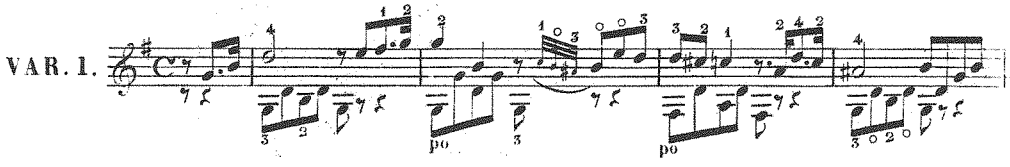
Even prior to this, lutenists were debating the subject passionately: Vincenzo Capirola stated in his lute book (circa 1517), "the less you use the thumb, the prettier things will look on the fretboard."[30] However, at the outset of the nineteenth century, the stakes increased. In his *Principes Généraux de la Guitare*, published in 1801, Charles Doisy had this to say on the use of the LH thumb:

> One uses four fingers in order to play the guitar. Some persons also enter the LH thumb into service sometimes; but, with this instrument, as with many others, one finds a bit of charlatanism sometimes mixed in, and since this is a subject I cannot deal with, I will only speak of four fingers, first, second, third and fourth.[31]

Ferdinando Carulli, on the other hand, took a more generous stance and supported using the thumb whenever it could prove helpful. In his *Méthode* (ca. 1810), he states:

> In some methods, the authors absolutely forbid the pupils to make use of the left hand thumb, by the side opposite the other fingers, on the sixth string and sometimes on the fifth. As music is more agreeable when it is richer with harmony, four fingers are not enough for its execution, and at the same time, a melody requires its bass notes in different keys, thus one must necessarily use the thumb; therefore, I invite all those who wish to play with a greater facility, to use it.[32]

Of course, one must bear in mind that the typical guitar in Carulli's day had a much narrower neck than the modern classical model, so that using the LH thumb to execute passages like that by Giuliani in Example 1.32 was considerably less awkward.



Example 1.32. Mauro Giuliani, *Variations pour la Guitarre sur un thême favori de l'opéra: Amazilia*, op. 128, Variation 1 (Tempo: "Allegro"). Courtesy of the Musik- och teaterbiblioteket / The Music and Theatre Library of Sweden. "Po" is the abbreviation for pouce, here indicating the LH thumb.

Although in vernacular guitar music one often sees the LH thumb used to stop notes on the sixth string, in contemporary guitar literature one seldom sees the LH thumb put it into play unless there are compelling reasons to do so, beyond that of mere guidance and support. When deployed, the LH thumb can be used to finger harmonics and half harmonics as well as normal notes.

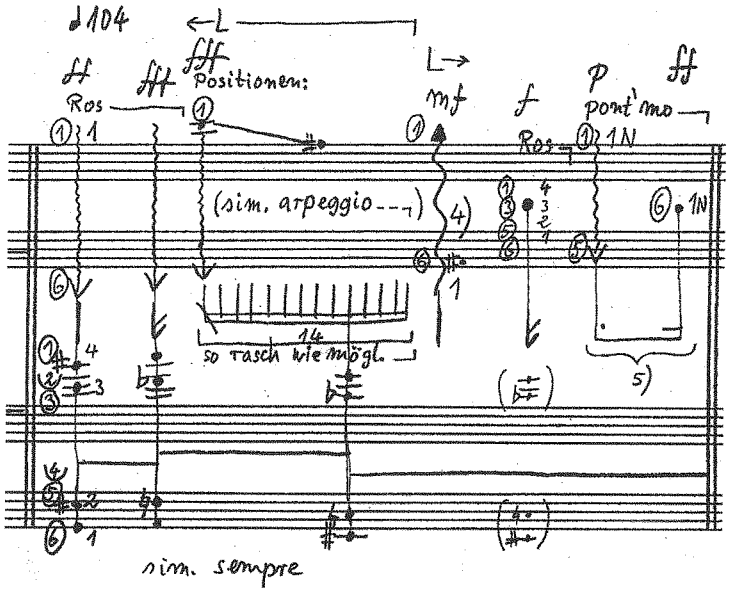
The LH thumb can also be brought around to the front of the fretboard to stop notes much as in violoncello technique. In the beginning of Example 1.33, Riehm uses the LH thumb (indicated by the non-circled number 1 in the bottom stave) to finger the *E* on string 6, followed by fingering strings 5, 3, and 1 with the index (1), middle (2) and ring fingers (3) of the LH (the half circled numbers indicate that strings 2 and 4 must be dampened). The upper two staves indicate strumming upwards across all six strings at the *rosetta* (Ros.) position with the thumb (1) of the RH.

29 Sparks and Tyler, *Guitar and its Music*, 261–263. See also Ophee, "Left-hand thumb."

30 . "...et manco che adoperi el deo groso, e piu bel al veder sul manego" Capirola, *Lute-book*, pl. 2–2 (translation Seth Josel).

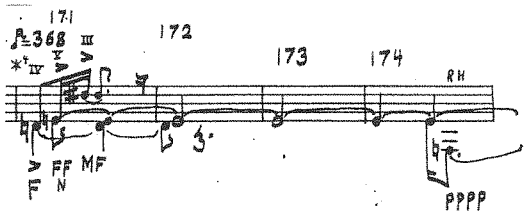
31 Doisy, *Principes généraux de la guitarre*, 11 (translation Seth Josel).

32 Carulli, *Méthode Complète pour la Guitare*, 6.



Example 1.33. Rolf Riehm, *Toccata Orpheus*, system 11 (measure 2), G. Ricordi & Co (Tempo: ♩ = 104)

In some cases, when the LH is stretched to its capacity, either the RH index or middle finger can be used to stop notes on the fretboard while the RH thumb is plucking just behind it. In Example 1.34, the RH finger is to stop the low *F* on string 6 and the RH thumb is to pluck the string quietly behind it, since the LH is busy sustaining a note in a higher position on the neck. Generally, when a string is plucked behind a note stopped with a RH finger on the fretboard, its sound will be weaker and feebler than it would be otherwise.



Example 1.34. La Monte Young, *for Guitar,* measures 171–174, Just Eternal Music (Tempo: = 368)

1.7.7 Barré positions

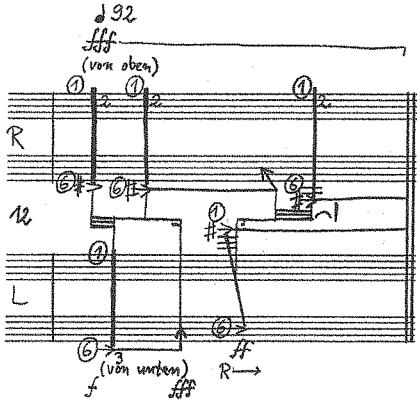
Barré techniques belong to standard LH fingering practices. A barré customarily involves pressing the index finger like a bar across all or several of the strings simultaneously to hold them fully against (*full barré*) or nearly against (*partial barré*) the fretboard. The action ostensibly shifts the nut upward toward the bridge, yet also limits the means for stopping notes to the remaining three fingers of the LH. Sustaining a barré for a period of time can be physically challenging. The most infamous barré study is Sor's *Étude, op. 29 no. 13* (published 1827), a work that taxes even the most seasoned guitarist's strength and stamina through its extensive use of barré fingerings.

Although unusual, it is possible to perform a partial barré with a digit other than the index finger. In Example 1.35, for instance, the guitarist is to bar two consecutive strings with the third finger of the LH.

Example 1.35. Leonard Schulz, *The Indispensible or Nine Progressive Exercises for the Guitar...*, op. 40, Study no. 12 (ca. 1840), J.G. Holm Facsimile Reproduction (18--?)
Courtesy of Det Kongelige Bibliotek Nationalbibliotek og Københavns Universitetsbibliotek

The Iberian guitarist Antonio Abreu describes an extension of the barré technique that he calls *zegilla ladeada torcida* (twisted barré). This variant involves laying the index finger diagonally across the strings so that the treble strings can be stopped at one fret and the bass strings at another.[33]

In Example 1.36, Riehm uses a combination of normal barré (the vertical lines) and twisted barré (the diagonal line across the lower two staves) executed with both the left and right hands on the fretboard. In other areas of the composition, he also makes use of the *half-pressure barré*, where the finger presses the strings down only halfway, so that they yield a muted sound when strummed.



Example 1.36. Rolf Riehm, *Toccata Orpheus*, system 12 (measure 1), G. Ricordi & Co

For his piece, *música impura*, Mathias Spahlinger uses four variants of barré to elicit subtle variations in pitch and timbre:

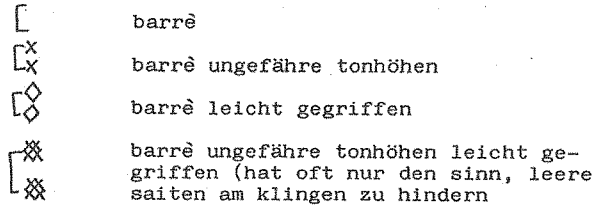
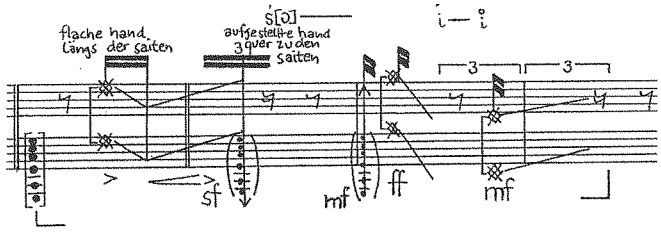


Figure 1.35. Mathias Spahlinger, *música impura*, legend, peer music[34]

In Example 1.37, the guitarist is to perform a LH barré exerting light pressure, first with the flat of the hand, and then with its edge. This technique mutes the chord and, as the LH whisks along the strings, gives each subsequent glissando different qualities of noise.

33 Abreu and Preito, *Escuela para tocar*, 78.

34 Legend translates as follows: Normal barré / Barré anywhere in the vicinity of the notated pitches / Barré with light left hand pressure (akin to a half harmonic barré) / Barré with light left hand pressure anywhere in the vicinity of the notated pitches. Spahlinger, legend for *música impura* (translation Seth Josel).

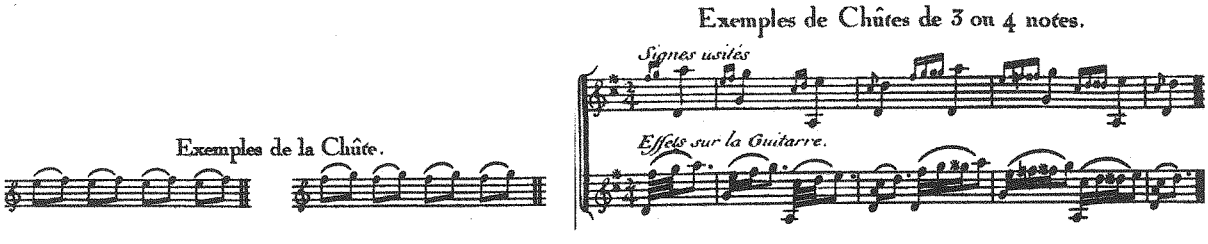


Example 1.37. Mathias Spahlinger, *música impura*, page 7, system 3, rehearsal 2, peer music (Tempo: ♩ = 68–72)
The upper system sounds two octaves lower and the lower system sounds one octave lower than written.

1.7.8 Slurs—hammer-on/pull-off

Slurring notes on the guitar involves energetic but supple movement of the LH fingers, either by pulling a finger off a string,[35] thus sounding the open string or a stopped note on that string, or by "hammering" a finger on a string, usually after plucking it.[36] Traditionally, a *pull-off* was called a *tirade* (drawing out), and a *hammer-on,* a *chûte* (fall) (Examples 1.38, 1.39). Although guitarists work years to develop the ability to play crisp, balanced-sounding slurs, composers can assume that under normal circumstances the slur's auxiliary note(s) will have slightly less amplitude than the initial plucked note. This imbalance applies to slurs in either pitch direction, i.e., ascending with hammer-ons, or descending with pull-offs. Furthermore, the LH pull-off or hammer-on action is limited to a linear sequence of at most four additional notes following an initial plucked note. When the player plucks a note stopped by the little finger, they can pull-off behind the little finger up to four times, the fourth action in this case being that the index finger pulls off to the open string. If the initial plucked note *is* the open string, the player can hammer on up to four times beginning with the index finger. The composer should also keep in mind that, when notating slurs in either direction, it is important to articulate slurs and phrasing separately.

Example 1.38. *Tirade* from Francesco Alberti's *"Nouvelle Méthode de guitar dans laquelle on y trouve différentes Variations, une Sonate, douze Menuets et six Ariettes ..."* (1786), reprinted in *Guitare: Méthodes-Traités-Dictionnaires et Encyclopédies-Ouvrages généraux,* vol. 2, (J.-M. Fuzeau, 2003), 93.



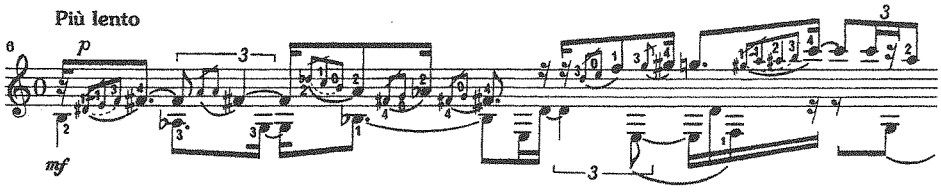
Example 1.39. Chûte from Giacomo Merchi's *"Traité des agrémens de la musique exécutés sur la guitarre ... œvre XXXVIe"* (1777), reprinted in *Guitare: Méthodes-Traités-Dictionnaires et Encyclopédies-Ouvrages généraux,* vol. 2, (J.-M. Fuzeau, 2003), 49–50.

35 Similar to a violin "LH pizzicato." Sparks and Tyler, *Guitar and its Music,* 265.

36 In his book on the Baroque guitar, Foscarini discusses the use of hammer-ons by theorbo players, referring to the technique as *strascini*. This is one of the first mentions of slurred notes in the guitar literature. Foscarini, *Cinque libri della chitarra,* 3.

Slurring can also be achieved by executing consecutive notes on different strings in such a way that the notes elide. This effect, known as *campanelas* (little bells) was a typical flourish on the Baroque guitar. It was intended to imitate the sound of the harp by allowing as much slurring as possible in scalar passages.

The practice of slurring on the guitar has continued into the twentieth century repertoire. In Example 1.40, Claude Vivier includes graceful slurring passages that require hammer-ons and occasional glissandi.



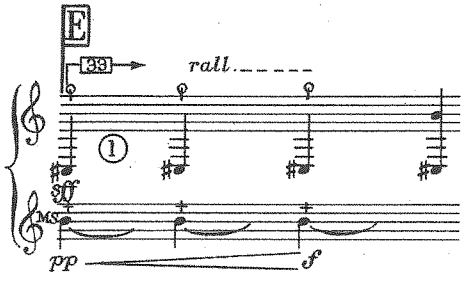
Example 1.40. Claude Vivier, *Pour Guitare*, system 6, Doberman-Yppan/Boosey & Hawkes (Tempo: ♩ = 72, though slower in this passage)

In much of contemporary guitar literature, slurring has been extended in various ways, but particularly through LH finger percussion. This technique produces a more "percussive" attack on the strings by setting the fingers perpendicular to the fretboard, as well as by making audible the presence of bi-tones. LH finger percussion and bi-tones will both be discussed more extensively in Chapter 3.

1.7.9 Extensions of the pull-off

Contemporary extensions of pull-offs have also yielded various forms of LH pizzicato. Reflecting standard string notational conventions, some composers have employed the "+" sign to signal their use, while others have invented their own designations. In general, the effect is not dissimilar to a LH pizzicato on a bowed string instrument in that the note (either a stopped pitch, or the open string itself) is sounded by an incisive pull-off. Properly executing any LH pizzicato demands that the guitarist take care *not* to activate the neighboring strings, which makes it an especially delicate manoeuver requiring considerable practice.

Example 1.41 shows a combination of *Bartók pizzicato* on the sixth string (upper stave) and LH pizzicato on the open second string (lower stave). The LH pizzicato yields a more delicate timbre than a pizzicato plucked with the RH. Because the LH pizzicato is being activated by a release of the string, the initial attack of the note sounds less decisive.



Example 1.41. Tristan Murail, *Tellur*, page 6, letter E, Éditions musicales transatlantique (Tempo: ♩ = 60)

A few recent composers have sought to simultaneously refine and exaggerate the pull-off action, multiplying its effects. In his *Toccata Orpheus*, for instance, Riehm achieves subtly different sonic results through carefully prescribed methods of releasing a string (Figure 1.36).

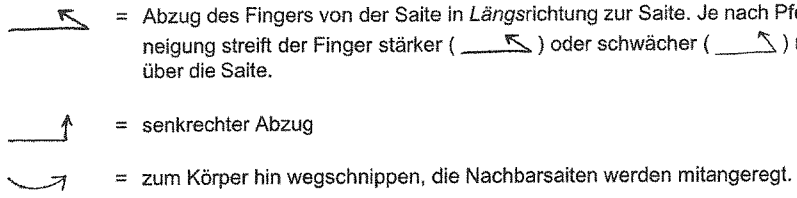
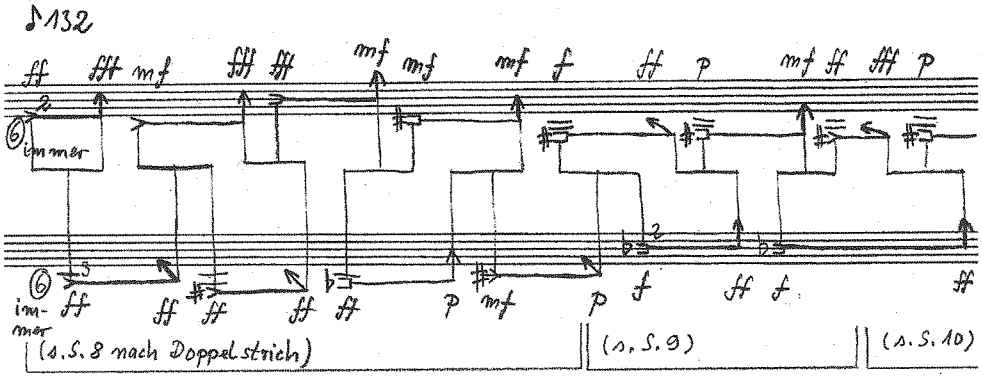


Figure 1.36. Rolf Riehm, *Toccata Orpheus*, legend, G. Ricordi & Co[37]

For example, one can: (a) allow the finger to glide quickly along the string creating a rapid glissandi before the moment of release; (b) lift off at a 90 degree angle or at an oblique angle from the fretboard, thereby brushing the string slightly before the moment of release (creating a little noise in the sound); or (c) violently snap the finger off the strings and set the neighboring strings in motion.

In Example, 1.42, both the LH (bottom stave) and the RH (upper stave) are to pull off the sixth string in a variety of ways as indicated by the arrows.[38] This generates a wonderful counterpoint between RH and LH tapping involving a virtual dance between the two hands as they repeatedly cross over one another



Example 1.42. Rolf Riehm, *Toccata Orpheus*, system 5, G. Ricordi & Co

1.7.10 Vibrato

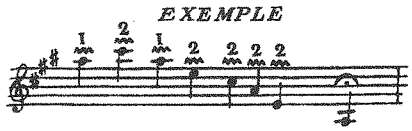
Vibrato entails small, pulsating changes in the frequency and amplitude of a note. To create this effect on the guitar, the finger induces oscillations in a plucked string by repeatedly shifting the pressure on it as the note sounds. The technique ostensibly prolongs a plucked note's duration while lending it a distinct singing quality, although applying vibrato at different rates and speeds will vary the intensity of its effect. In modern guitar literature, the standard signal for vibrato is the abbreviation *vib.* above a note.

Vibrato has a long history on plucked string instruments. Until recently, it was treated principally as

37 Legend translates as follows: Withdrawal of the finger from the string, pulling finger along the direction of the string / Depending on the angle of the arrow, the finger brushes the string more firmly or more lightly / Withdrawal from the fretboard (at a right angle) / Snatching away towards body, the neighboring strings are also activated. Riehm, legend for *Toccata Orpheus* (translation Seth Josel).

38 Each pull-off is preceded by an LH or RH tapping action on the string, a technique discussed in Chapter 3.

an ornament on single notes. As such it is clearly described for the lute in a number of treatises from the seventeenth century, and for the vihuela as early as 1557, in this case by Luis Venegas de Henestrosa.[39] Late eighteenth century works on methods for the early six-string guitar also make ample mention of *frémissement* (literally, quivering), a vibrato technique in which the finger rocks back and forth while the fingertip remains in place. An early example of vibrato as *frémissement* appears in Example 1.43. One can also find interesting examples of vibrati in contemporary music used for a variety of effects beyond what one normally associates with traditional vibrato.



Example 1.43. Francesco Alberti, "*Nouvelle Méthode de guitar dans laquelle on y trouve différentes Variations, une Sonate, douze Menuets et six Ariettes ...*" (1786), reprinted in *Guitare: Méthodes-Traités-Dictionnaires et Encyclopédies-Ouvrages généraux*, vol. 2, (J.-M. Fuzeau, 2003), 94.

In Figure 1.37, Company designates various speeds in vibrato as well as various changes in frequency through exaggerating the vibrato action.

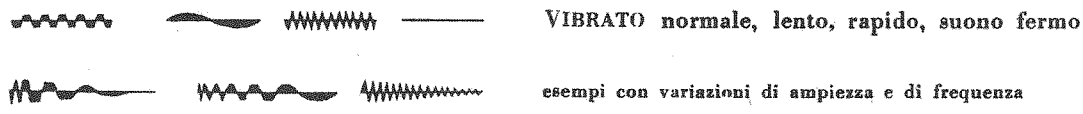
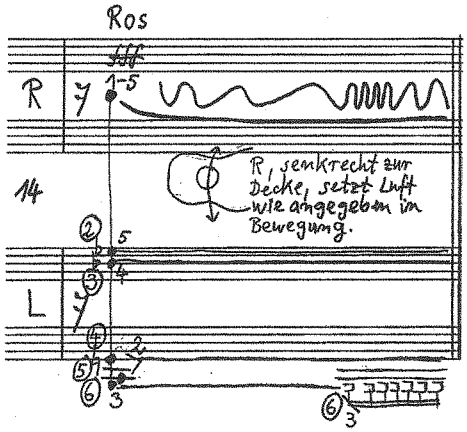


Figure 1.37. Alvaro Company, *Las Seis Cuerdas*, legend, Edizioni Suvini Zerboni[40]

In Example 1.44, Riehm has the guitarist generate a quasi *tremolo* resonance by twisting the instrument back and forth with the rosette turned to the ceiling. This action sets the air in motion, producing changes in amplitude very physically, with a result strongly resembling the so-called Leslie effect of a guitar amplifier.



Example 1.44. Rolf Riehm, *Toccata Orpheus*, system 14 (measure 1), G. Ricordi & Co (Tempo: ♩ = 72)

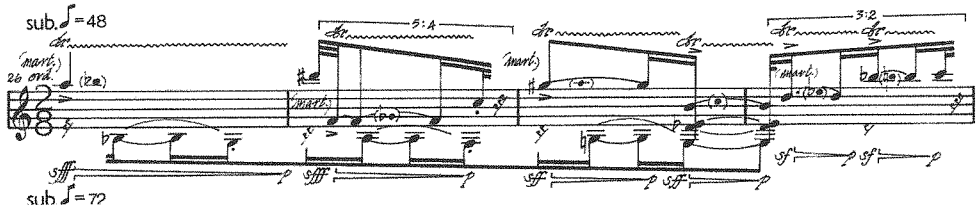
39 Venegas de Henestrosa, *Libra de cifra nueva para tecla, harpa y vihuela*, 35.

40 Legend translates as follows: Vibrato speeds: normal, slow, rapid, no vib. / Examples [of vibrato] with variations in amplitude and frequency. Company, legend for *Las Seis Cuerdas* (translation Eliot Fisk).

1.7.11 Trills—on one or two strings

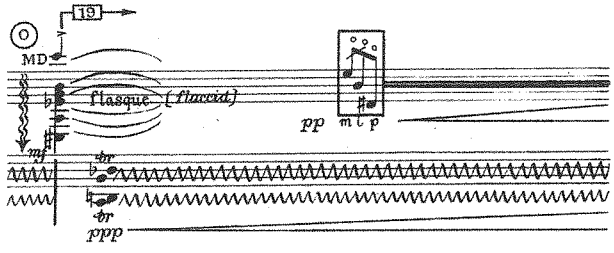
Considered by many to be an extension of vibrato, trills have been customarily performed utilizing a combination of rapid slurring movements (pull-off/hammer-on) on a single string following an initial attack. Recently, there have been attempts to complement trills with other actions, thus contributing to an increased density of texture. Trills can also be produced simultaneously on more than one string, as in double-stop trills on the violin.

In Example 1.45, trills on a single string provide a counterpoint to the melodic strand in the lower voice, increasing in density as the phrase progresses.



Example 1.45. James Dillon, *Shrouded Mirrors*, measures 26–29, Edition Peters

In Example 1.46, the guitarist executes a double trill on strings 5 and 3 with the LH (lower stave), which is accompanied by a RH arpeggiation (upper stave) of the open strings 1, 2, and 4, which is tuned to a $D^{\sharp}$.



Example 1.46. Tristan Murail, *Tellur*, page 7, system 4, Éditions musicales transatlantique.
No specific tempo indication given: approximate durations of entire sections in seconds are given at the beginning of each new section. The sections are marked by a capital letter. See Example 1.3

Composers have also asked for trilling within the same fret as the stopped note, thereby producing more of a change in timbre than pitch.

In Figure 1.37, Cornelius Schwehr indicates two subtly differentiated trills:

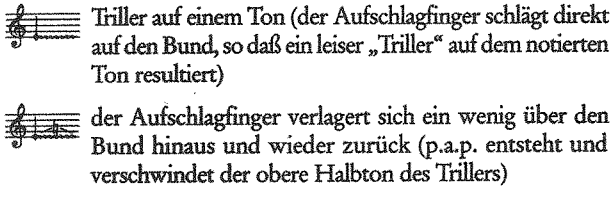
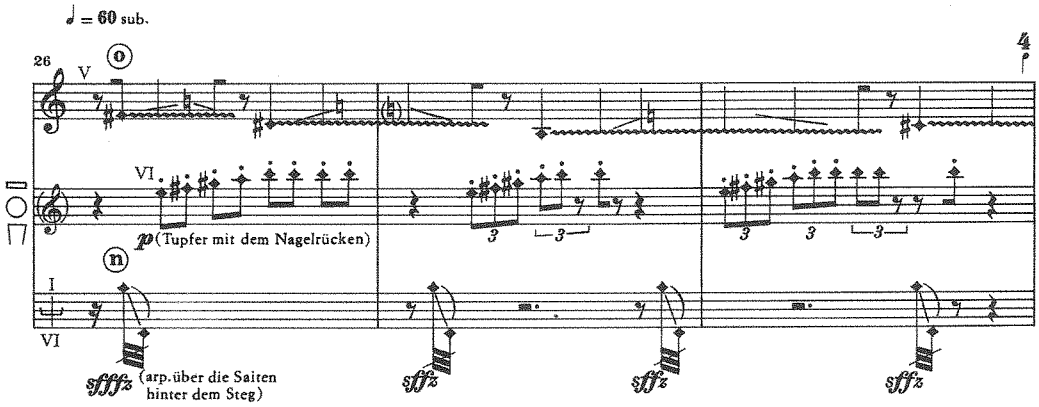


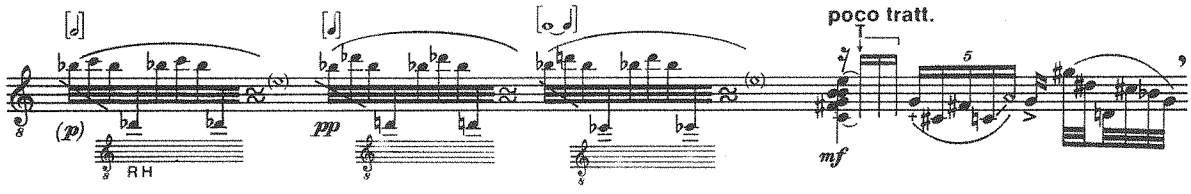
Figure 1.38. Cornelius Schwehr, *sub-version*, legend, Breitkopf & Härtel[40]

40 Legend translates as follows: "Special" trill, whereby the hammer-on finger is striking the fret just beyond the stopped note, thus resulting in a tremolo-like trill on the notated pitch / Same trill as above but followed by a slight movement of the hammer-on finger beyond the fret so that the half-step change of pitch slowly emerges and then disappears back into the tremolo-like effect. Schwehr, legend for *sub-version* (translation Seth Josel).



Example 1.47. Cornelius Schwehr, *sub-version*, measures 26–28, Breitkopf & Härtel

The single string trills found in Example 1.48 are striking in that a third pitch is added to them by use of a single RH finger hammer-on/pull-off (lower stave). This motion adds not only a further dimension of volume due to the stronger attack by the RH, but also some surface level excitement through the increased activity.



Example 1.48. Luciano Berio, *Sequenza XI*, page 5, system 4, Universal Edition (Tempo: ♩ = 60)

1.7.12 Glissandi/Portamenti

The contemporary glissando and *portamento* derive from vocal techniques that eventually transferred to the guitar. Vocalists of the early eighteenth century began sliding between two notes for expressive effect, an ornament that was gradually adapted for certain string and woodwind instruments, the guitar among them.[42] The *plainte*, a late-eighteenth century expressive technique in guitar performance, was described as the ascending sliding action of a finger along the string of a semitone, an action comparable to the *glissade*, which involved moving the finger in intervals up to and including a major third.[43] Similarly, the *portamento* (often notated with a diagonal line before the notehead) usually entailed approaching a note from a semitone above or below. In modern practice, the *portamento* requires sliding between notes to produce a continuously variable pitch. It is sometimes referred to as a continuous glissando. Here it is important to distinguish between a *slide*—a fast, continuous movement of the LH that does not yield audibly discrete notes between the beginning and ending pitches—and a standard *glissando*, a slower movement that does. It should also be noted that, regardless of speed, sliding up and down on a fretted string instrument produces a less continuous effect than on an unfretted instrument, for the frets act as interference, disrupting—albeit slightly—any

42 The *portamento* was first described in the eighteenth century by Garcia and, later, Marchesi, in the context of *bel canto, the* school of vocal methods prominent at that time.

43 Sparks and Tyler, *Guitar and its Music,* 269.

movement along a string over the fretboard. Nevertheless, historically portamenti (and other slides) have been favored techniques for the guitar, especially during periods such as the Romantic era, for they lend melodic lines a distinctive flair and expressivity.

Generally, glissandi can be executed either by plucking the initial note and sliding the LH finger to the final note without articulating it, or by plucking both initial and final notes to articulate them. Company, who equates glissandi with *portamenti*, notates these alternatives with the presence or absence of a slur over the notes.

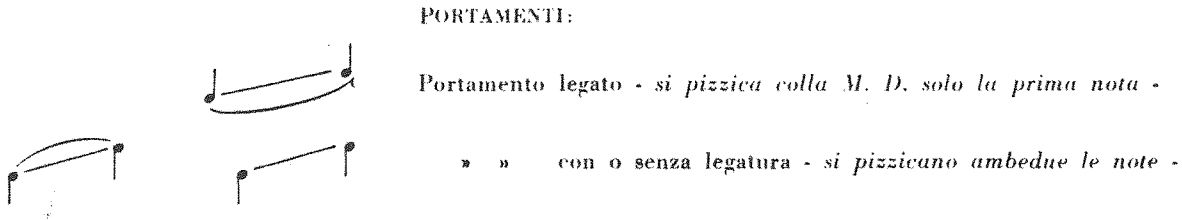
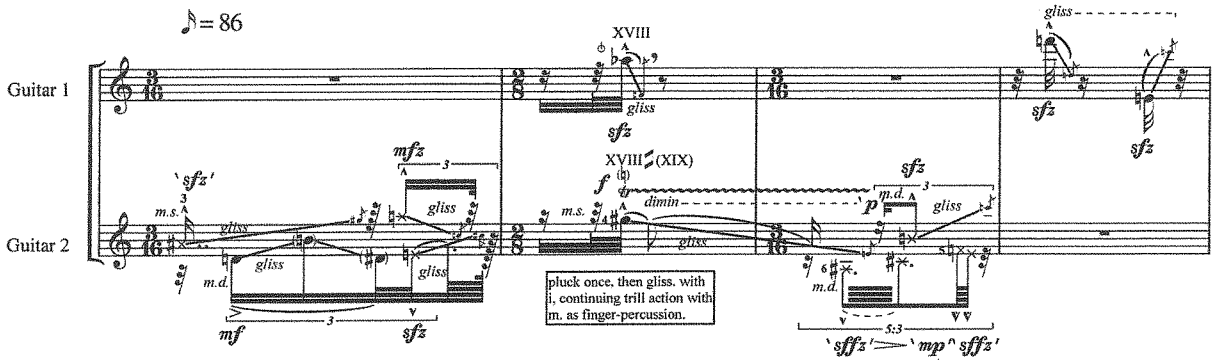


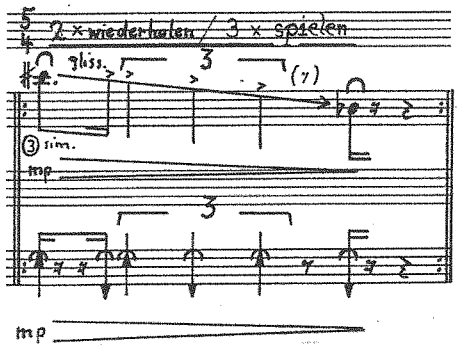
Figure 1.39. Alvaro Company, *Las Seis Cuerdas*, legend, Edizioni Suvini Zerboni

An excerpt from Ferneyhough's *no time (at all)* (Example 1.49), a piece for two guitars, features overlapping glissandi that are to be executed respectively by the left (m.s.) or right (m.d.) hand. The glissandi with *x-noteheads* indicate RH or LH finger percussion (that is, tapping the fingers against the fretboard without a plucked attack), which is followed by a glissando.



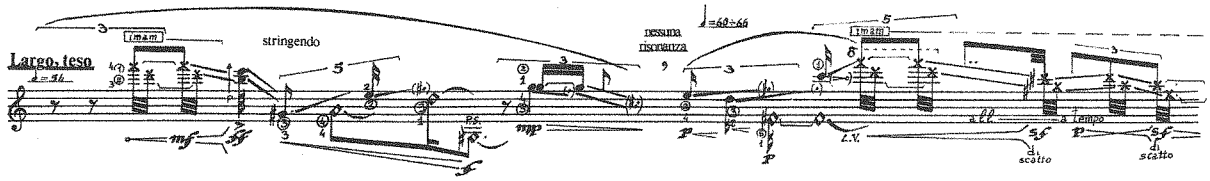
Example 1.49. Brian Ferneyhough, *no time (at all)*, third movement, measures 1–4, Edition Peters

In Example 1.50, in order to execute the music in the upper stave, the guitarist must slip the fingernail of the LH little finger under the third string and then perform a steady glissando between the notes indicated. In effect, the fingernail of the little finger acts as an ersatz bottleneck slide.

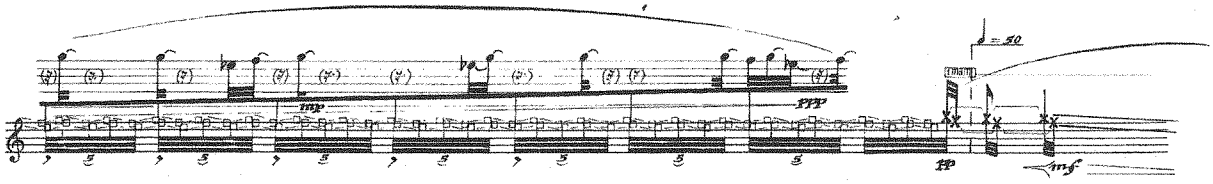


Example 1.50. Helmut Oehring, *Nr. 1 (aus: Koma)*, measure 15, Bote & Bock for two guitars. (Tempo: ♩ = 104)

Maurizio Pisati's *Sette Studi* (Example 1.51) occasionally calls for glissandi to be executed beyond the fretboard and over the rosette (as indicated by the *x*-noteheads). Example 1.52 indicates a rapid back and forth glissando by the LH while the RH plucks individual notes within the glissando (notated in the upper stave). The square noteheads indicate rapid ascending and descending glissandi performed by the LH alone, which yield a ghostly vibrato.

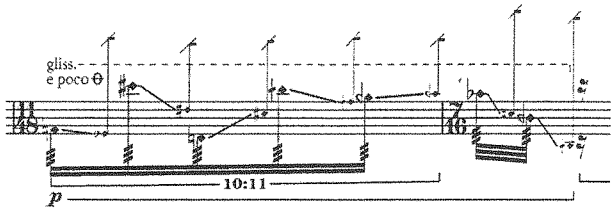


Example 1.51. Maurizio Pisati, *Sette Studi*, Studio 1, page 2, system 1, Ricordi



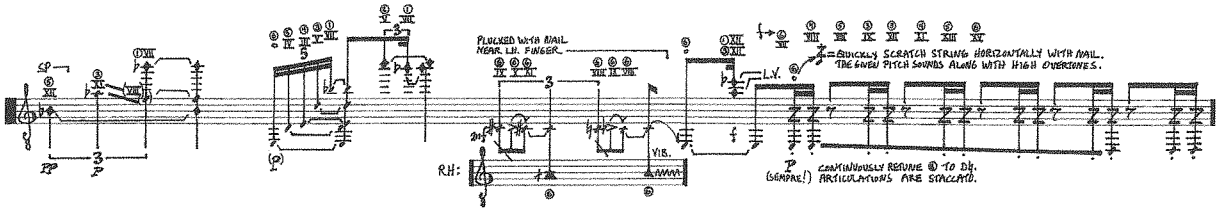
Example 1.52. Maurizio Pisati, *Sette Studi*, Studio 3, page 8, system 3, Ricordi (Tempo: ♪ = 112)

In Example 1.53, Mahnkopf asks for rapid LH glissandi with RH tremolo using half harmonic pressure in the LH.



Example 1.53. Claus-Steffen Mahnkopf, *Kurtág-Duo*, measures 53–54, CSM (Tempo: ♪ = 30)

Glissandi can also be produced by detuning the tuning pegs while playing. In Example 1.54, Applebaum has the guitarist detune the lowest string with the tuning peg while quickly scratching the string in the indicated rhythm (the "z" on the stem). This confluence of techniques yields high overtones from that string.



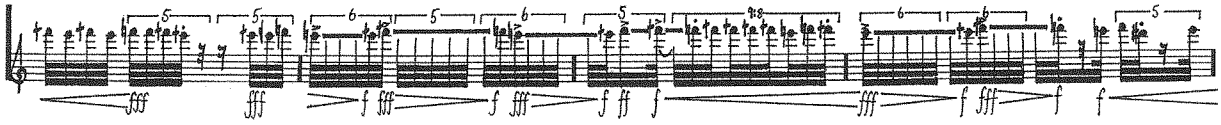
Example 1.54. Mark Applebaum, *DNA*, page 6, system 4, manuscript (Tempo: ♩ = 60)

1.7.13 String bending

String bending involves pushing or pulling a stopped string in a direction parallel to the frets and perpendicular to the string itself. Although the technique does not appear in the early literature for the classical guitar, one encounters it frequently in music for more vernacular genres

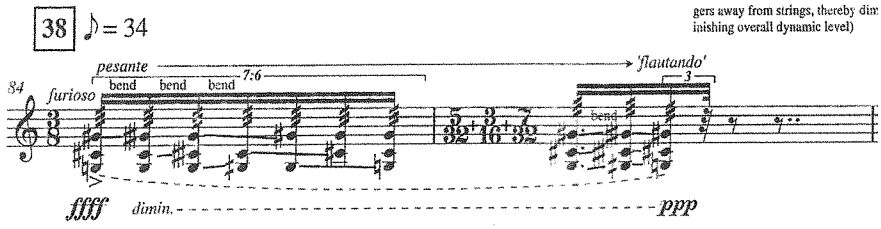
such as folk and blues. Bending the strings on the classical guitar can raise pitches microtonally or chromatically. In general, the ambitus of any given bend depends on where it occurs on the fretboard, for the position places constraints on the flexibility of the string. For instance, the pitches between the 10th and 14th positions are subjected to the least string tension, as they have the most string length at either end and therefore can attain the widest interval spans. In this position, the upper three strings can be bent a minor 3rd higher; the lower three strings can be bent comfortably a major 2nd higher. The farther one moves toward the nut, the less maneuverability one has. At the 3rd position, one can bend the strings at most a major 2nd, keeping in mind that the lower three strings require considerable effort. Large interval bends such as the minor 3rd and major 2nd will undermine the string's ability to remain in tune.

When string bends have been introduced into the contemporary classical repertoire, it has often been to extend the twelve-note tempered system microtonally. In Example 1.55, Ian Willcock has the guitarist bend the first string up a quarter-tone either in a continuous fashion to create a glissando or more discreetly by bending it before plucking to attain quarter-tone inflected pitches.



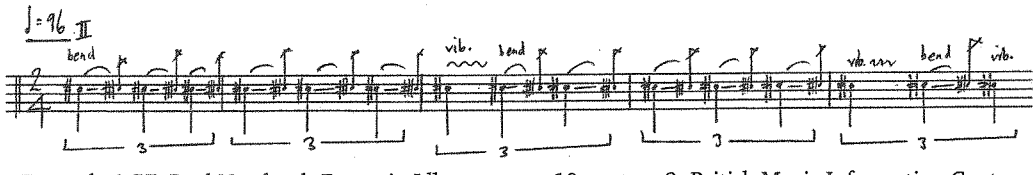
Example 1.55. Ian Willcock, *I Memory*, measures 171–174, Forward Contemporary Music (Tempo: ♪= 108)

In Example 1.56, there are three successive string bends of a quarter-tone on the lower three strings followed by a return to their original pitches, an action which is then repeated simultaneously. It takes a certain degree of finger strength and independence to successively bend the lower three strings in third position on the fretboard as required.



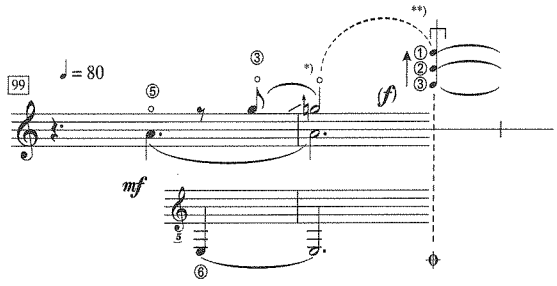
Example 1.56. Brian Ferneyhough, *Les Froissements d'Ailes de Gabriel*, measures 84–85, Edition Peters

Paul Newland employs string bends, often accompanied by vibrato, to invoke an exotic tone—in this case, that of Japanese Koto music (Example 1.57).



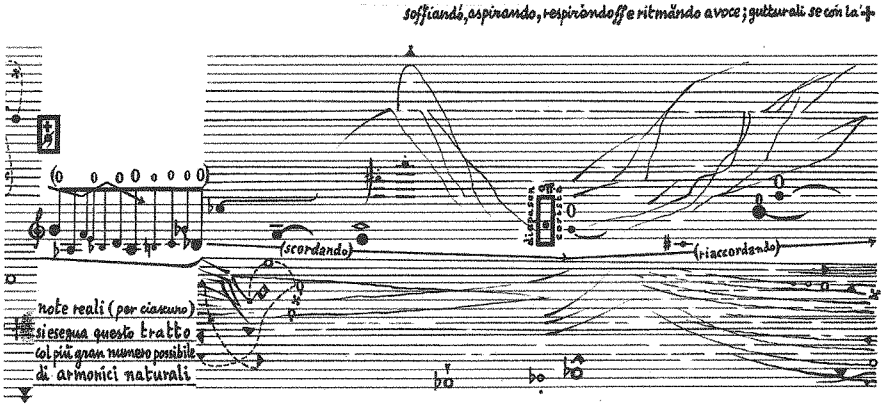
Example 1.57. Paul Newland, *Essays in Idleness*, page 10, system 3, British Music Information Centre

In Example 1.58, from a piece by Uroš Rojko, the composer instructs the guitarist to pluck the harmonic *G* and then bend the plucked string behind the nut in order to raise that pitch by a quarter-tone. The short diagonal line before the note signals the bend



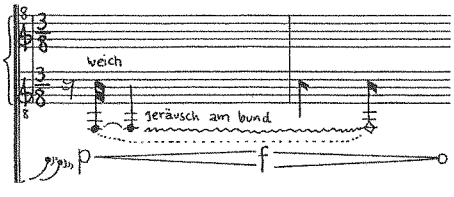
Example 1.58. Uroš Rojko, *Chiton (Pst!)*, measures 99–100, Verlag Neue Musik

For the opening of a passage from *Rara* (Example 1.59), Sylvano Bussotti stipulates that the guitarist use as many natural harmonics as possible, reminding the reader that the actual sounding pitch is an octave higher than notated. The $D^{\flat}$ at the end of the passage is best realized as an artificial harmonic that, once plucked, is detuned and retuned by the RH with the tuning peg. These actions create a beautiful smearing of the harmonic texture.



Example 1.59. Sylvano Bussotti, *Rara (eco sierologico)*, Page 3: rehearsal 3, Ricordi (Tempo: left up to performer)

In Example 1.60, the friction that results from a deliberately slow bending of string 6 back and forth against the metal fret produces a sound with subtle but distinctive noise components.



Example 1.60. Mathias Spahlinger, *musicá impura*, page 8, system 1, measures 1–2, peer music (Tempo: ♩ = 68–72)

1.8 RH techniques

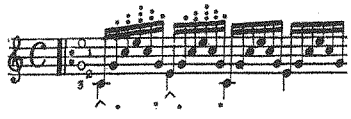
The guitarist employs the RH chiefly to pluck individual strings, or to attack multiple strings either simultaneously or in rapid succession. Over time, many RH techniques for plucking and strumming have been developed, and most continue to be invoked by composers writing today.

With many of these RH approaches, certain basic anatomical factors affect performance. The use of the little or *e* finger is impaired by the fact that it is relatively short and feeble; for this reason it is seldom employed outside of *rasgueado* strumming. The ring or *a* finger can (and must) be used quite frequently, but it generally lacks the agility and strength of the RH index (*i*) and middle (*m*) fingers, so it can be somewhat harder to control. However, it is the proper utilization of the thumb (*p*) that tends to pose the greatest challenges. The difficulties inherent in coordinated thumb movement are due largely to the digit's junction with the hand, for the thumb moves not only in opposing direction to the other fingers, but also from the wrist rather than from an isolated joint at its base. Consequently, while the thumb has the greatest strength and weight in attack, it tends to be clumsier in its execution because it can only pluck the string from the side of the nail.

1.8.1 RH patterns: arpeggiation (Giuliani, Tárrega, Pujol)

One of the most common ways to articulate a chord on the guitar is play the notes serially as opposed to all at once in a block. This technique is called *arpeggiation*, from the Italian *arpeggiare*—to play upon the harp. Its origins as far as the guitar is concerned can be traced to the French lutenists of the Baroque era who established the *stile brisé* (broken style), which consisted specifically in exploring how to articulate chordal progressions by fragmenting them. This new method of using the RH carried over into the late Classical and early Romantic periods, with the contemporary virtuosi developing it not only to new levels of complexity but presumably to new levels of speed as well. A pedagogical standard for the study of RH combinations is Giuliani's *120 Arpeggi* (from his *Studio per la Chitarra, opus 1*, 1812) where the myriad of RH fingering combinations is astounding.[44]

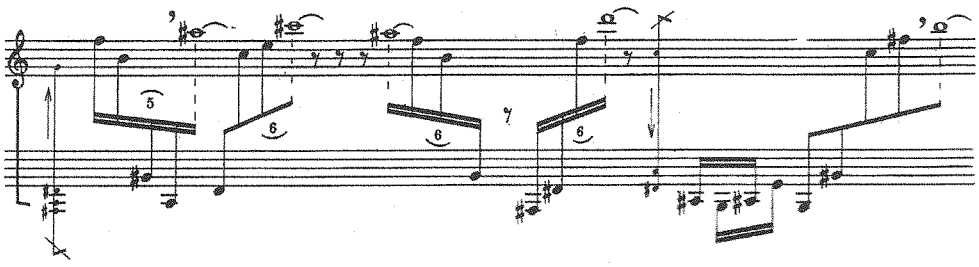
The speed of RH fingering necessary for arpeggiation varies from pattern to pattern. For instance, the sextuplet arpeggios from Giuliani's *120 Arpeggi* depicted in Example 1.61 can usually be played cleanly at a tempo of quarter = 90–100 MM.



Example 1.61. Mauro Giuliani, *120 Arpeggi*, #31 (1812), Tecla Facsimile Edition

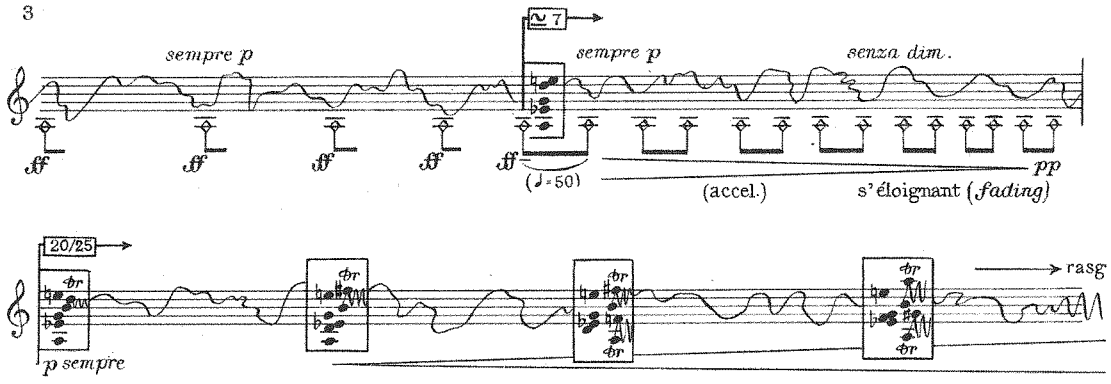
A multitude of RH arpeggiation patterns, as exemplified by Giuliani and later Tárrega, have been carried over into new contexts in the twentieth century guitar repertoire. In Example 1.62, Aldo Clementi explores typical arpeggiation patterns in a variety of different ascending and descending figures, often varying their timbres, rapid, slow, or quasi *cantabile*.

44 For further reference see the arpeggiation exercises in the method books by Aguado (1820), Roch (1921), and Pujol (1954).



Example 1.62. Aldo Clementi, *Dodici Variazione*, Variation 6, page 4, Edizioni Suvini Zerboni (Tempo: "presto possibile")

In Example 1.63, Murail asks for consistently varied and maximally rapid arpeggiations of the boxed notes. Trills are introduced in the second system to further heighten the activity of the irregular arpeggios, which eventually shift to *rasgueado* strumming.



Example 1.63. Tristan Murail, *Tellur*, page 3, systems 1–2, Éditions musicales transatlantique (Tempo: See Example 1.3)

1.8.2 RH strokes: *tirando* vs. *apoyando*

The standard method of plucking until the nineteenth century was the *tirando* or *free stroke*, in which an RH finger plucks the string and follows through toward the palm of the hand as a single gesture (Figure 1.40). The *apoyando* or *rest stroke*, which first emerged in the mid-nineteenth century classical guitar repertoire, is an interruption of the free-stroke where the finger pushes the string inward toward the soundboard as it plucks, and then comes to rest on the adjacent string.[45] Generally, the latter is perceived to be fuller in sound than the former, though many expert players can switch between the two with hardly a trace of difference. Some performers today do not use the *apoyando* in order to maintain a semblance of historical fidelity. By all accounts, it is often a personal decision as to which type of stroke a performer will employ. Many believe the *tirando* is the more natural stroke, and that one can control dynamics and tone more effectively with it. Moreover, as it is not customary for a composer to indicate *tirando* or *apoyando* stroking in a score, the choice is usually left to the guitarist.

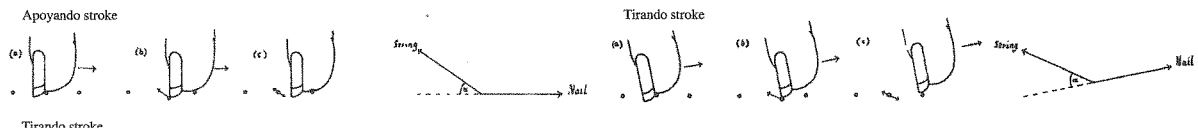


Figure 1.40. *Apoyando* and *tirando* strokes

45 Diagram from Taylor, *Tone Production on the Classical Guitar*, 46–47.

Nevertheless, some composers do stipulate the stroke, assuming that a timbral difference between them emerges. For *Las Seis Cuerdas,* (Figure 1.41), Company notates the *apoyando* stroke (*appoggiando*) and the *tirando* stroke (*non appoggiando*) as follows:

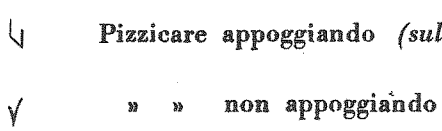
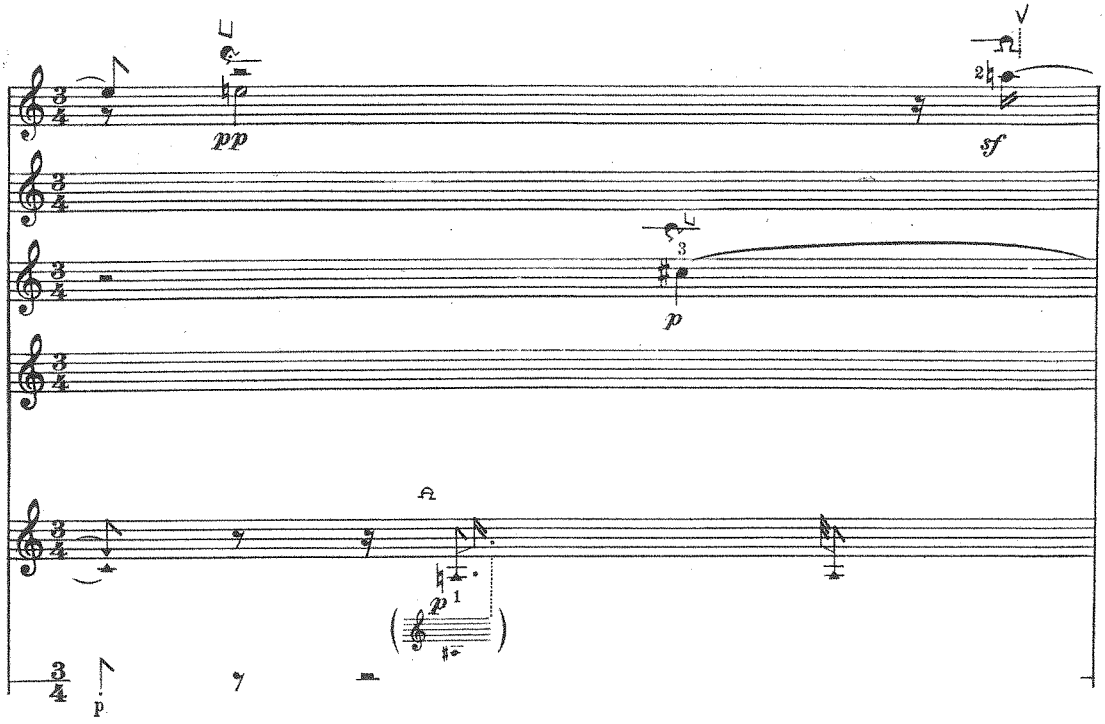


Figure 1.41. Alvaro Company, *Las Seis Cuerdas,* legend, Edizioni Suvini Zerboni

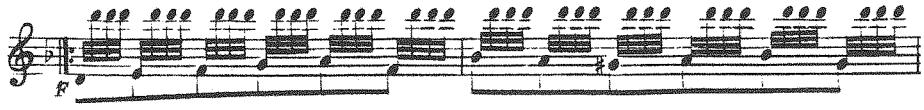
Example 1.64 shows the notation of the two different strokes in context. Company's multiple-stave notation will be examined in more detail below.



Example 1.64. Alvaro Company, *Las Seis Cuerdas,* page 8, system 2, Edizioni Suvini Zerboni (Tempo: ♩ = 40)

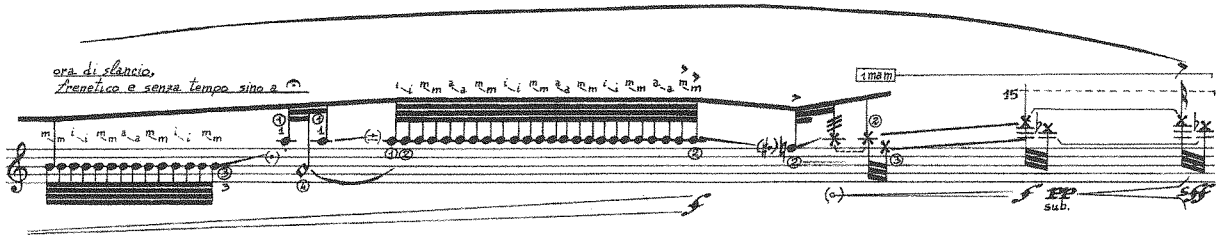
1.8.3 Tremolos

A tremolo on the guitar consists in the rapid alternation of two or more notes. Like vibrato, it engenders an auditory illusion of sustained, though wavering sound. The addition of notes to tremolo combinations naturally increases their complexity in terms of both acoustics and performance. Executed by the RH *p-a-m-i* fingers, the four-note tremolo is one of the most challenging of all guitar techniques. Most famously exploited by Tárrega in his *Recuerdos de la Alhambra* (1896), the pattern actually dates back at least to the earliest part of the century when Salvador Castro de Gistau used it in the finale of his *Mélange d'airs ou Pot-Pourri* (Example 1.65). However strenuous it may be, this combination is nonetheless surpassed in difficulty by tremolos in the flamenco tradition, which can comprise as many as five (*p-i-a-m-i*) or even six (*p-i-m-a-m-i*) notes.



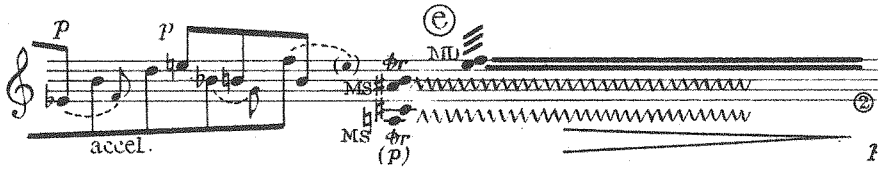
Example 1.65. Castro de Gistau, *Fandango*, op. 12, (17--?), page 11, system 7, Studio per Editione Scelte (Tempo: "Allegro")

The semblance of continuous, sustained sound that a tremolo affords has been explored in contemporary guitar literature by extending the traditional tremolo technique. In Example 1.66, the composer/guitarist Pisati introduces a series of unique tremolo effects requiring novel RH fingerings so as to achieve a continuum of sound. Two slightly different combinations, both based on the central *i-m-a-m-i* circular finger pattern, are required. When played on two or three strings, each finger consecutively plucks the uppermost string, passing from that string to the string below in rapid succession, much as in a tremolo of double or triple stops. A striking sound world emerges as these variant tremolos converge with LH glissandi. The *x*-noteheads indicate half harmonic pressure.



Example 1.66. Maurizio Pisati, *Sette Studi,* Studio 1, page 3, system 4, Ricordi (Tempo: ♩ = 54)

In Example 1.67, the RH index finger, designated by *MD*, stops F^5 on string 2 (at letter **e**) whereupon the RH thumb lightly tremolos back and forth in alternating down and up strokes across strings 2 and 1. This manoeuver is an extremely challenging variation on the tremolo technique since the upward motion of the thumb is not often employed, except in *rasgueado* strumming.

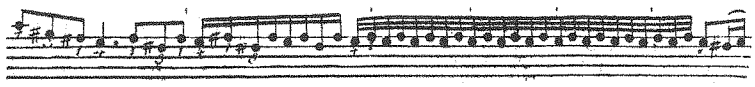


Example 1.67. Tristan Murail, *Tellur*, page 4, system 6, Éditions musicales transatlantique (Tempo: See Example 1.3)

1.8.4 Cross-string trill

The cross-string trill is an ornamental device that involves rapid play on two strings, alternating between notes that are usually a tone or semitone apart. It has become a standard guitar technique because it offers greater resonance, dynamic control, and definition than a slurring trill on a single string achieved by way of a hammer-on. Many guitar treatises and instructional books of the early nineteenth century recommend executing a trill on two strings as opposed to one.[46] Example 1.68 is from Simon Molitor's *Große Sonata*, op. 7 (published 1856), which stipulates moving from a one-string trill to a cross-string trill in order to imitate the sound of a harp.

46 Molitor (1806 and 1812), Bathioli (1823), and Giuliani (1812). Cadential cross-string trills also feature in method books by Carulli, Molino, and Carcassi, as well as in the Baroque guitar repertoire (e.g., Murcia [1714] and Granata [1646]). The Russian guitarist Andrei Sychra invokes the cross-string technique in his *Étude* (1817). Ophee, *The Russian Collection, vol 2.*, m 42.



Example 1.68. Simon Molitor, *Große Sonata*, op. 7 (Tempo: "Agitato non troppo")
Courtesy of the Bayerische Staatsbibliothek

Figure 1.42 shows the performance note to the piece in which Molitor prescribes various RH fingerings for the cross-string trill, using numbers to indicate the RH fingers (where $0 = p$, $1 = i$ and $3 = a$):

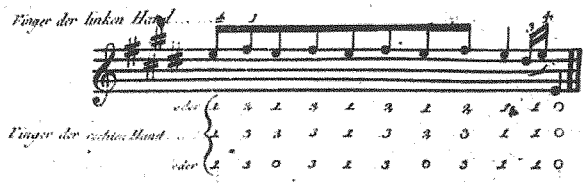
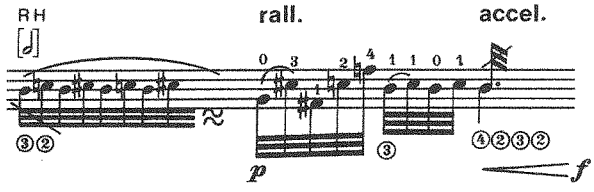


Figure 1.42. Simon Molitor, *Große Sonata*, op. 7 (performance note) (1856). Courtesy of the Bayerische Staatsbibliothek

Contemporary guitarists and composers both employ the cross-string trill to great effect. The notable guitarist Eliot Fisk, for instance, has introduced these trills into his interpretations of Baroque music in order to emulate the sound of the same embellishment on a harpsichord. One also finds this technique prevalent in Berio's *Sequenza XI*, a work dedicated to Fisk. In Example 1.69, Berio embellishes the *B/C* cross-string trill by adding a third pitch, namely $C^{\sharp}$. The guitarist is to execute this flourish simply by sliding the LH finger upward and then backward one fret.[47]



Example 1.69. Luciano Berio *Sequenza XI*, page 3, system 5, Universal Edition (Tempo: ♩ = 60)

1.8.5 RH timbre

With its surfeit of musical possibilities, the guitar has been compared on more than one occasion to a "miniature orchestra".[48] That metaphor must refer, at least in part, to the wide range of timbres available as one plucks along a string. These tone colors multiply between the bridge and the second partial at the twelfth fret, the region dedicated largely to RH activity. Plucking at different positions is thought to evoke specific timbral qualities (Figure 1.43), although the coloration may also be influenced somewhat by the means used to pluck. Indeed, for precisely this reason, debate raged in the late eighteenth and early nineteenth centuries about whether to employ the fingernails or the fingertip to pluck the strings. While modern practice favors the nails, the flesh is sometimes used to elicit subtle shadings and to filter sounds as well. In fact, the modern classical guitar sound typically combines both components, flesh and nail, with the flesh adding some warmth to it.

47 Fisk also has experimented with different fingerings for cross-string trills, trying to achieve varying expressive results depending upon context. He has found that the best way to execute the trill on two strings is with the *i* and *a* fingers.

48 A remark attributed to Beethoven and later invoked by Segovia. Segovia, "The Romance of the Guitar," 318. Another reference to the guitar's "orchestral-like" colors was made by Fernando Ferandiere in his book on the Spanish guitar: "It [the guitar] can easily imitate other instruments such as flutes, trumpets, or oboes, and has the ability to accompany singing as if it were a pianoforte." Ferandiere, *Arte de tocar la guitarra*, 77.

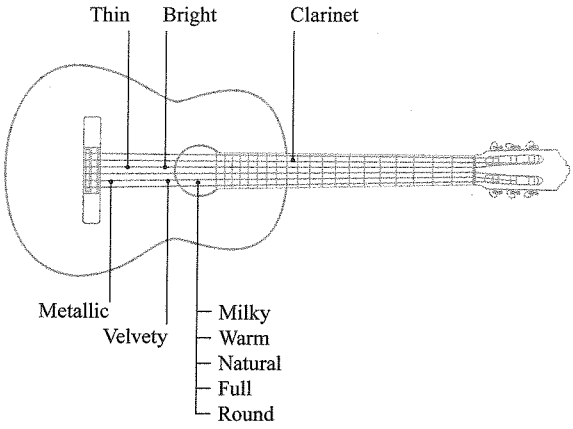


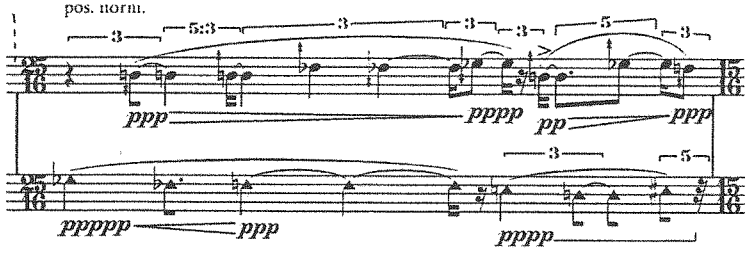
Figure 1.43. Right hand plucking positions for timbral variety

The standard designations for areas along the string for RH activity are as follows:

Molto sul ponticello	very close to the bridge
Sul ponticello (pont.)	near the bridge
Ordinario	between the soundhole and bridge (nearer to the soundhole)
Sul boca	over the soundhole
Sul tasto	over the frets (between the 12th and 19th frets)
Flautando	over the 12th fret (octave nodal point)

A common coloration device is the *flautando*, a plucking action at the first harmonic node of the string. This technique produces a warm and velvety tone akin to the sound of a clarinet, whose peculiar harmonics are generated naturally by the instrument's cylindrical bore.[49] Because of the delicate nature of the *flautando* action, it is generally played very softly. One needs to exercise caution when playing extreme sul tasto since the fretboard and frets can impede the rapid motions of the RH fingers.

In Example 1.70, the lower line is played with the "clarinet sound" (indicated by the triangular-shaped notes), and acts as a counterpoint to an ascending microtonal line, all played at hushed, ultra-*pianissimo* dynamics.[50]



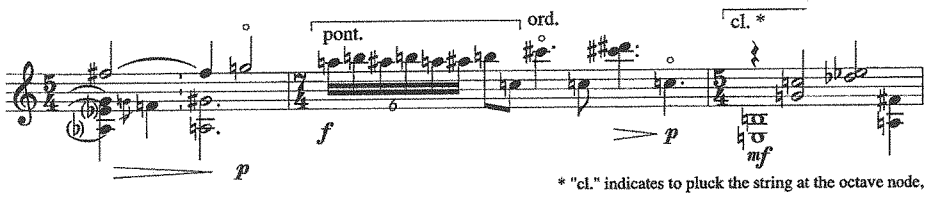
Example 1.70. Claus-Steffen Mahnkopf, *Kurtág-Duo*, measure 2, CSM (Tempo: ♪= 30)

49 In his music, Reginald Smith Brindle refers to this technique as "12° tasto" (*El Polifemo de Oro*, 1956) and later, as the "clarinet tone." (*Do Not Go Gentle*, 1976). Similarly, Brian Ferneyhough calls it the "clarinet sound." (*Kurze Schatten II*, 1992).

50 Guitar 1 features a radical scordatura; see example in "Category 2" in the scordatura section above.

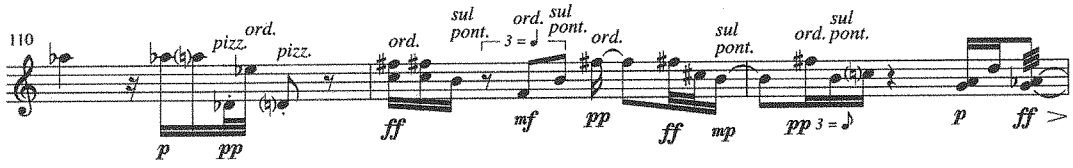
ANADOLU UNIVERSITESI

A passage from Wuorinen's *Guitar Variations* (Example 1.71) requires consecutively plucking sul ponticello, ordinario, and clarinet so as to evoke these three distinctive timbral qualities.



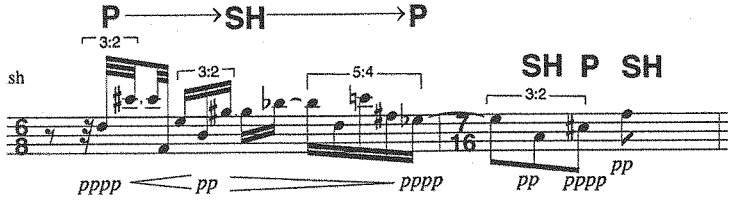
Example 1.71. Charles Wuorinen, *Guitar Variations*, page 1, system 4, Edition Peters (Tempo: ♩ = 76–80)

In Example 1.72, Milton Babbitt creates sharp timbral contrasts as the RH radically shifts positions between sul ponticello and ordinario, the former always occurring on the same pitch, thereby drawing a pitch–color relationship.



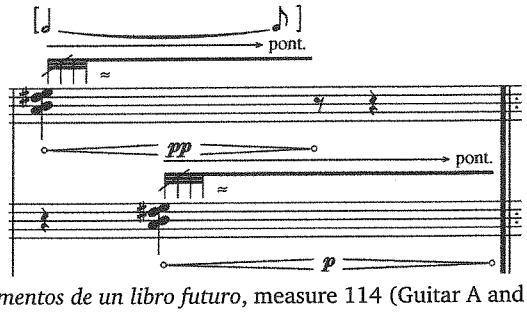
Example 1.72. Milton Babbitt, *Sheer Pluck*, measures 111–112, Edition Peters (Tempo: ♩ = 69 ca.)

During the execution of a passage, one can gradually shift RH position from sul tasto to sul ponticello or vice versa, thus creating a slight morphing effect in the timbral spectrum. Example 1.73, from a piece by Joanna Bailie, demonstrates this idea.



Example 1.73. Joanna Bailie, *Primary Interpolations*, measures 123–124, manuscript (Tempo: ♪ = 120; SH = soundhole and P = sul ponticello)

In Example 1.74, Beat Furrer asks that two guitarists rapidly arpeggiate the notated chord while shifting the RH position from ordinario to sul ponticello, creating a flurry of notes that become more "brittle" in character.



Example 1.74. Beat Furrer, *Fragmentos de un libro futuro*, measure 114 (Guitar A and B), Bärenreiter (Tempo: ♩ = 72)

Lachenmann's notations for various plucking positions with the RH include indications to move the RH from one position to another while plucking (Figure 1.44). At one point the guitarist is to pluck the strings between the nut and the LH producing bi-tones, a technique that will be discussed in Chapter 3.[51]

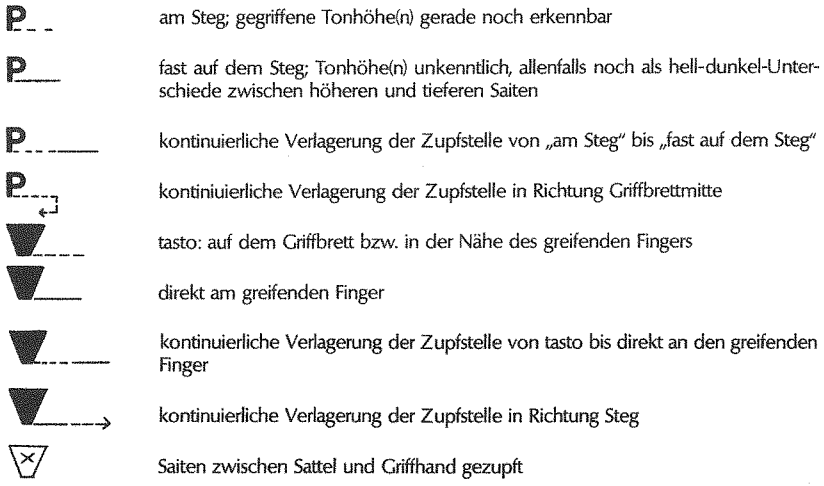
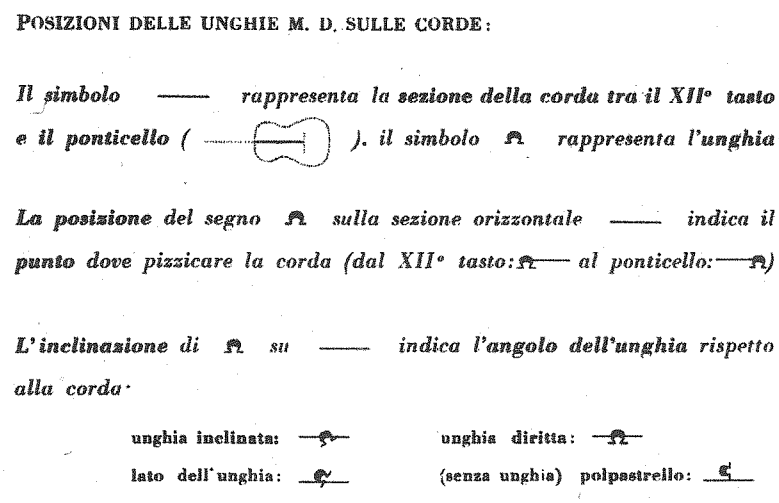


Figure 1.44. Helmut Lachenmann, *Salut für Caudwell*, legend, Breitkopf & Härtel[52]

In the legend to *Las Seis Cuerdas*, Company presents four symbols, each indicating the specific type of attack to be employed. Three variations refer to the angle of the nail in relation to the string; a fourth refers to the use of the fingertip without any nail. In addition, Company uses a horizontal line as an analogue for the fretboard in order to indicate the point of attack along the string. Below the explanations for these symbols are four examples of nail angle and attack point (Figure 1.45)



51 The published English version of the performance notes erroneously translates the word *saddle* as *nut*.

52 Legend translates as follows: At the bridge / the stopped pitches are just barely recognizable / Almost on the bridge / the pitches are no longer recognizable / at most as a difference of light and dark shading resulting from the higher and lower strings / Progressive shifting of the plucking position from "at the bridge" to "almost on the bridge" / Progressive shifting of the plucking position towards the middle of the fretboard / Tasto: on the fretboard or in the vicinity of the stopping finger / Directly next to the stopping finger / Progressive shifting of the plucking position from tasto towards the point directly in front of the stopping finger / Progressive shifting of the plucking position towards the bridge / Pluck the strings between the nut and the stopping hand. Lachenmann, legend for *Salut für Caudwell* (translation Seth Josel).

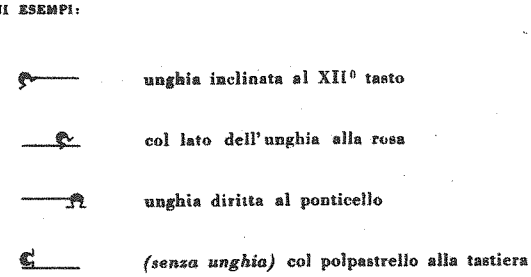
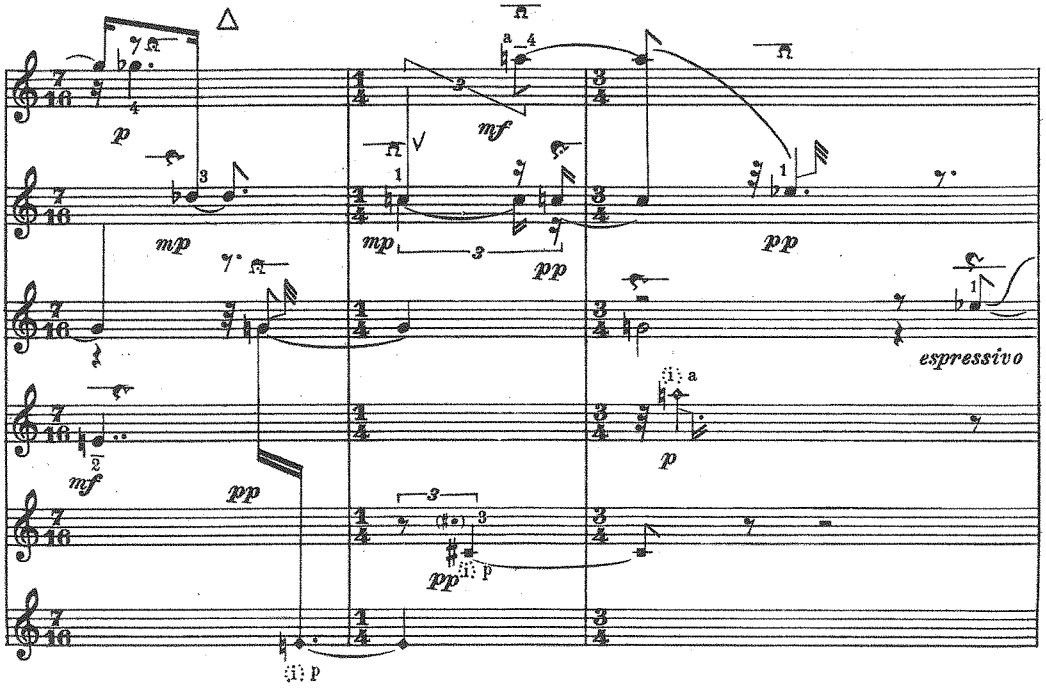


Figure 1.45. Alvaro Company, *Las Seis Cuerdas*, legend, Edizioni Suvini Zerboni[53]

In Example 1.75, the diamond and square noteheads indicate natural and artificial harmonics, respectively.



Example 1.75. Alvaro Company, *Las Seis Cuerdas*, page 10, system 2, Edizioni Suvini Zerboni (Tempo: ♩ = 40)

Whenever a composer develops such a detailed coloration scheme, it is important to leave ample time within or between phrases for the guitarist either to shift the RH position along the string or to change the angle of the nail to be employed. In general, timbral contrasts achieved by shifting position along the string are easier to execute than those involving rapid alternation between the nail and flesh.

53 Legend translates as follows: The symbol represents the section of the bridge between the 12th fret and the bridge / The symbol represents the fingernail / The position of [the sign] on [the line] indicates the point where the string must be plucked, from the 12th fret to the bridge / The inclination of [the sign] on [the line] indicates the angle at which the fingernail plucks the string / (4 angles shown) Fingernail inclined; fingernail straight; side of the fingernail; with the fingertips / A few examples: Fingernail inclined at the 12th fret / With the side of the nail at the soundhole / Fingernail straight at the bridge / (Without the nail) with fingertips at the fretboard.. Company, legend for *Las Seis Cuerdas* (translation Seth Josel).

1.8.6 Filtering

Pressure from the RH palm can be used to *dampen* strings after their attack. This dampening can immediately stifle the resonance of a note or chord. Furthermore, pressing slowly with the right side of the RH palm can gradually extinguish a sound, in contrast to the abrupt effect of a sudden dampening gesture.

In *Salut für Caudwell,* Lachenmann proposes dampening the strings with either the RH arm or palm in order to produce stopped pitches whose resonance is thereby "choked". The composer's symbols for dampening and "undampening" the strings appear in Figure 1.46.

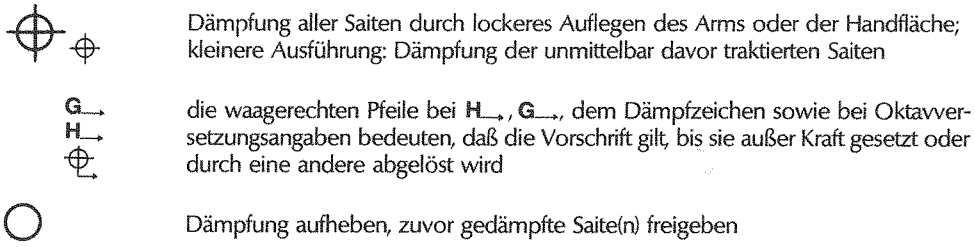
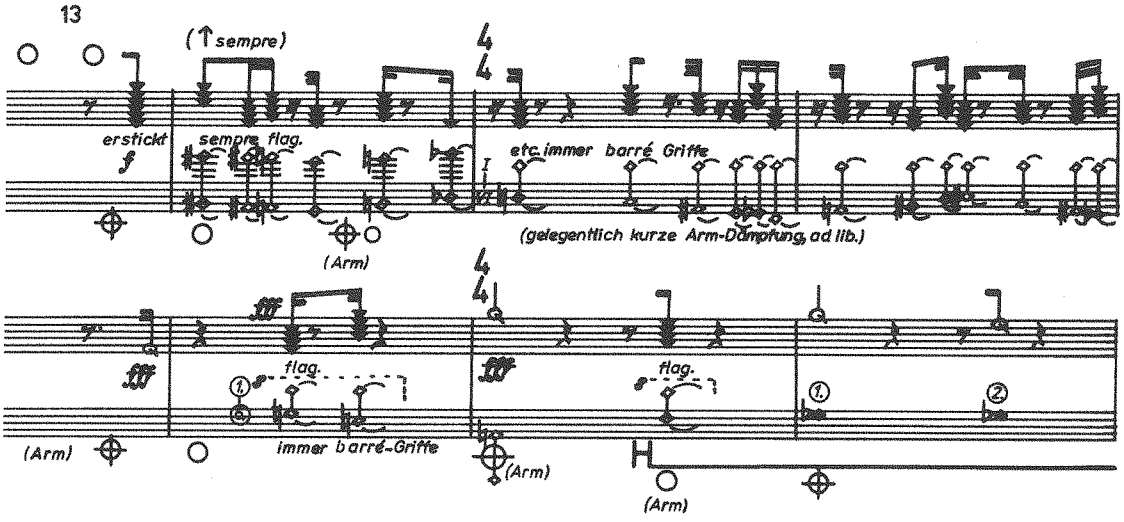


Figure 1.46. Helmut Lachenmann, *Salut für Caudwell,* legend, Breitkopf & Härtel[54]

An excerpt (Example 1.76) from the same piece indicates that the two guitarists are to alternate between playing ringing, barré harmonic chords and immediately dampening them, as if to abruptly suffocate the sound. These actions are indicated below the lower staves in each guitar part through the alternation of crossed and open circles.



Example 1.76. Helmut Lachenmann, *Salut für Caudwell,* measures 224 - 226, Breitkopf & Härtel (Tempo: ♪= 100)

54 Legend translates as follows: Damp all strings by lightly laying the arm or the flat of the hand on them / Shorter version: damp all the strings which have just been touched / The horizontal arrows at H, G, at the mute sign and the octave transpositions signify that the action is to be maintained until it is annulled or replaced by another / Stop damping after releasing the previously muted strings. Lachenmann, legend for *Salut für Caudwell* (translation Seth Josel).

Lachenmann also instructs the guitarist to pat the hand up and down very close to the bridge so that the alternating pressure and release creates a quasi "wah-wah" effect (Figure 1.47). This effect is shown in context in Example 1.77.

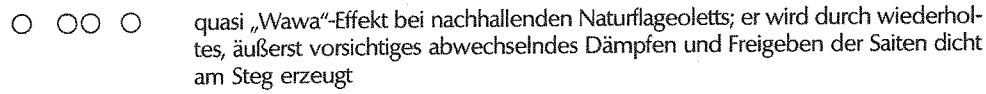
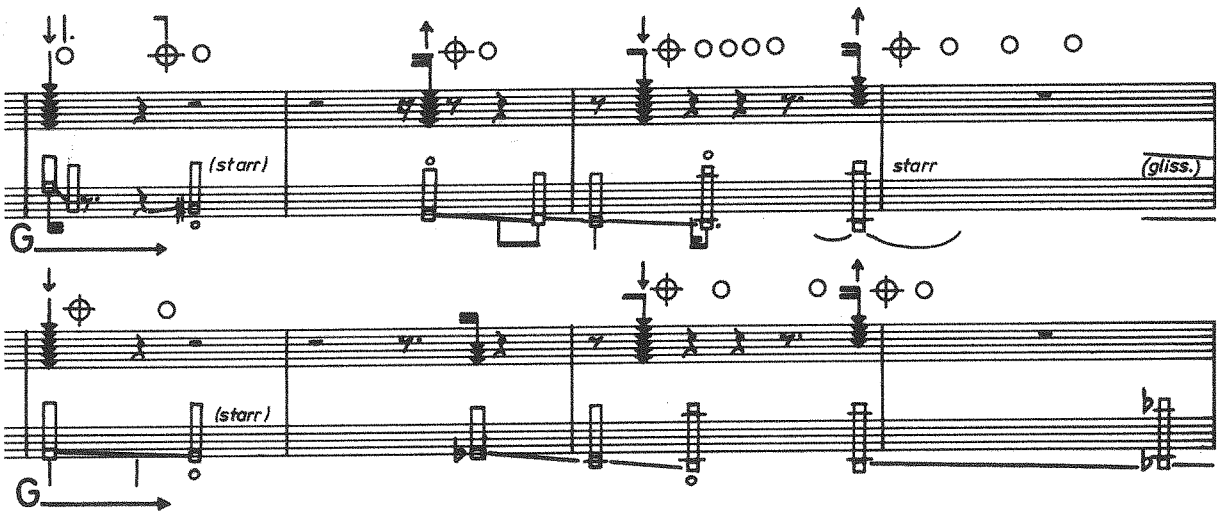


Figure 1.47. Helmut Lachenmann, *Salut für Caudwell*, legend, Breitkopf & Härtel[55]



Example 1.77. Helmut Lachenmann, *Salut für Caudwell*, measures 337- 340, Breitkopf & Härtel (Tempo: ♪= 100)

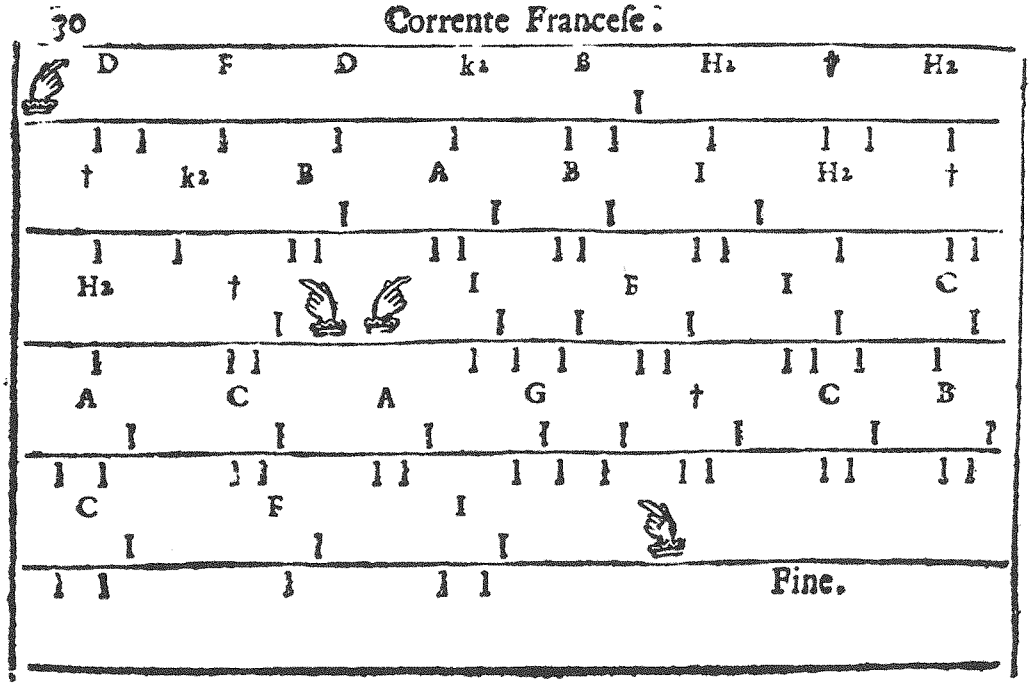
1.8.7 Strumming

Strumming entails brushing the fingernails or a plectrum across several strings in order to set them in motion. Obviously, this differs from plucking where only one string is activated at a time. An elaboration of the strumming action is the *rasgueado*, a technique often associated with flamenco music. The original meaning of *rasgueado* is "tearing" or "ripping," and in fact the technique is frequently employed in the modern literature for its dramatic or aggressive impact. The *rasgueado* generally uses only one finger for each strum, with multiple strums performed successively by multiple fingers, thus creating rhythmical embellishment. With each action, moreover, the fingernail strikes the strings, which gives rise to a characteristic rattling. The simplest *rasgueado* is performed starting with the fingers curled into the palm of the hand, from whence the little finger *e* falls downwards across the strings followed by the fingers *a*, *m* and *i*, producing four separate strummed chords in rapid succession. When the guitarist quickly cycles through a strumming pattern (e.g., *i-p-e*, *e-a-m-i*, *e-a-m-i-p*, or *a-m-i-p*), the *rasgueado* can generate a sound continuum with various micro-rhythmic levels of activity.

Prior to the emergence of the six-string guitar, strumming had different linguistic designations. These terms were largely contingent on the languages spoken by the leading composers and musicians for the guitar at the time. The Spanish word

55 Legend translates as follows: A kind of wah-wah effect together with echoing natural harmonics / it is produced by a repeated and very careful alternation of damping and releasing the strings very close to the bridge. Lachenmann, legend for *Salut für Caudwell* (translation Seth Josel).

rasgueado would eventually prevail, but during the Baroque era strumming was also known by the French term *stile à battre* and the Italian term *battuto*.[56] The earliest surviving example of strumming in printed music for solo guitar dates to 1606, with the publication of Girolamo Montesardo's *Nuova inventione d'intavolatura per sonare li balletti sopra la chitarra spagniola...*[57] This instructional text, published in Florence, describes *battuto* in such a way that it emerges essentially as a delicate rendering of *rasgueado* technique.[58] The accepted norm after Montesardo was to provide a rhythmic marking system using vertical slashes to indicate a chord's rhythmic strumming patterns. Example 1.78 shows a later example of this system from Pietro Millioni.



Example 1.78. Pietro Millioni & Lodovico Monte, "Corrente Francese" from: Vero facil modo d'imparare a sonare et accordare da se medesimo la chitarra spagnuola ... (1647). Courtesy of the Irving S. Gilmore Music Library at Yale University

This rhythmic marking system provided a foundation for the strumming patterns and ornamentation that comprised the Italian Baroque *battente* (to beat) style. Among the simpler techniques was the *trillo,* a rapid series of down- and upstrokes with the index finger. A pedagogical collection of works for the Baroque guitar by Millioni also describes a more complex type of strumming called the

56 Today the term *battuto* more often refers to the tapping of strings to produce auxiliary tones (see Chapter 3).

57 Girolamo Montesardo, *Nvova inventione d'intavolatvra per sonare li balletti sopra la chitarra spagniuola, senza numeri e note; per mezzo della quale da se stesso ogn'vno senza maestro potrà imparare.* Newly invented tablature for playing dances on the Spanish guitar; without numbers [i.e. the numbers used in Italian-style lute tablature] or notes [staff notation]; by means of which you can learn [to play] by yourself without a teacher. Tyler, *Baroque Guitar,* 13 (translation James Tyler).

58 "Del modo di sonare con la mano dritta. Chi vorrà haver una bella e leggiadra mano su la Chitarra, è necessario prima, e principalmente tener la mano relassa dall'attaccatura di essa, quanto sia possible, tanto che diventi leggiera; che cosi farà molto leggiadra al sonare, e poi batter le corde dolcemente con tre, ò quattro dite in modo di arpeggiare, e non tutte insieme che cosi farebbono un gran fracasso, & oltre che il suono sarebbe crudo, darebbe gran noia all'udito." Hold the right hand (the strumming hand) relaxed and strike the strings gently with 3 or 4 fingers in the manner of an arpeggio, not all at once, which would create a great noise and sound crude. "Montesardo, *Nvova inventione,* 1606 (f. 5r)," (translation Gary Boye), (accessed 15 November 2013) http://applications.library.appstate.edu/music/guitar/1606montesardo.html.

repicco.[59] This technique involved actions that were considerably more intricate than the simple down/up motion of the index finger. Such *battente* strumming techniques could be used to lend a work striking rhythmic vitality, as is evident in measures from a *ciaccona* by the virtuoso guitarist Francesco Corbetta (Example 1.79).[60]

Example 1.79. Francesco Corbetta, *Caprice de Chacone* from *La Guitarre royalle*, system 9 (1671), Minkoff Reprint

Certain types of *battente* found their way into early performance practice for the six-string guitar, at least when they proved compatible with the newer instrument. One such carryover was the simple strumming pattern called *frisé*, which had been an integral technique for Baroque guitarists but nevertheless proved well suited for the six string guitar and in some ways even typified approaches to playing it. According to Carcassi's *Méthode Complète pour la guitarre* (1825), to perform the *frisé* the RH fingers (*i, m, a,* and *e*) had to be "opened, one after another, passing over all the strings, without moving the arm".[61] This technique, with it's emphasis on the stability of the arm and continuous but individuated use of the fingers, manifested one of the key differences between the then emergent flamenco *rasgueado* and the earlier Baroque *battente*: whereas the strumming style of the seventeenth century involved considerable movement of both the wrist and forearm, flamenco *rasgueado*—probably due to the higher string tension on the six-string guitar—used the fingers more so than the wrist.

Contemporary composers have also utilized *rasgueado* and, in many cases, extended it considerably. In particular, they have worked with such parameters as speed, rhythm, and timbre to vary the technique's sound. Alvaro Company differentiates between three speeds of *rasgueado* in both directions (up and down): (a) *simultaneo*, with rapid movement akin to a single strum; (b) *normale*; and (c) *lento*, where each of the individual fingers produces discrete strums (Figure 1.48).

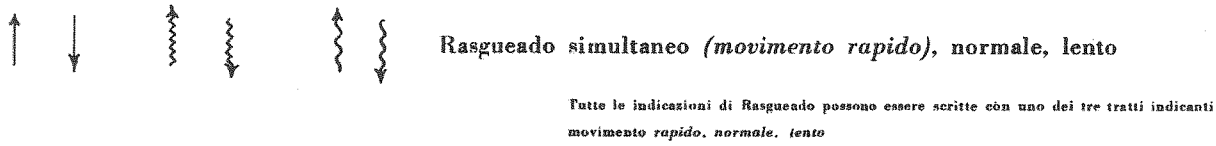


Figure 1.48. Alvaro Company, *Las Seis Cuerdas*, legend, Edizioni Suvini Zerboni

Furthermore, Company varies the number of fingers to be used in *rasgueados* from two to four:

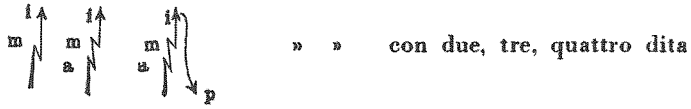


Figure 1.49. Alvaro Company, *Las Seis Cuerdas*, legend, Edizioni Suvini Zerboni

59 Millioni, *Libro d'intavolatura*, 1627.

60 Corbetta's work is an example of "mixed" tablature (notes and chords) and features a complicated version of the *repicco*. Monica Hall explains that "notes with the long stems are played down–up with the thumb and the tied notes are played down with the middle finger followed by the index finger and then up with the index finger and middle finger." Monica Hall, "Millioni," personal e-mail, 10 November 2013.

61 "Indique quìl faut tenir les doigts de la main droite fermés a l'exception du Pouce: et les ouvrir les uns après les autres en les faisant passer sur toutes les Cordes, sans faire de movement avec le bras". Carcassi, *Méthode Complète*, 102 (translation Seth Josel).

Bruno Maderna has extended Company's techniques by also including a rapid strum with the back of the thumbnail, notated as follows:

Accordo rasgueado, ottenuto con un movimento del p dalle corde acute verso le gravi, cioè in senso opposto a quello usuale – di conseguenza è il dorso dell'unghia che mette in vibrazione le corde scivolandovi sopra (qui il tratto grafico indica che il gesto del dito deve essere rapidissimo per far vibrare le corde simultaneamente).
Rasgueado chord obtained by dragging the thumb upwards over the strings, from the highest to the lowest pitched string (i.e. contrary to the usual movement). The back of the thumbnail therefore strikes the strings as it slides over them. (The sign indicates that the stroke should be so rapid as to make the strings sound together).
Geschlossener "rasgueado"-Akkord: p gleitet in entgegengesetzter Richtung wie üblich über die Saiten, d.h. beginnend mit der höchsten, so dass die Oberfläche des Nagels die Saiten zum Vibrieren bringt (p muss so schnell bewegt werden, dass der Eindruck entsteht, die Saiten würden gleichzeitig zum Schwingen gebracht).

Figure 1.50. Bruno Maderna, *Aulodia per Lothar*, legend, Edizioni Suvini Zerboni

He also uses Company's continuous, tremolo-like *rasgueado* with three fingers (*a-m-i*) plucking downward and then upward in turn.

Rasgueado tremolato con tre dita (movimenti intrecciati fra loro in successione rotativa).
Tremolo rasgueado with three fingers plucking in turn.
Tremolo rasgueado mit drei Fingern (in sich verschränkte Rotationsbewegungen).

Figure 1.51. Bruno Maderna, *Aulodia per Lothar*, legend, Edizioni Suvini Zerboni

Tristan Murail's *Tellur*, written some years after the Company and Maderna works, makes for a modern *rasgueado* tour de force. He writes in the program notes to the piece:

Tellur starts off as a kind of wager: how can one produce the long sound continuum necessary for my work on procedures, transitions and evolutions, on an instrument that produces brief, plucked sounds? I found the answer by using the flamenco *rasgueado* technique and even, more generally, by employing the style and sound of flamenco. The way attacks on the strings, for example, are dealt with is particularly delicate and careful: two textures can be produced on one string simultaneously that evolve in different ways (by disassociating the percussive sound caused by the nails on the strings— a sound that has an exact and controllable frequency—and the sound produced by the resonance of the strings themselves). I also used passages that move progressively from sound to noise (gradual dampening of the strings), the progressive appearance of harmonics, of harmonic resonances of flat chords, unusual fingerings for harmonics, multiple trills using both hands.[62]

For *Tellur*, Murail has developed inventive textural combinations that include diverse *rasgueado* patterns combined with either trills or hammerons. The symbols for these actions are specified in the legend for this piece:

62 Program note for *Tellur* (translation Éditions Henry Lemoine), (accessed 17 October 2013) http://www.tristanmurail.com/en/oeuvre-fiche.php?cotage=TR1458

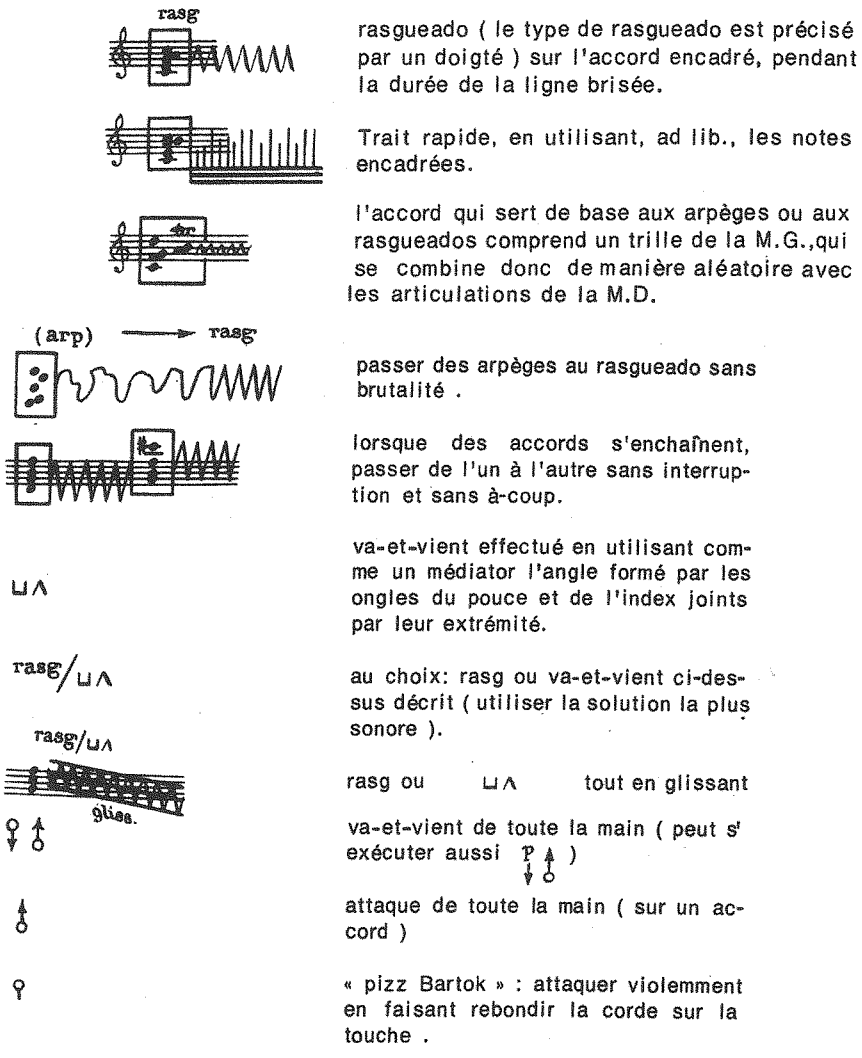


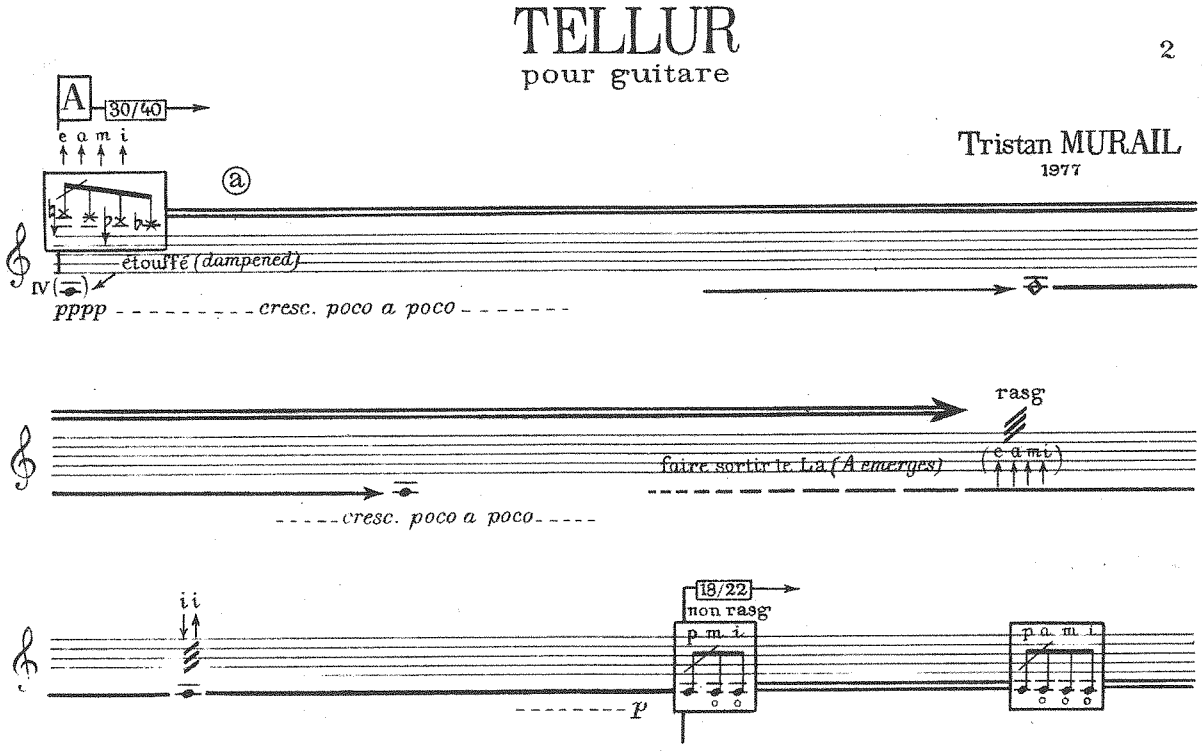
Figure 1.52. Tristan Murail, *Tellur*, legend, Éditions musicales transatlantique[63]

In the opening passage (Example 1.80), the guitarist is asked to perform a continuous *rasgueado* on the sixth string (using *e-a-m-i*) while the LH dampens the sixth string at the fourth position. Because of the extreme delicacy of this *rasgueado*, Murail notates the pitches produced by the *e-a-m-i* nails when gently tapping the string (akin to *battuto* pitches) as a continuous *rasgueado* gesture. These boxed pitches lie (approximately) just right of the soundhole toward the bridge (note that the E string is tuned down to an F and the *battuto* pitches are notated *son reale*). With this gentle *rasgueado*, one should hear the *D-C-B♭-A♭* sequence that the RH fingernails produce when

63 Legend translates as follows: *Rasgueado* using the boxed chord, for the entire duration of the wavy line / Rapid figuration, using the boxed notes, ad lib. / The chord on which the arpeggiations or the *rasgueado* are based include a trill in the LH. The trill should be combined in an aleatoric manner with the articulations of the right hand / A smooth change from arpeggiations to continuous *rasgueado* / Re: to consecutive chords: transition without interruption from one boxed chord to the next employing continuous *rasgueado* / Strum back and forth, using (instead of a plectrum) the angle formed by the nails of the thumb and the index finger pinched together / Ad lib. : choose between *rasgueado* or strumming back and forth (Use the more sonorous one) / Continuous *rasgueado* or back and forth strumming while moving the left hand downwards in a glissando-like manner / Strum back and forth with the entire hand (Can also be performed with a single thumb stroke, followed by a downward strum of the hand) / Single strum with the entire hand downwards. Murail, legend for *Tellur* (translation Seth Josel).

striking the sixth string. Over the course of the first three systems of the composition, the LH gradually undampens the sixth string to finger an *A* harmonic, and then to the fully stopped *A* (both on the sixth string, fourth position because of the scordatura). As the LH gradually reveals note *A*, the RH transitions from: (a) the opening gentle *rasgueado* in which it is possible to discern distinct pitches made by the RH nails against the sixth string to (b) a normal *rasgueado* in which the sixth string pitches cease to matter, to (c) rapid tremolo of the RH index fingernail back and forth across the sixth string, and finally to (d) rapid tremolo of the sixth string using *p-m-i* to *p-a-m-i* arpeggio combinations.

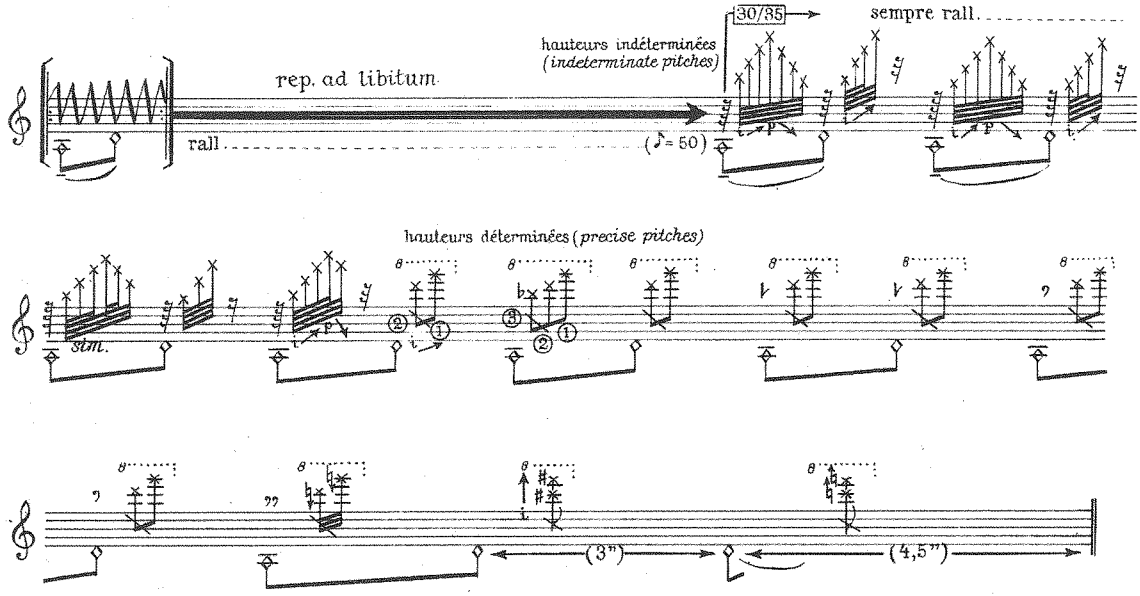
Both the RH and LH gradually generate transitions on the guitar during which "sound aggregations evolve slowly, [and] methods of playing are substituted one for another indiscernibly."[64]



Example 1.80. Tristan Murail, *Tellur*, page 2, systems 1–3, Éditions musicales transatlantique (Tempo: See Example 1.3)

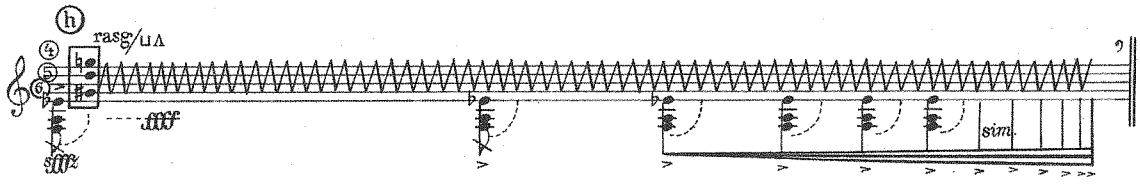
In Example 1.81, the guitarist is asked to perform continuous *rasgueado* with the RH while shifting its position from sul ponticello (Sp) to the right side of the soundhole. As the RH changes position, the LH gradually dampens all six strings (the boxed six *x*'s) so that the *rasgueado* produces percussive articulations only. The fifth and sixth strings are then released from the dampening in order for harmonics to be played at the 4th and 5th positions, respectively. The *rasgueado* action gradually slackens pace and, with the softer dynamics, the *battuto* pitches return as indeterminate pitches that are produced by the RH index and thumb nails lightly strumming across the strings. These indeterminate pitches gradually metamorphose into precise pitches as the strumming fragments into isolated actions across the upper strings. Again, how Murail gradually reveals the subtleties of sound phenomena through continuous processes on the guitar is quite astounding.

64 ibid, 1.



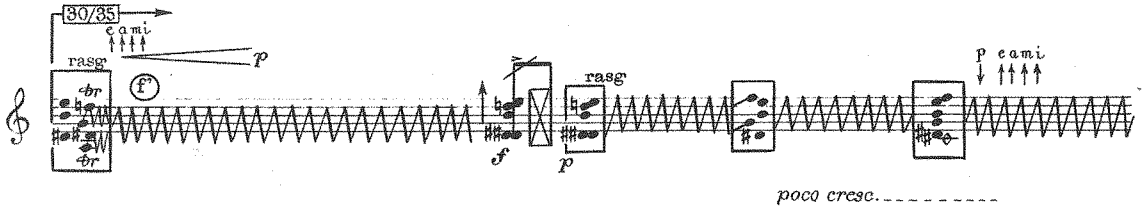
Example 1.81. Tristan Murail, *Tellur,* page 3, systems 4–6, Éditions musicales transatlantique (Tempo: indeterminate till new section)

The *rasgueado* strum in Example 1.82 is executed as a quasi-plectrum technique on strings 6–4. The grace note articulations on the open lower three strings add rhythmic punctuation to the more aleatoric rhythm of the *rasgueado* strumming. Note that the bottom *F*, *A*, and *E*♭ are the open strings at this juncture, due to scordatura.



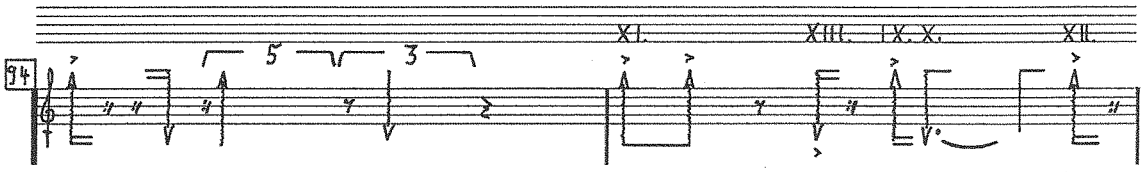
Example 1.82. Tristan Murail, *Tellur*, page 5, system 4, Éditions musicales transatlantique (Tempo: See Example 1.3)

In Example 1.83, Murail combines the *rasgueado* with a double trill in the LH, and then interrupts it forcefully at the *forte* indication with a single downward stroke. Next, the palm of the RH, indicated by the box containing the large ×, suddenly mutes the strings, and the RH proceeds with a continuous *rasgueado* such that the pattern at the end of the system changes from *e-a-m-i* to *p-e-a-m-i*.



Example 1.83. Tristan Murail, *Tellur*, page 8, system 1, Éditions musicales transatlantique (Tempo: See Example 1.3)

Another interesting use of *rasgueado* comes from Helmut Oehring's guitar duo *Nr. 1 (aus: Koma)*. Here (Example 1.84), the LH executes a full barré at varying positions, beginning first at the third position in a continuation from the previous measure. The guitarist is then to perform quick *rasgueado* strums between the barré positions and the nut, producing rhythmic auxiliary-tone chords.



Example 1.84. Helmut Oehring, *Nr. 1 (aus: Koma)*, measures 93–100 (Guitar 1 part), Bote & Bock (Tempo: ♩ = 104)

For his piece *Sequenza XI,* Luciano Berio employs several effective variations of *rasgueado* for which he provides clear and precise notations (Figure 1.53):

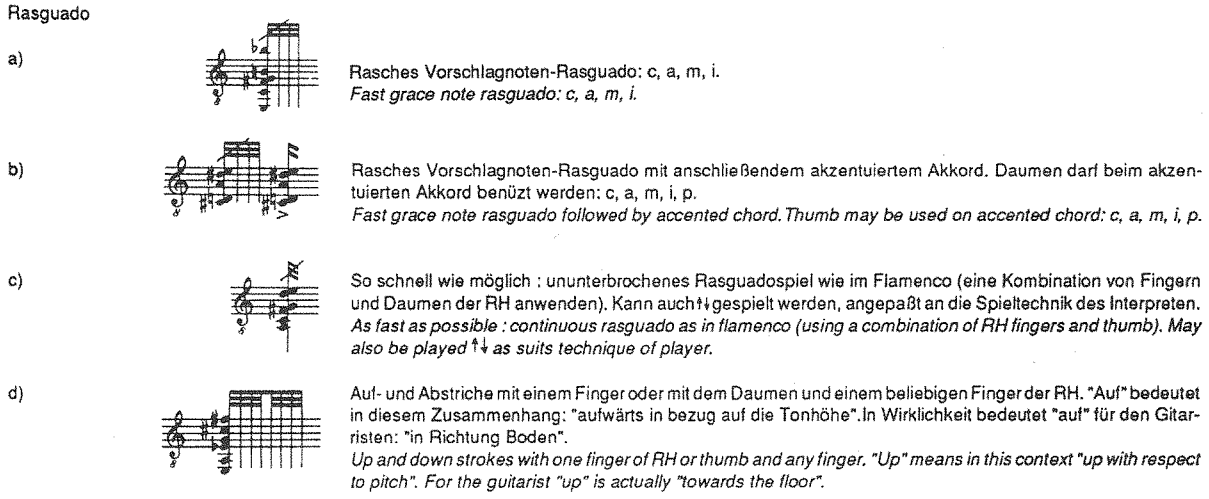
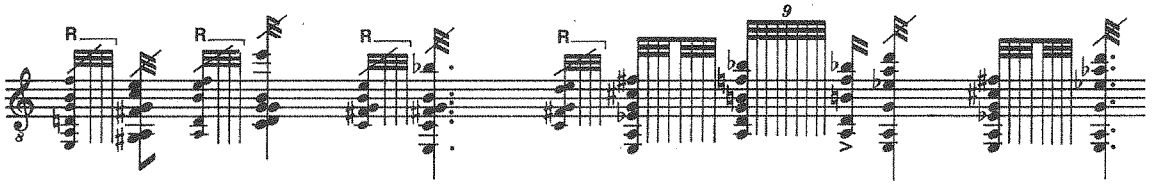


Figure 1.53. Luciano Berio, *Sequenza XI*, legend, Universal Edition

The rhythmical passage in Example 1.85 exploits three of the four types of *rasgueado* strumming described in the preceding legend.



Example 1.85. Luciano Berio, Sequenza XI, page 1, system 3, Universal Edition (Tempo: ♩ = 60)

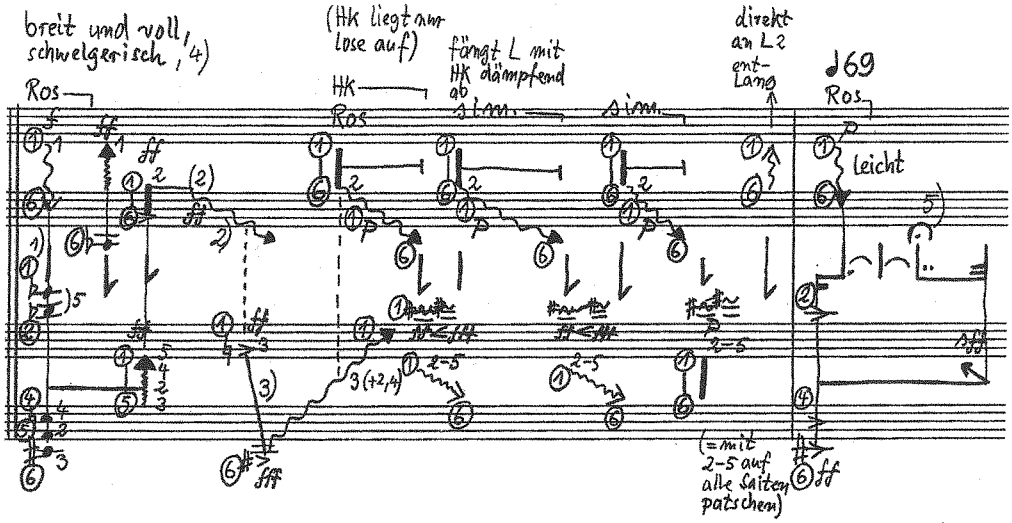
Rolf Riehm's *Toccata Orpheus* has the guitarist perform several different strumming actions, sometimes involving the LH fingers:

1. Strumming with both hands.
2. Strumming with the LH finger over the fretboard while the LH simultaneously stops notes on the fretboard.
3. Strumming with the RH finger over the fretboard while the RH simultaneously stops notes on the fretboard.
4. Different *rasgueados* with the nails (flicking out) of either the right or left hand. The LH *rasgueado* is performed over the fretboard in an upward manner that is much weaker than the normal RH downward *rasgueado* strum.
5. Strumming at three different speeds: slowly (carefully over each string), briskly, and as one quick scrape across the strings.
6. Strumming executed over the fretboard, usually at specific fret positions (A tablature notation is sometimes used when the strumming is to occur beyond the fretboard.)
7. Strumming the strings with an RH finger while the LH applies a barré with half pressure at an angle, sometimes progressing to full pressure. The sounding result is a muted strum. (See letter D above, and the beak-like noteheads at either end of the wavy diagonal lines in Example 1.86).

Table 1.4.

In Example 1.86, which represents what is perhaps the most lyrical moment in the piece, both RH and LH execute *rasgueados* across the fretboard while simultaneously stopping notes. Among other maneuvers, the LH must execute a barré at an angle with the index finger as it flicks the remaining fingers upwards across the strings. A full breakdown of the passagework follows:

- RH and LH perform oblique and straight barré percussive hits. Some of these hammer-ons are not full pressure so as to produce a rattling noise against the frets.
- These strikes are followed by *rasgueado* strums. The notated angles indicate a strum's duration—the steeper the angle, the shorter the duration, and vice versa.
- The LH performs *rasgueados* either with the nails, flicking the fingers upwards in an arpeggiated strum, or with the flesh, strumming the fingers downwards. Conversely, the RH performs downward *rasgueados* with the nails and upward, arpeggiated *rasgueados* with the flesh.



Example 1.86. Rolf Riehm, *Toccata Orpheus*, system 14 (measure 2), G. Ricordi & Co (Tempo: ♩ = 72)

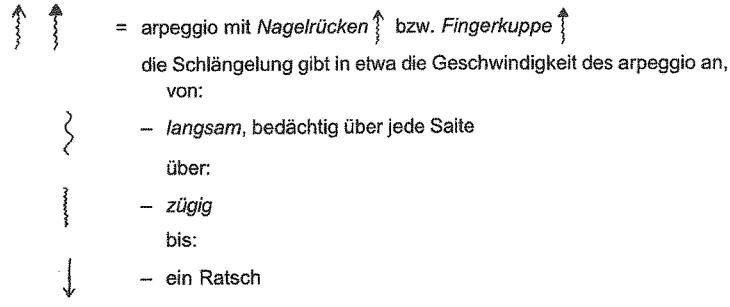
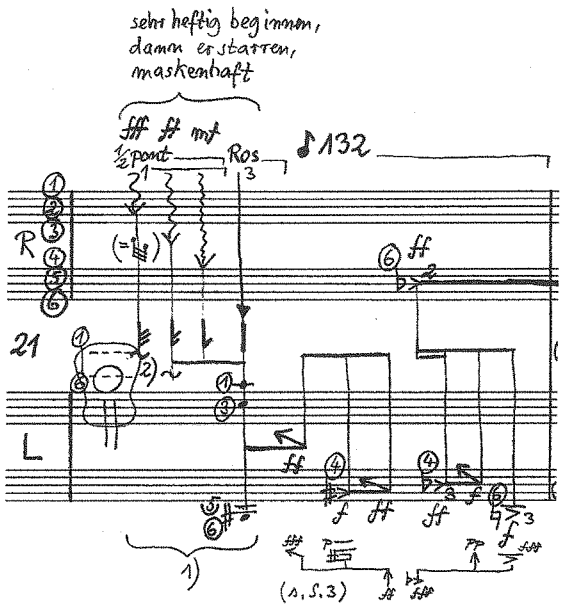


Figure 1.54. Rolf Riehm, *Toccata Orpheus*, legend, G. Ricordi & Co[65]

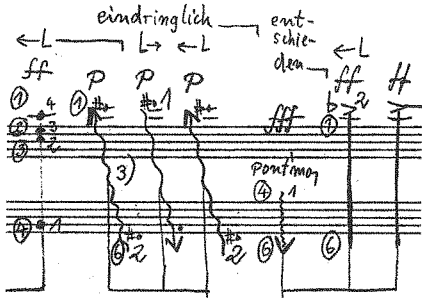
In addition to juxtaposing different left and right hand *rasgueado* actions, Riehm creates an interesting tension between the duration of notes and the strumming used to produce them (Example 1.87). As the notes of the *rasgueados* become longer, gradually increasing from thirty-second notes to quarter-notes, the physical *rasgueado* gestures become briefer, shifting from a very cautious movement that allows the breaks between strings to be heard, to one quick scrape across the strings.

65 Legend translates as follows: Arpeggio with the back of the fingernail, or the fingertip / The wavy line indicates more or less the speed of the the arpeggio, progressing from: slow, carefully across each string through briskly to: one slash across the strings. Riehm, legend for *Toccata Orpheus* (translation Seth Josel).



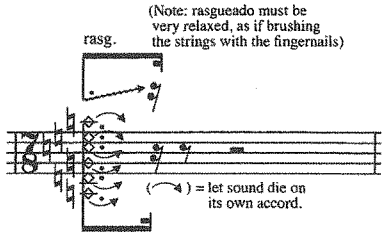
Example 1.87. Rolf Riehm, *Toccata Orpheus*, system 21 (measure 1), G. Ricordi & Co (Tempo: ♪= 112 until tempo change)

In Example 1.88, the RH executes *rasgueados* at specific fret positions. The strums are indicated by the wavy lines with pitches notated at opposite ends. These pitches represent the frets on strings 6 and 1 over which the *rasgueado* is performed.[66]



Example 1.88. Rolf Riehm, *Toccata Orpheus*, system 1 (right hand detail), G. Ricordi & Co (Tempo: ♪= 152)

Tsao sometimes employs *rasgueados* in "slow motion" (Example 1.89). Such supple, relaxed gestures reveal subtle acoustic information that is masked during rapid strumming. The *battutos* produced by the RH fingernails brushing against the strings are especially effective, for each delicate sweep of a finger elicits new components of pitch and timbre.



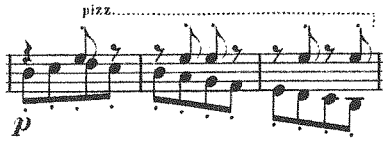
Example 1.89. Ming Tsao, *"if ears were all that were needed...,"* measure 2, Edition Peters (Tempo: ♩ = 46)

66 Example 1.88 will be discussed at length in Chapter 3.

1.8.8 Pizzicato or RH muting

Pizzicato on the guitar consists in muted plucking. The technique requires the RH thumb to pluck the string(s) and the RH palm—or, to be more precise, the side of the palm—to mute them. Customarily, the abbreviation *pizz.* signals the onset of pizzicato while the abbreviation *ord.* (for *ordinario*), signals its cancellation. As the RH thumb is generally the only digit employed when using RH palm muting, the guitar passages using pizzicato are usually limited to single lines, and the speed at which they are executed is also restricted.

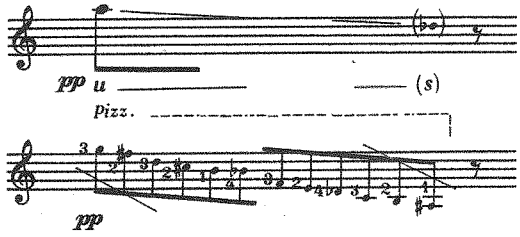
The *pizzicato* technique first emerges in the nineteenth century in tracts on guitar methodology. Dionisio Aguado's *Escuela de Guitarra* (1825), accurately describes pizzicato without referring to it as such: the book explains how one can apply the external edge of the RH palm to all the strings while plucking with the RH thumb, the ultimate effect being *un sonido oscuro* (dark sound).[67] The technique, explicitly with RH palm muting, makes one of its earliest known appearances in the repertoire in the work of the Spanish composer Juan Parga (Example 1.90), who was himself a guitarist. The pizzicato in this passage gently muffles the sounds.



Example 1.90. Juan Parga, *Del Ferrol á la Habanera*, op. 23, No. 5, system 9 (189-?), Chanterelle Verlag (Tempo: Allegro con moto)

In his *Escuela Razonada de la Guitarra* (1956), Emilio Pujol describes four kinds of RH pizzicati: *apagado*, *normal*, *abierto*, and *estridente*. *Pizzicato apagado* requires the RH palm to dampen all six strings, which uniformly softens the plucking sounds. *Pizzicato normal* requires that the RH palm dampen only the lower three strings so as to prevent unwanted bass resonances. Both types of muting place the RH palm close to the bridge, with the little finger on the soundboard for support. In contrast, for *pizzicato abierto*, the RH palm must be set on the bridge itself, an action that mutes not the strings but the guitar's overall resonance. Finally, *pizzicato estridente* is performed as *pizzicato apagado* but with the RH palm placed about halfway between the bridge and soundhole. Oddly, with this type of pizzicato, the string buzzes lightly against the RH palm, producing a tone that is somewhat nasal in character.[68]

In Example 1.91, an excerpt from a piece for guitar and soprano voice, Franco Donatoni indicates a "pizz.," which he describes in the legend as a *smorzato* or muting with the palm. The combination of this sound with the voice of the soprano quietly gliding between pitches above imbues the music with a haunting quality.



Example 1.90. Franco Donatoni, *ÅSE*, page 9, system 2, Edizioni Suvini Zerboni (Tempo: ♩ = 58)

67 Aguado, *Escuela de la Guitarre*, 47.

68 Pujol, *Escuela Razonada de la* Guitarra, vol. 4, 132–136.

A muting effect can also be achieved by using the RH little finger to dampen a string next to the bridge while another RH digit simultaneously plucks it. This method of muting yields a thinner and lighter sound than that produced with the RH palm. Company dubs this type of pizzicato "*normale e pizzicato.*" Company's *pizzicato apagado* is the normal RH palm muting (Figure 1.55). He also indicates a "*pizzicato apagado con risonanza*" (pizzicato with resonance). This technique is executed by muffling the string only at the moment of attack, thereafter allowing it to vibrate freely. The initial muffling is done either with the palm of the RH at the bridge or with the LH neighboring finger of the stopped note. The sounding result is a muffled pitch with a little reverb attached to it.

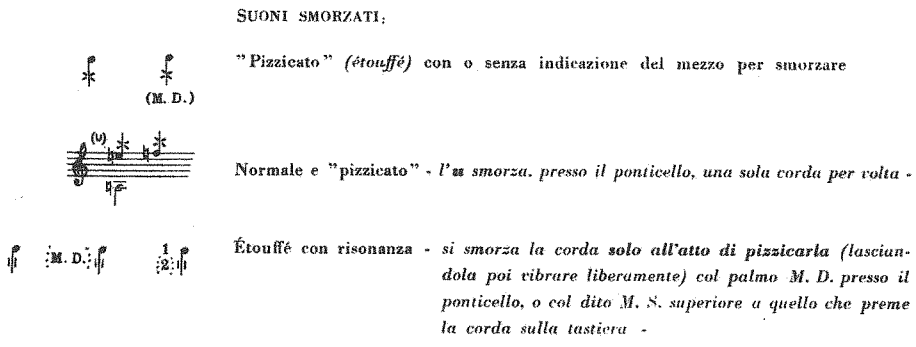
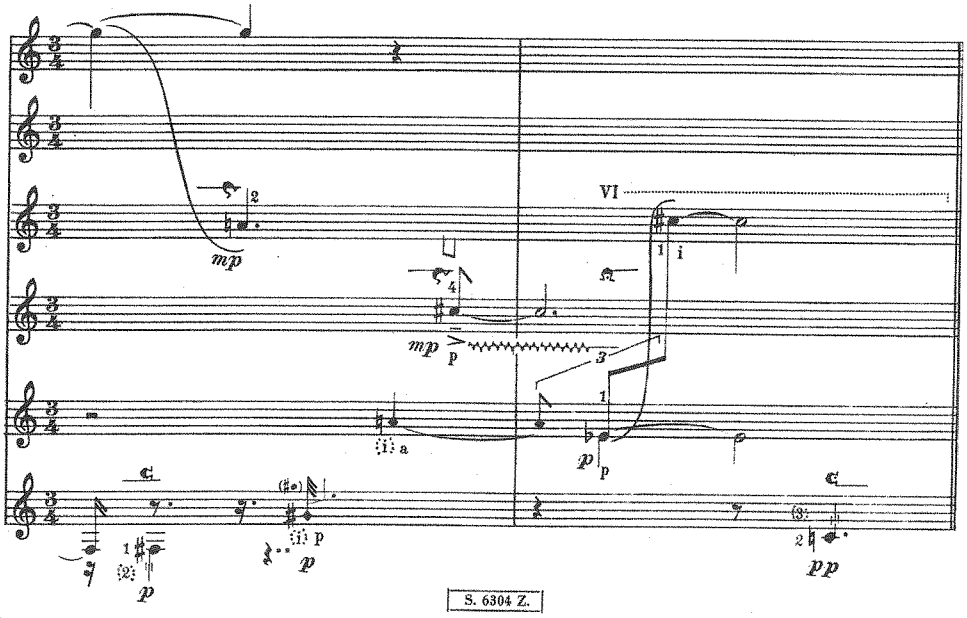


Figure 1.55. Alvaro Company, *Las Seis Cuerdas*, legend, Edizioni Suvini Zerboni

In Example 1.92, Company asks for an extremely severe angle of attack with the RH fingernail on string 6 (the bottom stave) accompanied by the *apagado con risonanza*, which is notated by the two short vertical lines around the stem of the note: $F^{\sharp}$ in the first measure and *C* in the next. Company generally uses the lower strings for this muting effect since their resonance is more audibly striking.

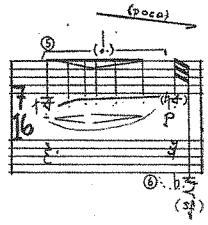


Example 1.92. Alvaro Company, *Las Seis Cuerdas*, page 7bis, system 2, Edizioni Suvini Zerboni (Tempo: ♩ = 40)

Josh Levine's *Downstream* employs a similar muting technique involving the RH. The RH dampens a string with one of the small fingers, *e* or *a*, near the bridge and plucks it with the thumb.

The result is a muffled "open" string whose pitch is slightly higher because the dampening near the bridge effectively shortens the string's vibrating length. Changing even slightly the distance of the muting position from the bridge can raise the pitch of the open string considerably.

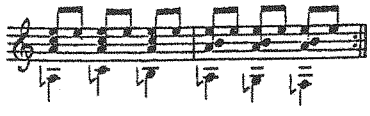
In Example 1.93, the RH pizzicato action on string 5 is succeeded by a glissando on the same string, executed with the dampening finger. Consequently, the muffled pitch of the open string subtly ascends. To produce this sequence, the RH finger first mutes the open A string extremely close to the bridge, raising its pitch to *A*. It then glides toward the soundhole, applying pressure all the while, until it reaches a sounding *C*. Levine notates this technique with a triangular notehead in the upper stave, which is reserved for RH actions.



Example 1.93. Josh Levine, *Downstream*, measure 16, manuscript (Tempo: ♩ = 60)

1.8.9 Bartók pizzicato/snap pizzicato

The *Bartók* or *snap* pizzicato is an especially strong pizzicato action. One of the earliest instances of a *Bartók* pizzicato can be found in Tomás Damas's composition *La Macarena* (1867), a piece for solo guitar. In the score for this work, there is a passage where what resembles a backward check mark accompanies each of the lower notes. Damas explains this signature as follows: "One pulls the string upwards with the thumb of the RH so that upon release the string slaps back onto the fretboard, thus imitating the sound of clapping".[69]

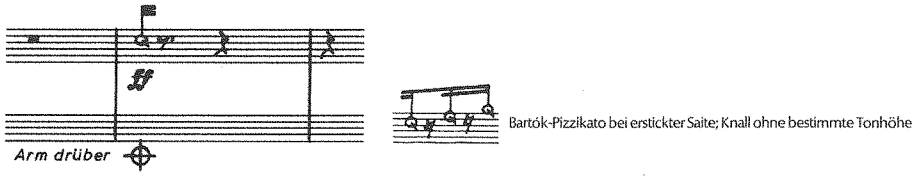


Example 1.94. Tomás Damas, *La Macarena*, page 6, system 9, edited by Antonio Romero (Tempo: none indicated)

The Bartók pizzicato, with its forcefully rebounding string, has been used frequently in contemporary guitar literature to add percussive effect.[70] In Example 1.95, Lachenmann stipulates a snap pizzicato with the LH arm muting all the strings, while the RH performs a snap pizzicato on string 3 (notated in the upper stave). The result is an explosive sound with unspecified pitch.

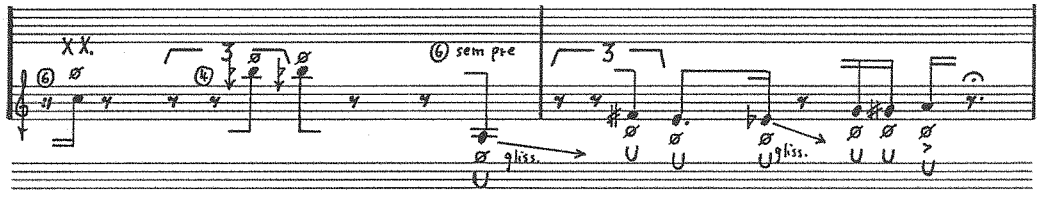
69 "El signo indica que las notas del bajo que le tienen, han de herirse con el dedo pulgar de la mano derecha doblando la 1ª falange para enganchar la cuerda hacia arriba para que choque despues de herida contra el diapason de la guitarra imitando de esta manera las palmas." (Damas, *La Macarena*, 6 [translation Eliot Fisk]). As the gesture described is repeated regularly, the word *palmas* (palms) most likely refers to rhythmic clapping similar to that used today in flamenco.

70 For a more extensive discussion of Bartók pizzicato in a variety of contexts, see Titre, "Thinking through the Guitar," Chapter 12.



Example 1.95. Helmut Lachenmann, *Salut für Caudwell*, measure 465 (second guitar part), Breitkopf & Härtel (Tempo: ♩= 54)[71]

In Example 1.96, Oehring explores an extension of the snap pizzicato: First the guitarist is to slip a LH fingernail under the sixth string. Two RH fingers then lift and quickly release that string—à la Bartók pizzicato. Next, acting as an ersatz slide, the LH fingernail glides beneath the string to induce deviations in pitch.



Example 1.96. Helmut Oehring, *Nr. 1 (aus: Koma)*, measures 96–97, Bote & Bock (Tempo: ♩ = 104)

In Figure 1.55 Claudio Ambrosini distinguishes two types of Bartók pizzicato: normal and "quasi-Bartók":

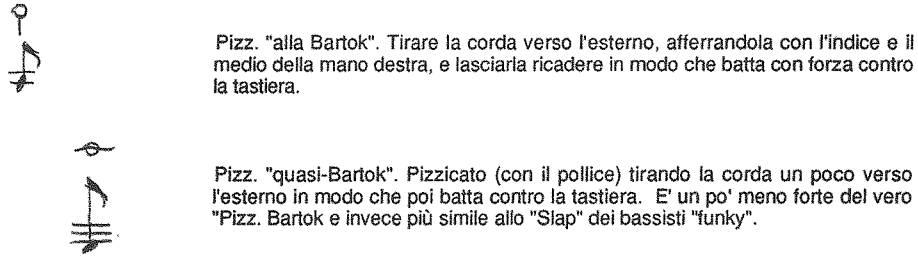


Figure 1.56. Claudio Ambrosini, *RAP*, legend, manuscript[72]

1.8.10 Plectrum

The *plectrum* (or pick) is a device for plucking strings. Using a plectrum, as opposed to the fingernails, yields an unmistakably sharper and brighter attack to any note, as well as an increase in surface noise. Plectrums come in a variety of shapes and materials, including plastic, nylon, rubber, felt, tortoiseshell, wood, metal, glass, and stone. They also come in a wide variety of thicknesses ranging from extremely thin (ca. 0.44 mm.) to fairly thick (ca. 1.50 mm.). Every one of these qualities will affect how the device works and the response it elicits; consequently, the composer should specify in the score the type of plectrum to be used.

Picking technique will likewise bear directly on the quality of tone production. The basic action combines up- and downstrokes (Figure 1.57), with the upstrokes typically weaker.

⊓ = downstroke, ∨ = upstroke

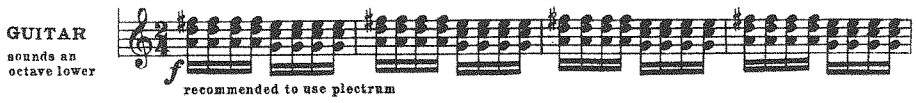
Figure 1.57

71 Legend translates as follows: Bartók pizzicato with stifled string; explosive sound without definite pitch. Lachenmann, legend for *Salut für Caudwell* (translation Seth Josel).

72 Legend translates as follows: Bartók Pizz. (Hard slap). Pull up the string, holding it with the thumb and forefinger, then release it allowing it to strike the fingerboard in a noisy manner / "Quasi-Bartók" pizz. Pull the string upwards using solely the thumb. Quite similar to the "slap" technique in "funky" music; in any event slightly softer than a normal Bartók pizz. ibid. (translation Ambrosini/Seth Josel).

If the composer chooses not to notate the direction of the plectrum's stroke, the performer will develop the necessary plucking patterns. It is important to keep in mind that rapid passages involving leaps with the RH across various strings are particularly challenging to perform.[73]

One of the earliest uses of the plectrum on the classical guitar appears in *Tilim-Bom*, the fourth of Stravinsky's *Four Songs* (Example 1.97). Here the guitarist is to strum chords with a plectrum as if to evoke the mandolin, thus underscoring the rustic, vernacular character of the song cycle.



Example 1.97. Igor Stravinsky, *Four Songs*, Movement IV: Tilim-Bom, measures 1–4, J. & W. Chester/Wilhelm Hansen (Tempo: ♩ = 108)

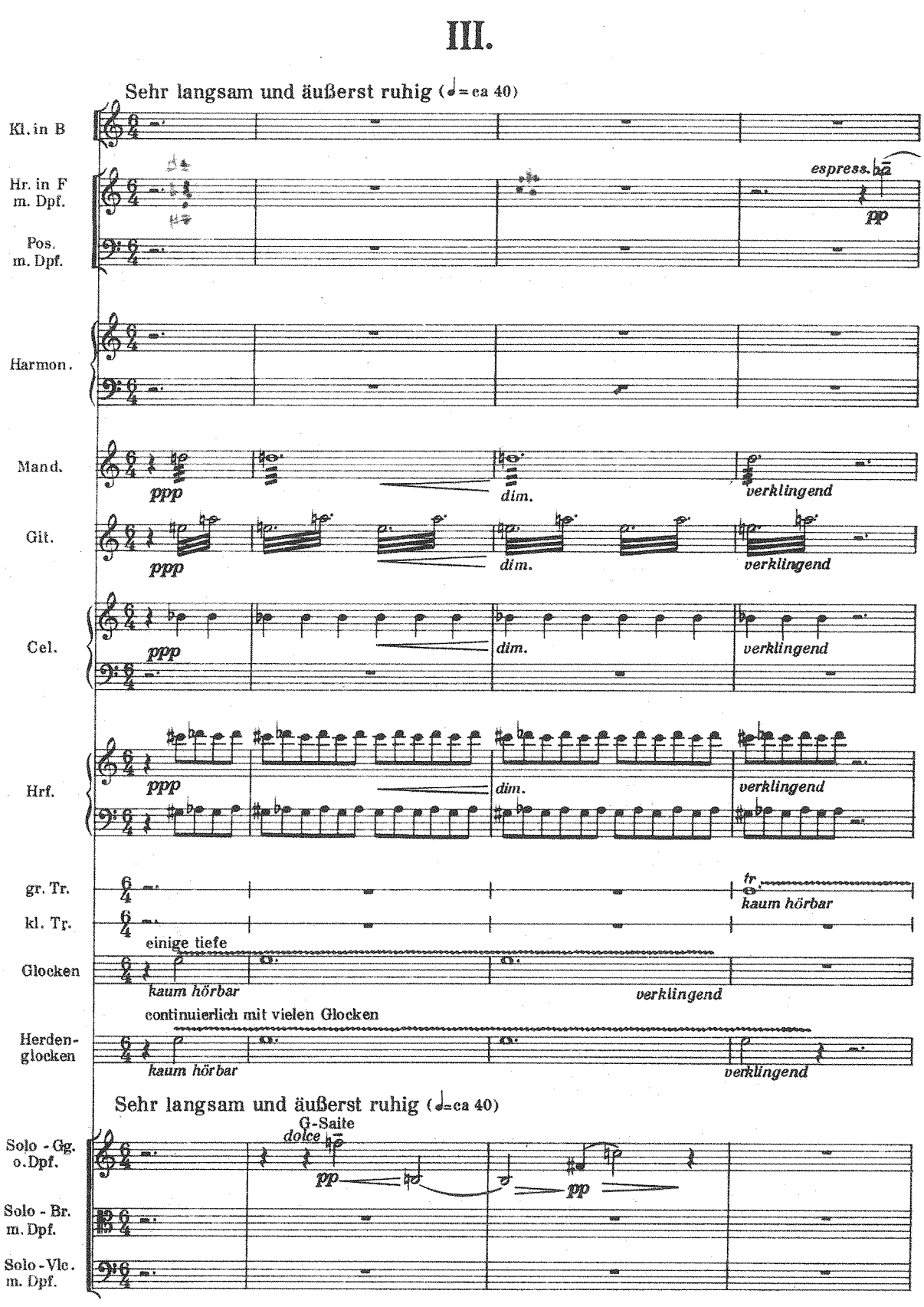
1.9 Orchestrating for the guitar: key historical works

Apart from the concerto literature, there are very few works for guitar and ensemble worthy of mention that date from any earlier than the start of the twentieth century. There are even fewer orchestral works featuring the guitar, discounting some operas such as Rossini's *Il Barbiere*, Weber's *Oberon*, and Verdi's *Othello* and *Falstaff*. Generally the guitar served as a reference to folk music and was relegated to the status of an accompaniment. Not until Gustav Mahler's *7. Sinfonie* (1904–1905) does the guitar start to transcend this role and contribute more prominently to the music. In Mahler's symphony, the combination of plucked instruments, namely, guitar, harp, and mandolin, helped to generate a very distinctive atmosphere. The impact of this instrumental combination was such that it inspired many other composers to use it, most notably Anton Webern in his Opus 10, and Schönberg in his Opus 24.[74]

A passage from the Webern piece *Funf Stücke* combines bells, cowbells, celesta, mandolin, guitar, and harp (Example 1.98) Rapid single tremoli in both bells and a very slow tremolo in the celesta merge with tremoli in the mandolin, two-note tremoli in the guitar, and trills in unison but on different notes in the harp, to create a shimmering texture. The cross-string tremoli on the guitar allow for both strings to ring continually (almost as in a chord) but require slightly slower articulation. This contrasts with the single-string tremoli in the mandolin, which can be rapidly performed with a plectrum. The "micropolyphony" resulting from the layering of the various speeds of the figuration gives the passage a decisively modern quality.

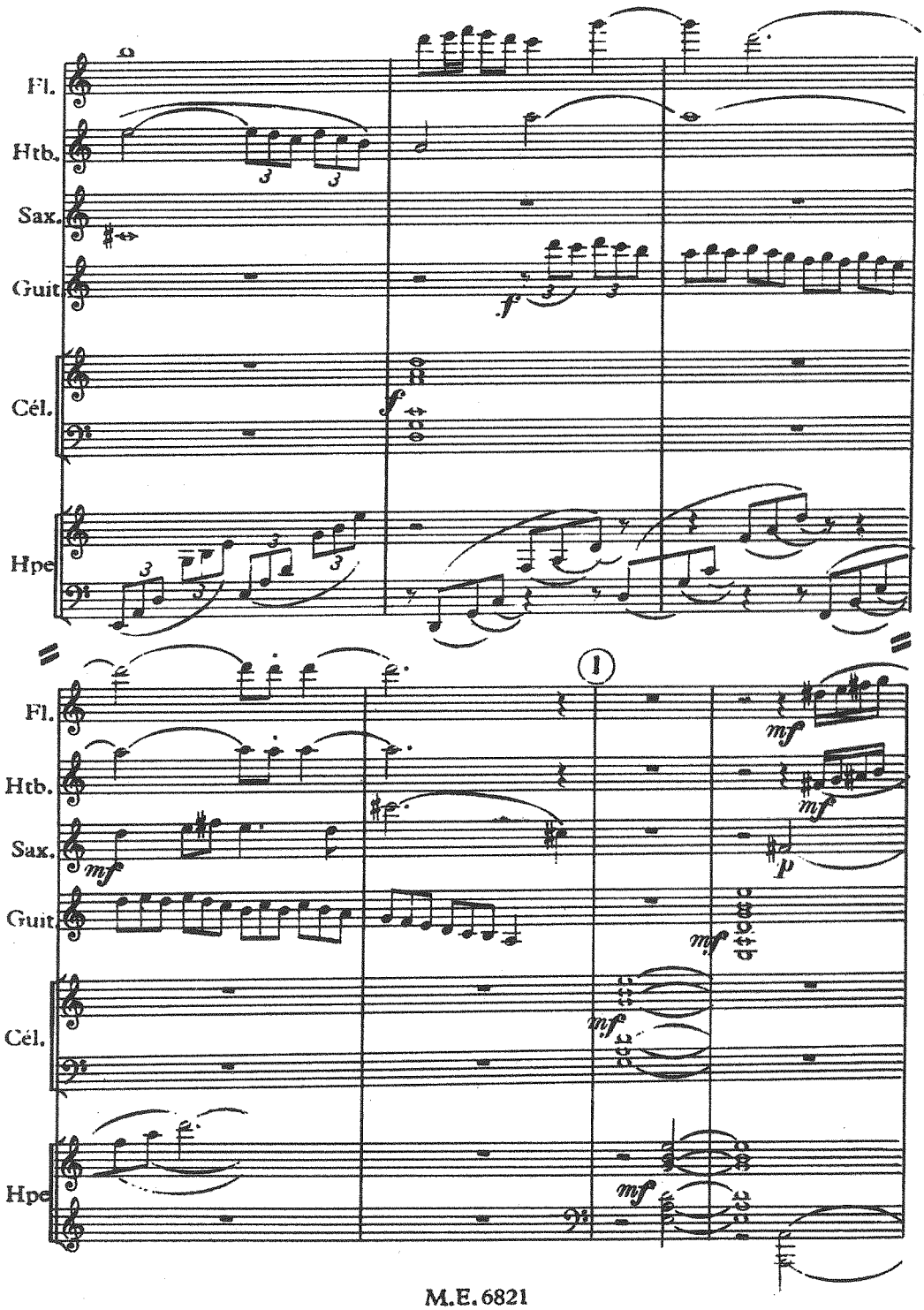
73 Vigorous picking is likely to damage the soundboard's finish, and, in extreme cases, the wood itself. It is not uncommon, therefore, to encounter players who, when confronted with having to perform various passages with a plectrum, will choose to use a second instrument, one perhaps of a lesser quality than their concert instrument.

74 The tradition of treating the guitar as as an accompanying or *bühnenmusik* (stage music) instrument was, however, continued in major operas such as Berg's *Wozzeck* (1921), Schoenberg's *Von heute auf morgen* (1930) and *Moses und Aron* (1930–32), Zemlinsky's *Der Traumgorge* (1904–06) and Schreker's *Der Ferne Klang* (1910) and *Der Geburtstag der Infantin* (1923), as well as in several stage works by Hans Eisler, Kurt Weill and Ernst Krenek. For a more extensive discussion of the use of the guitar as an accompanying or *bühnenmusik* (stage music) instrument, see Marriott Chapter 2.



Example 1.98. Anton Webern, *Fünf Stücke*, op. 10, Movement III, measures 1–3, Philharmonia

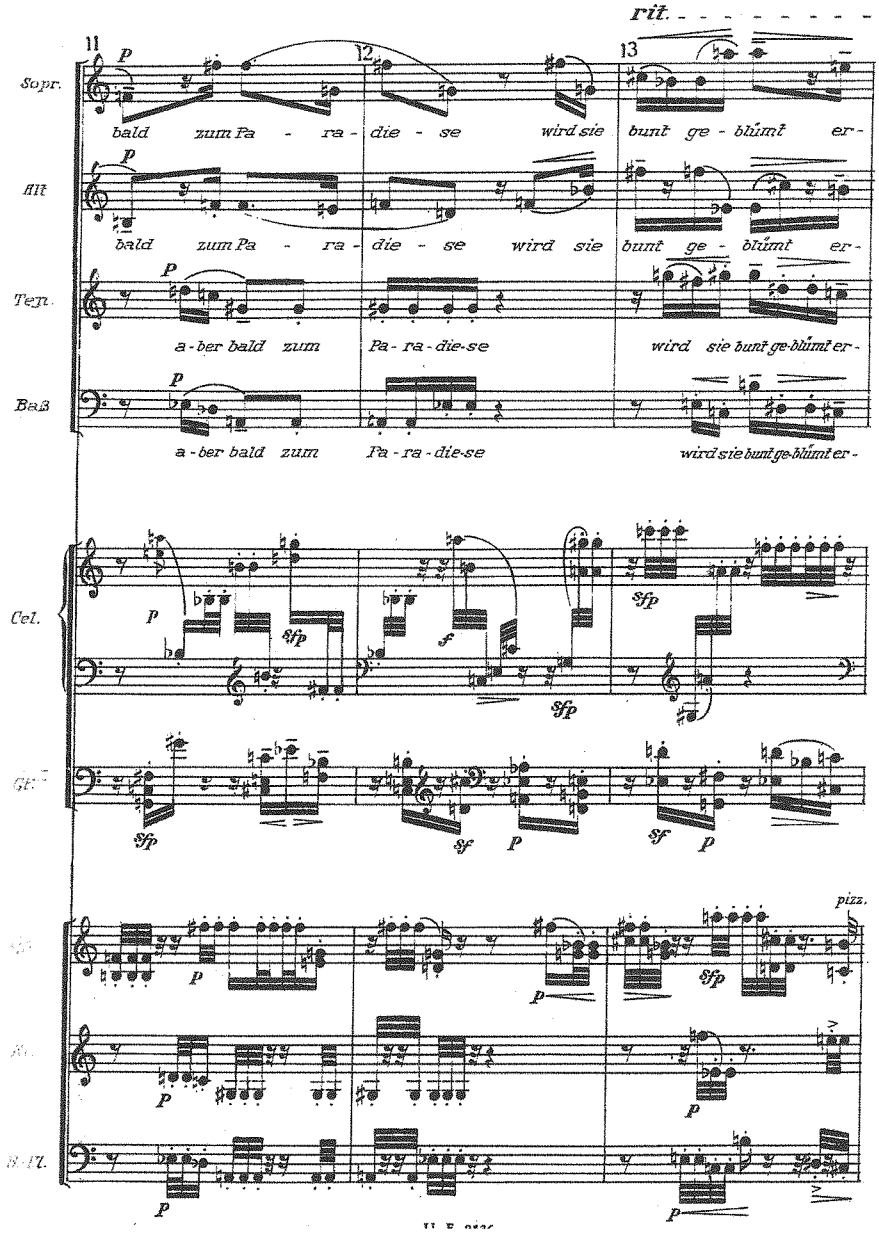
The guitar part in Villa-Lobos' *Sextuor mystique* (Example 1.99) attains a notable lyricism through its orchestration with the flute, harp, celesta, oboe and saxophone. In measure 5, the plucked string timbre of the rising harp arpeggio gracefully transitions to the guitar's continuation of the oboe's descending passage.



Example 1.99. Heitor Villa-Lobos, *Sextuor Mystique*, measures 4–10, Editions Max Eschig (Tempo: "Allegro non troppo"; guitar is sounding an octave lower than written.)

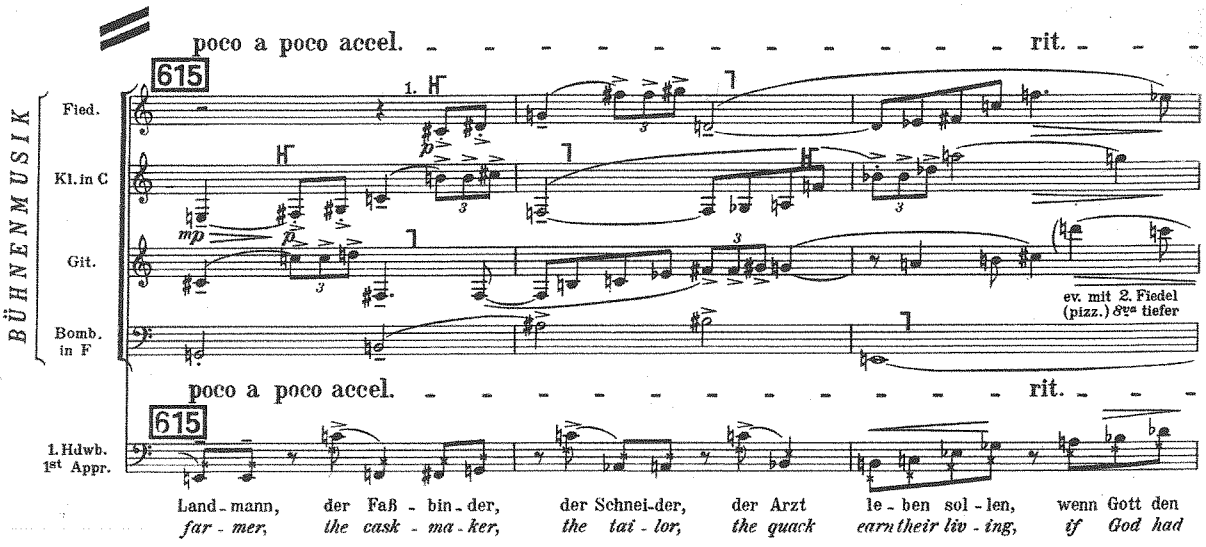
In his *Drei Lieder* op. 18, Webern explores the combination of guitar with E-flat clarinet and soprano voice. He extends that instrumental combination in his *Zwei Lieder* op. 19 by using guitar together with two clarinets, violin, and celeste as the supporting group for the chamber choir.

In Example 1.100, Webern weaves a wonderful filigreed texture from the arpeggiated celeste, the staccato notes in the clarinets and violin, and the alternating single, two note and three note articulations in the guitar that rhythmically punctuate the musical fabric.



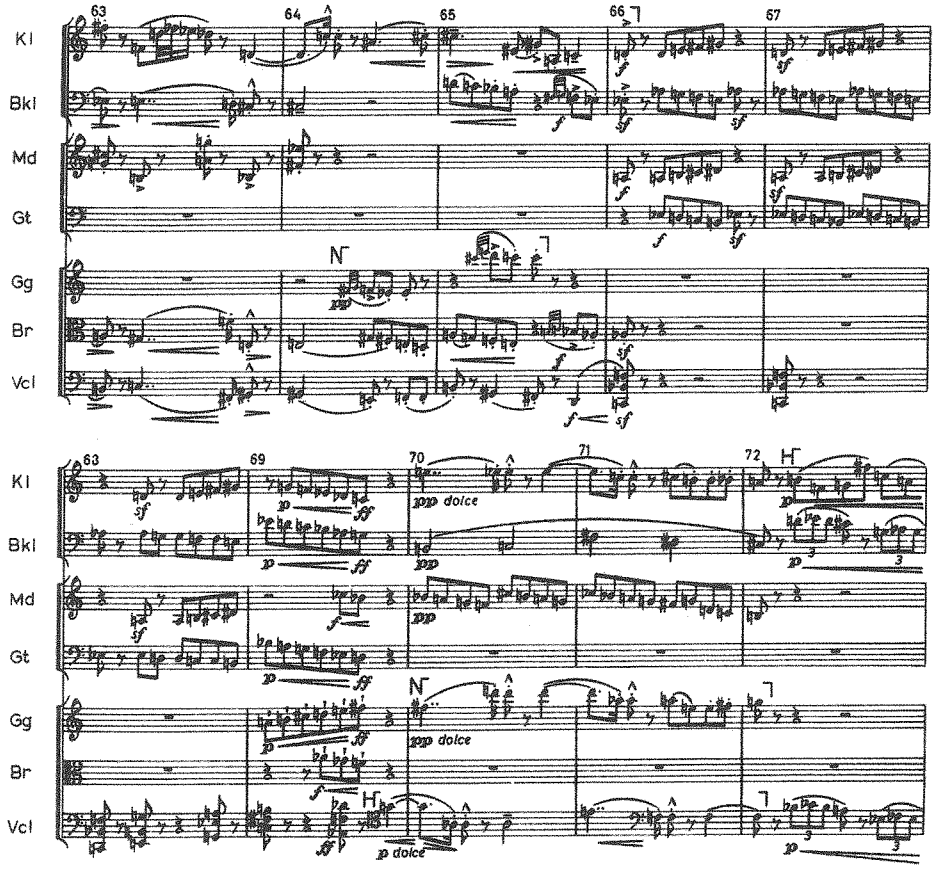
Example 1.100. Anton Webern, *Zwei Lieder*, op. 19, Movement II, measures 11–13, Universal Edition (Tempo: ♩ = 60 ca.)

In the *Bühnemusik* from his opera *Wozzeck*, Berg artfully combines the guitar with two fiddles (violins tuned up a whole step), clarinet in *C*, and bombardon (bass tuba) in *F*. This instrumentation helps to set the scene, which transpires in a nineteenth century Viennese pub, for it alludes to the small ensembles with guitars that typically provided musical accompaniment to gatherings in such places.



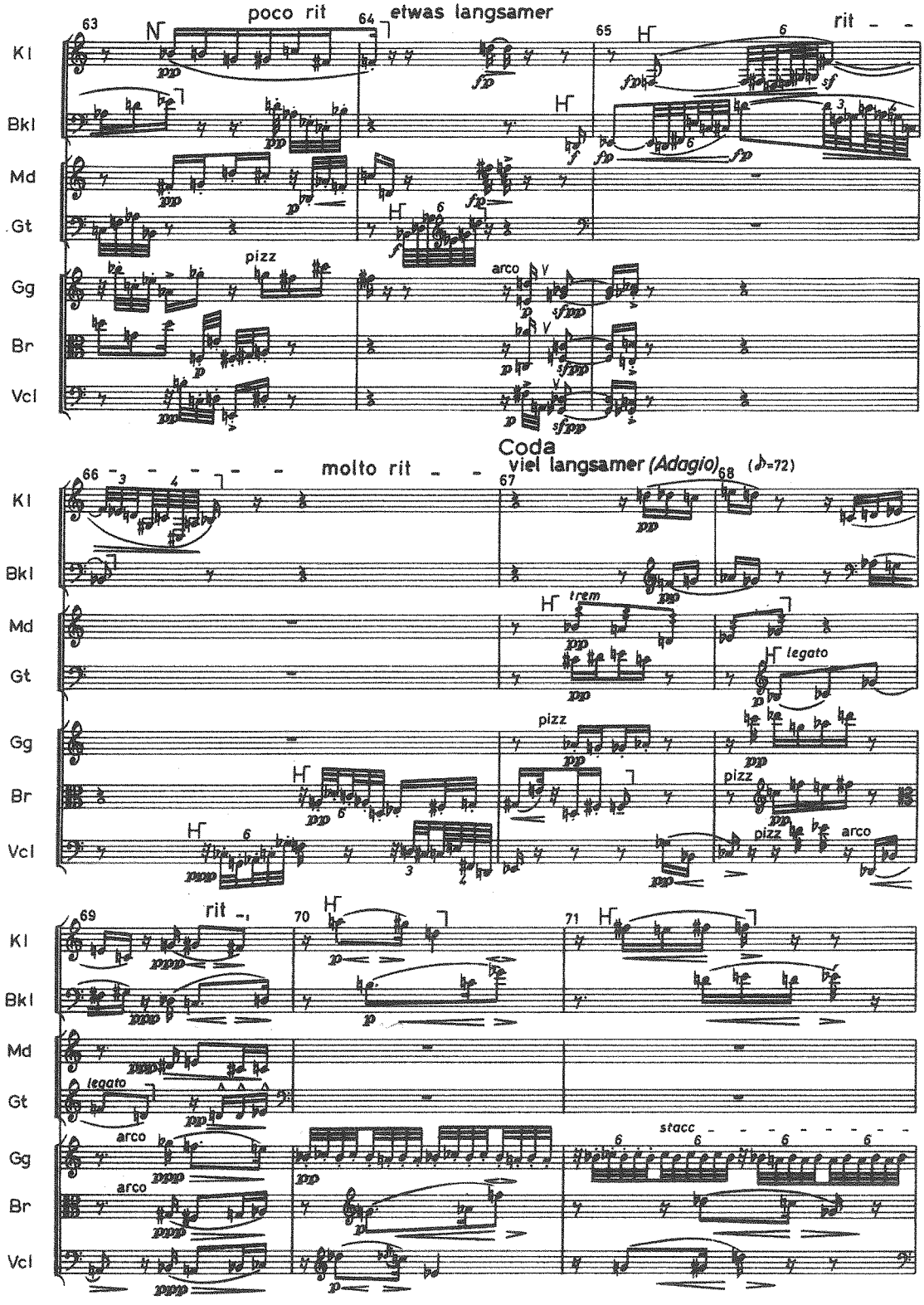
Example 1.101. Alban Berg, *Wozzeck*, measures 615–617, Universal Edition (Tempo: ♩ = 132)

Schönberg's *Serenade* (Example 1.102) treats the guitar in many places as an equal participant in the projection of dense, contrapuntal musical textures. In the opening movement, *Marsch*, Schönberg utilizes the guitar–mandolin duo but with a twist: he pairs the guitar with the bass clarinet and the mandolin with the clarinet, thereby creating a counterpoint between plucked/blown combinations.



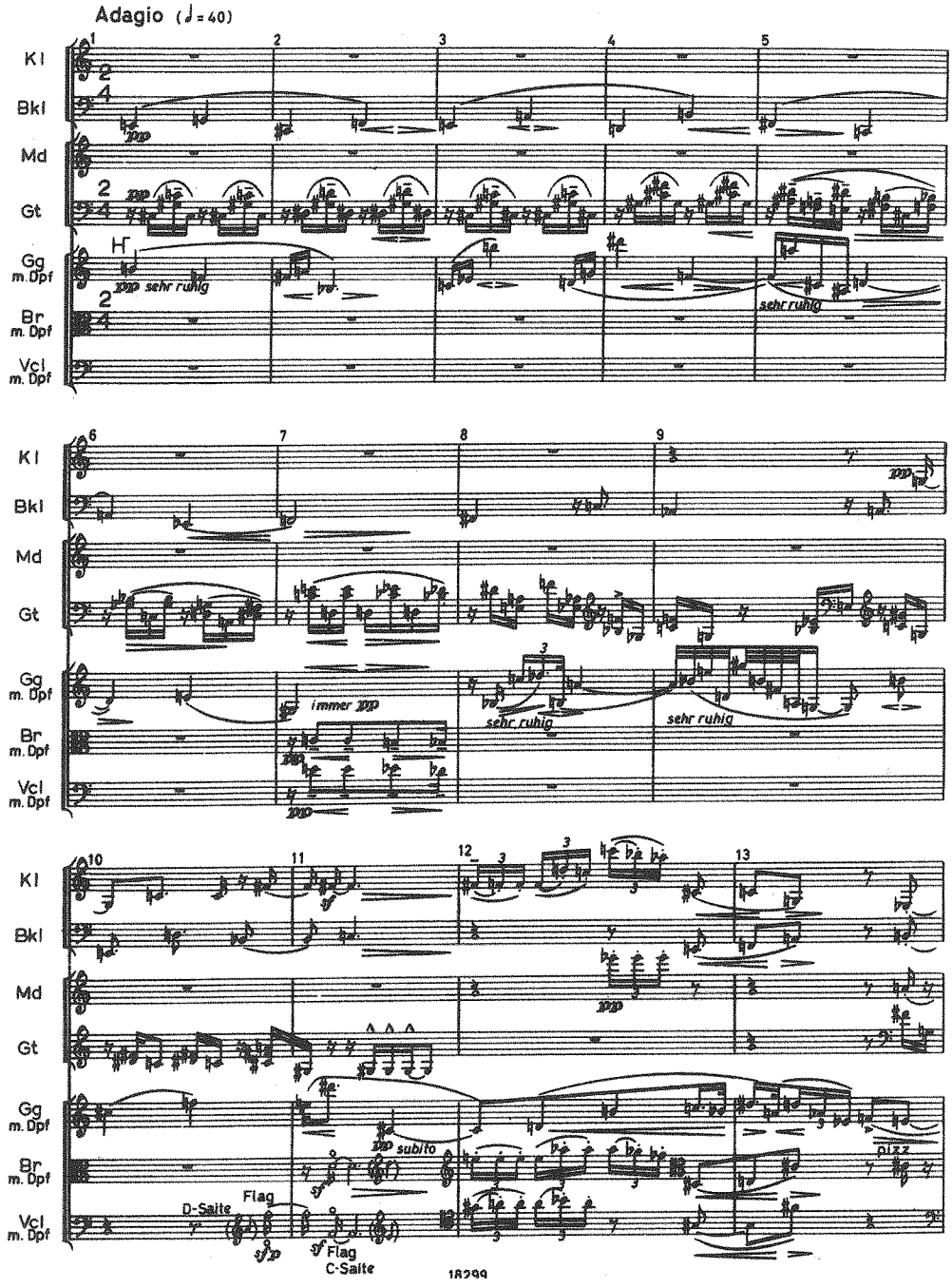
Example 1.102. Arnold Schönberg, *Serenade*, op. 24, Marsch, measures 63–72, Wilhelm Hansen Edition (Tempo: ♩ = 100)

The Serenade's third movement, *Variationen* (Example 1.103), gives the *Hauptstimme* (main voice) to the guitar, awarding it the same status as the rest of the ensemble.



Example 1.103. Arnold Schönberg, *Serenade*, op. 24, 3. Variationen, measures 63–71, Wilhelm Hansen Edition (Tempo: ♪= 108 until tempo change in measure 68)

In the work's sixth movement, *Lied (ohne Worte)* (Example 1.104), the guitar accompanies the bass significantly to a rich combination of blown, plucked, and bowed timbres.

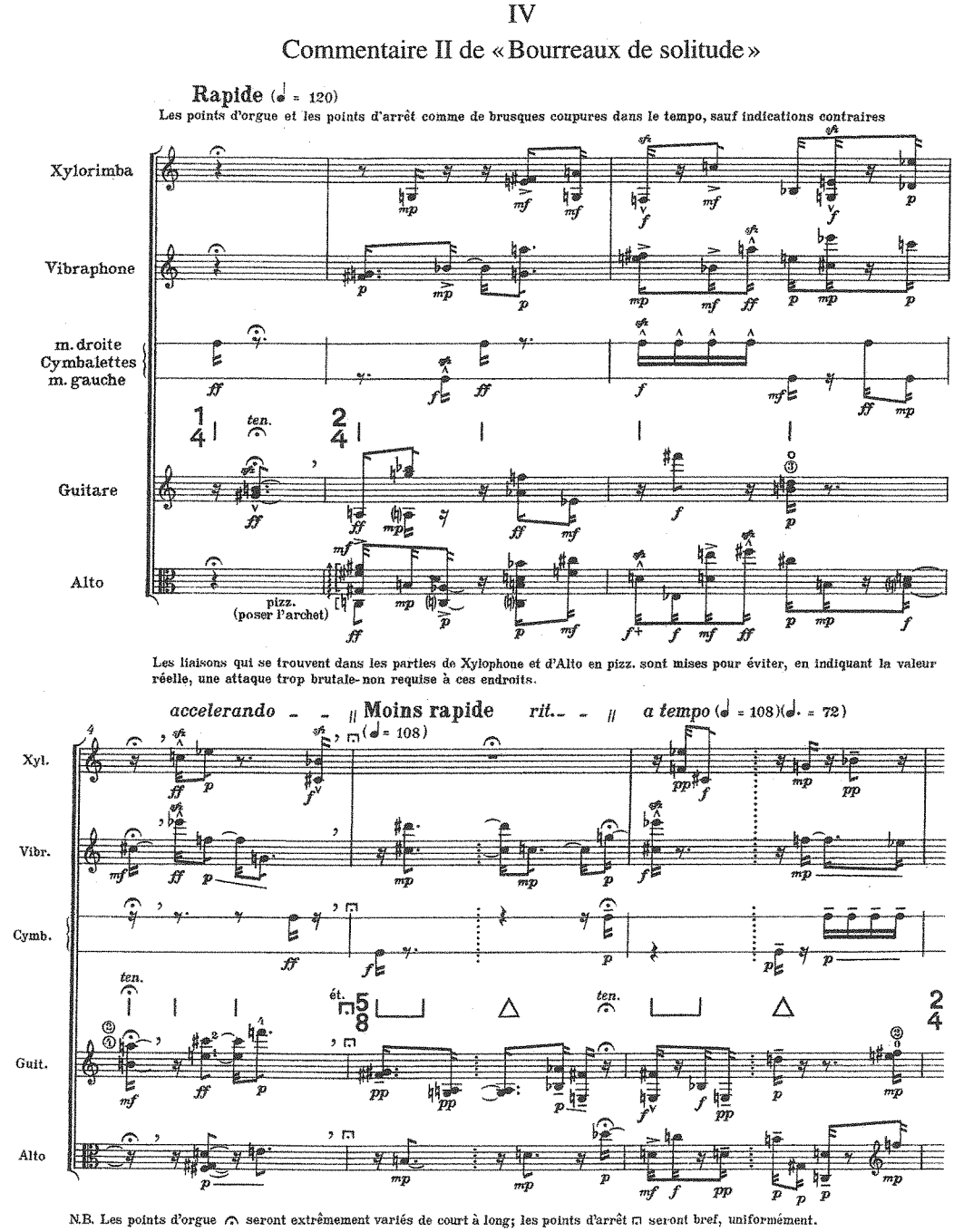


Example 1.104. Arnold Schönberg, *Serenade*, op. 24, Lied (ohne Worte), measures 1–13, Wilhelm Hansen Edition

With new developments in music and stronger interest in less traditional classical instruments such as those in the percussion family, the generation of composers who emerged after the Second World War often began to include guitar in their compositional experiments. With its potential for sharp, percussive attack and short decay, the guitar offered new timbral possibilities, both in and of itself and in combination with other instruments. Such avant-garde serial works as

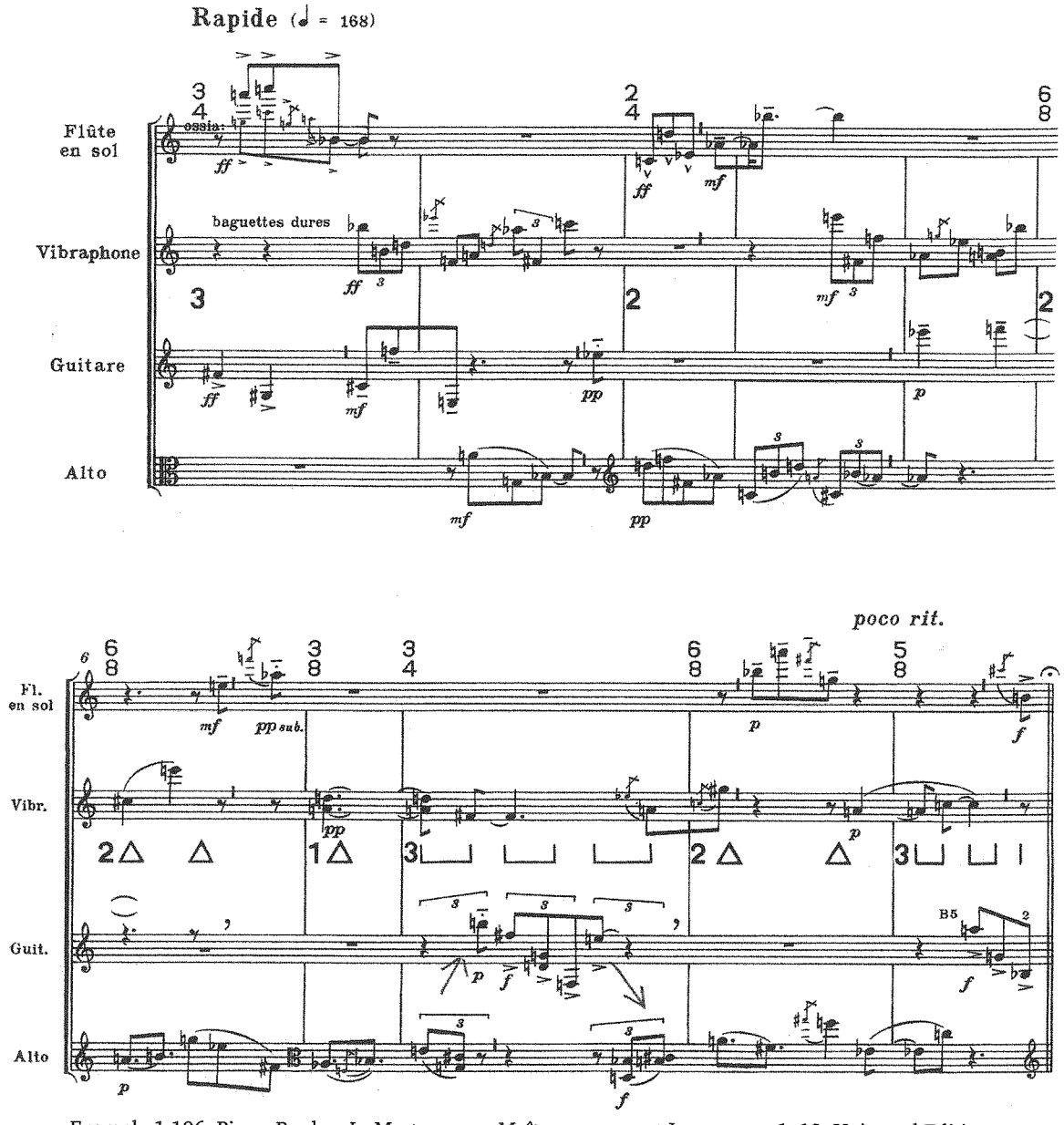
Boulez's *Le Marteau sans Maître* (1953/55), Stockhausen's *Gruppen* (1955), Maderna's *Compozione in Tre Tempi* (1954), Goeyvarts' *Opus 6* (1954) and Krenek's *Sestina* (1957) all incorporated the guitar in their "pointillist" musical canvasses.

The fourth movement of *Le Marteau sans Maître* (Example 1.105) combines the guitar with percussion, (xylorimba, vibraphone, and crotales), and viola. This unusual instrumentation, unique at that time, injects the music with what would have been—and to some extent still is—an exotic aura. The "pointillist" texture of the music further reinforces the foreign quality of the timbral mix.



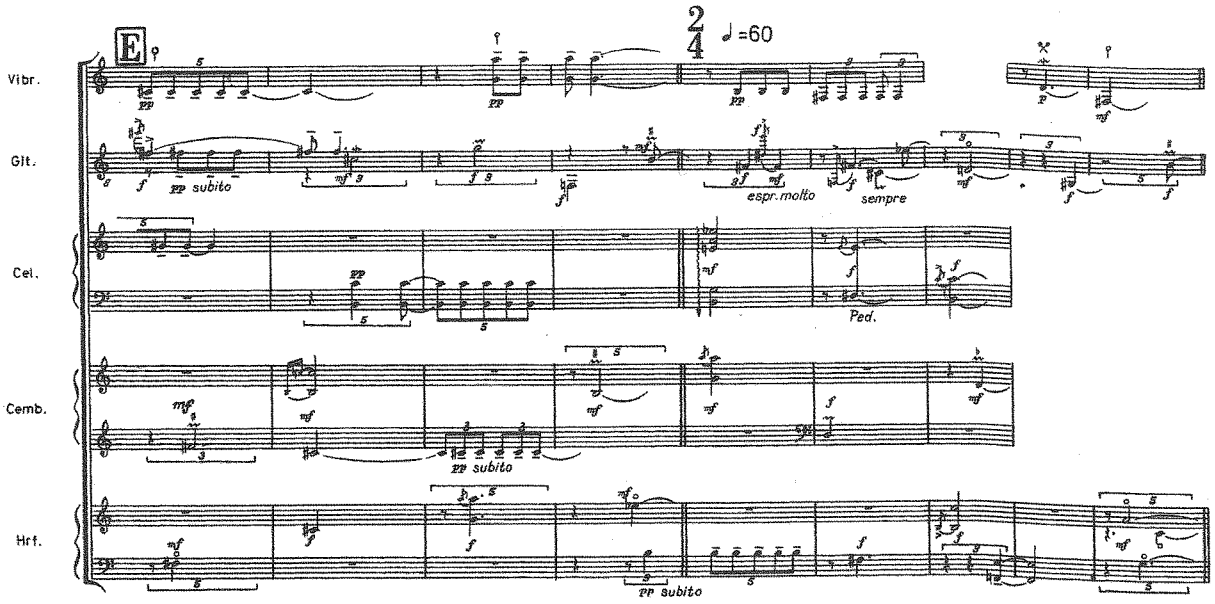
Example 1.105. Pierre Boulez, *Le Marteau sans Maître*, movement IV, measures 1–6, Universal Edition

In Example 1.106, Boulez combines the guitar with flute, vibraphone, and viola in a complex network of relationships. These intersecting relationships develop through one or another of several variables including motivic similarity, quality of attack, string timbre, dynamic, and register.



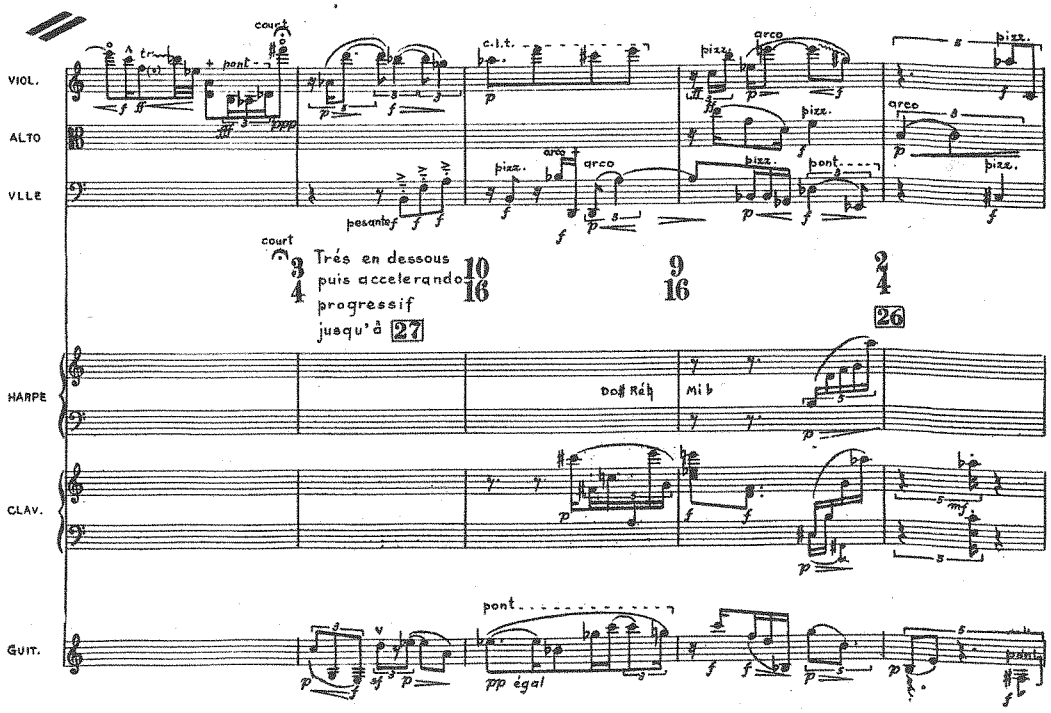
Example 1.106. Pierre Boulez, *Le Marteau sans Maître,* movement I, measures 1–10, Universal Edition

Bernd Alois Zimmermann, in Example 1.107, beautifully embellishes a "Nachtmusik" atmosphere by combining the guitar with vibraphone, celesta, harpsichord and harp as a preparation for the Nocturno II a few measures later.



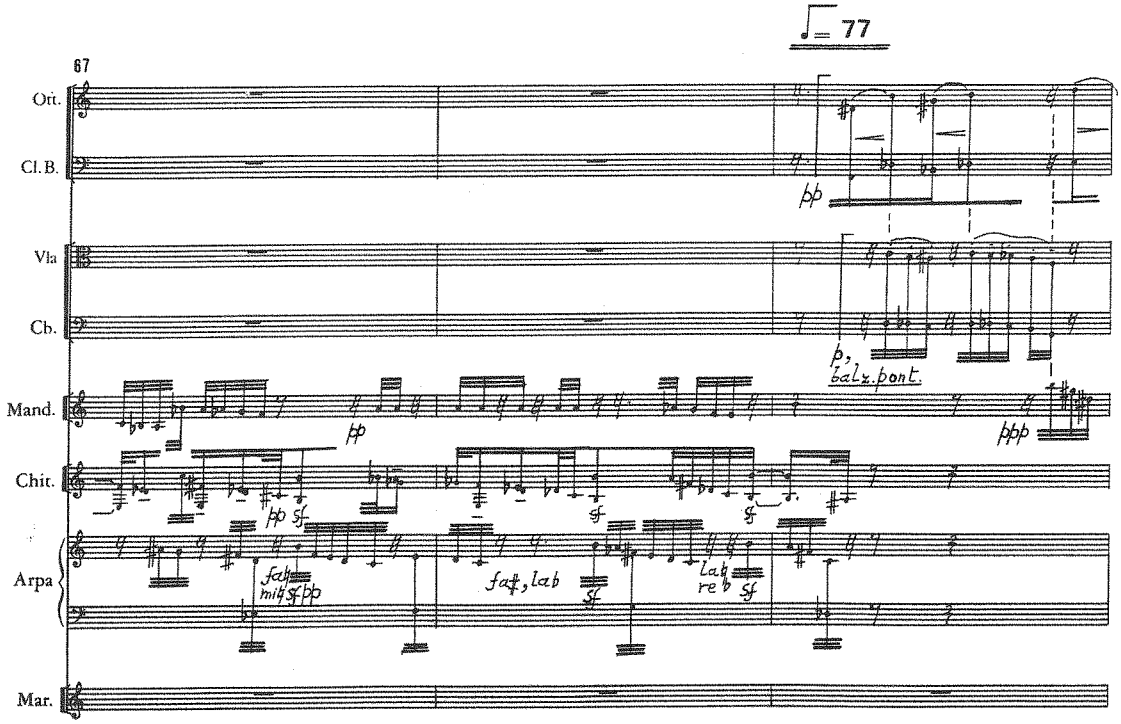
Example 1.107. Bernd Alois Zimmermann, *Die Soldaten*, Act 3, Romanza, Rehearsal E, Schott (Tempo: ♩ = 80)

For his *Concerto*, Barraqué combines melodic figuration on the guitar with a string trio, harp, and piano. Here, he creates unique color combinations through his use of pizzicato in the cello, *col legno tratto* in the violin, and plucking sul ponticello in the guitar, which produces a dry, brittle sound (Example 1.108).



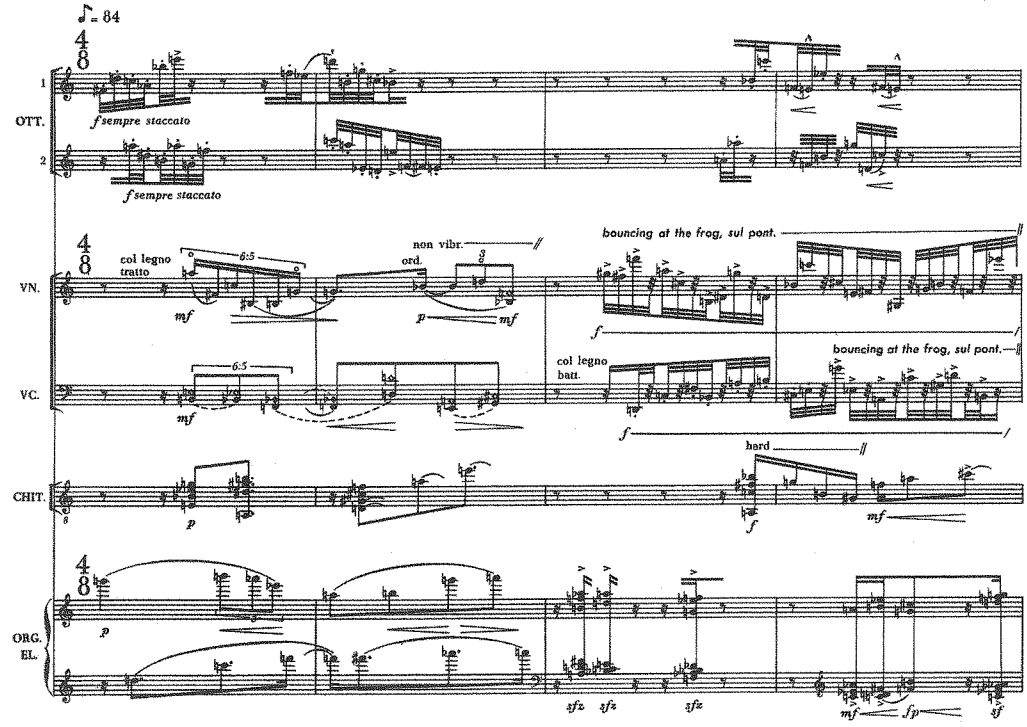
Example 1.108. Jean Barraqué, *Concerto*, page 13, rehearsal 25, Aldo Bruzzichelli ed. (Tempo: "trés modéré libre")

Donatoni continues the tradition of combining guitar with harp and mandolin. This trio of instruments forms a subset of an octet, in which each instrumental grouping performs virtuosic, rhythmic, and interweaving lines characteristic of Donatoni's late style (Example 1.109).



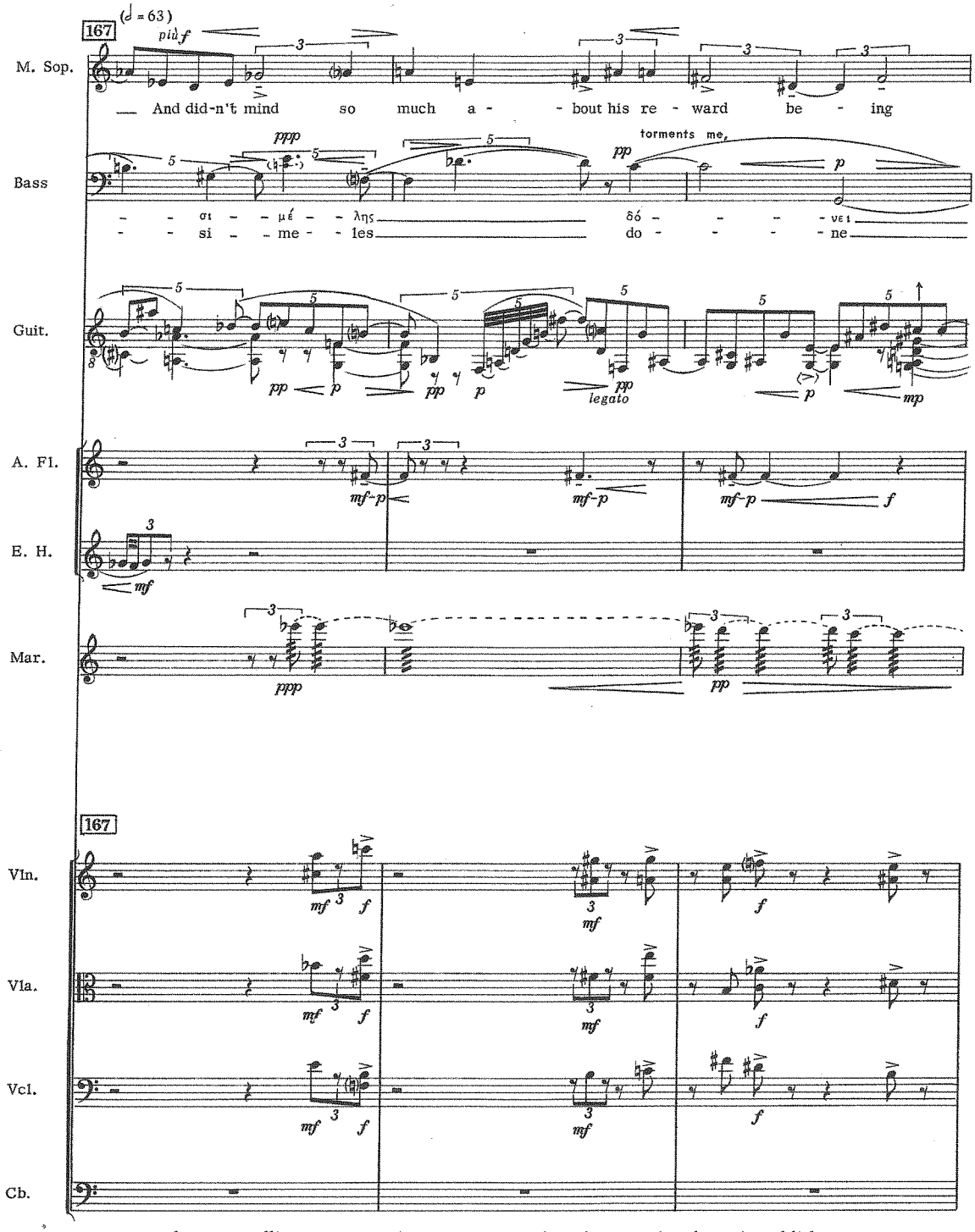
Example 1.109. Franco Donatoni, *Refrain*, measures 67–69, Ricordi (Tempo: ♪= 88)

Toru Takemitsu combines the guitar with two piccolos (upper two staves), violin, cello, and electric organ. In Example 1.110, the strings are initially playing either *col legno tratto* or harmonics against a staccato figuration in the piccolos. Both of these textures mix quite well with the guitar, but the juxtaposition becomes especially striking when the strings play *col legno battuto* in conjunction with a more aggressive (i.e., *hard*) plucking on the guitar.



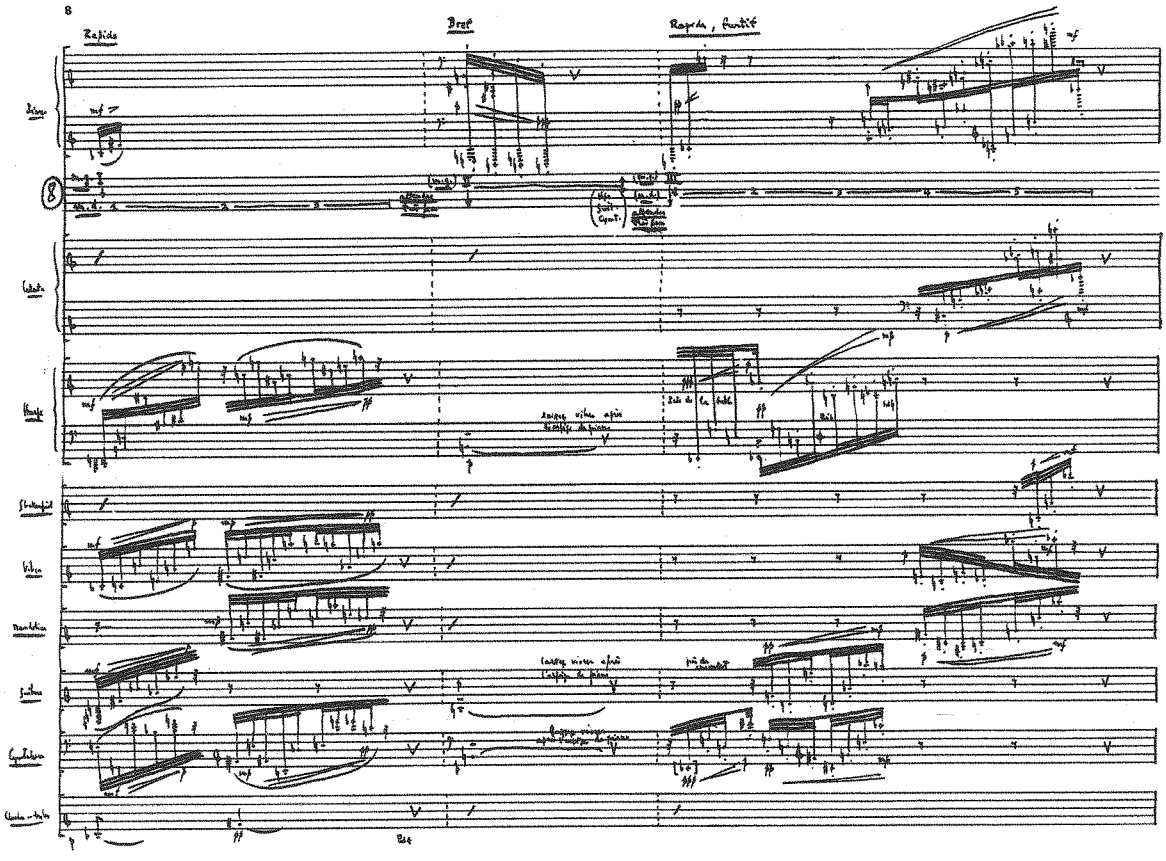
Example 1.110. Toru Takemitsu, *Valeria*, page 5, system 1, Universal Edition

Carter's *Syringa* remains one of the most daring and, for the performer, challenging uses of the guitar in an ensemble work. The passage below (Example 1.111) features the guitar with soprano and bass voices, along with marimba, woodwinds and strings. Through chords, arpeggios, and linear movements, the guitar supplies a middle-ground texture within the ensemble that connects the lyrical, flowing qualities of the voices with the more angular, perforated sounds of the other instruments.



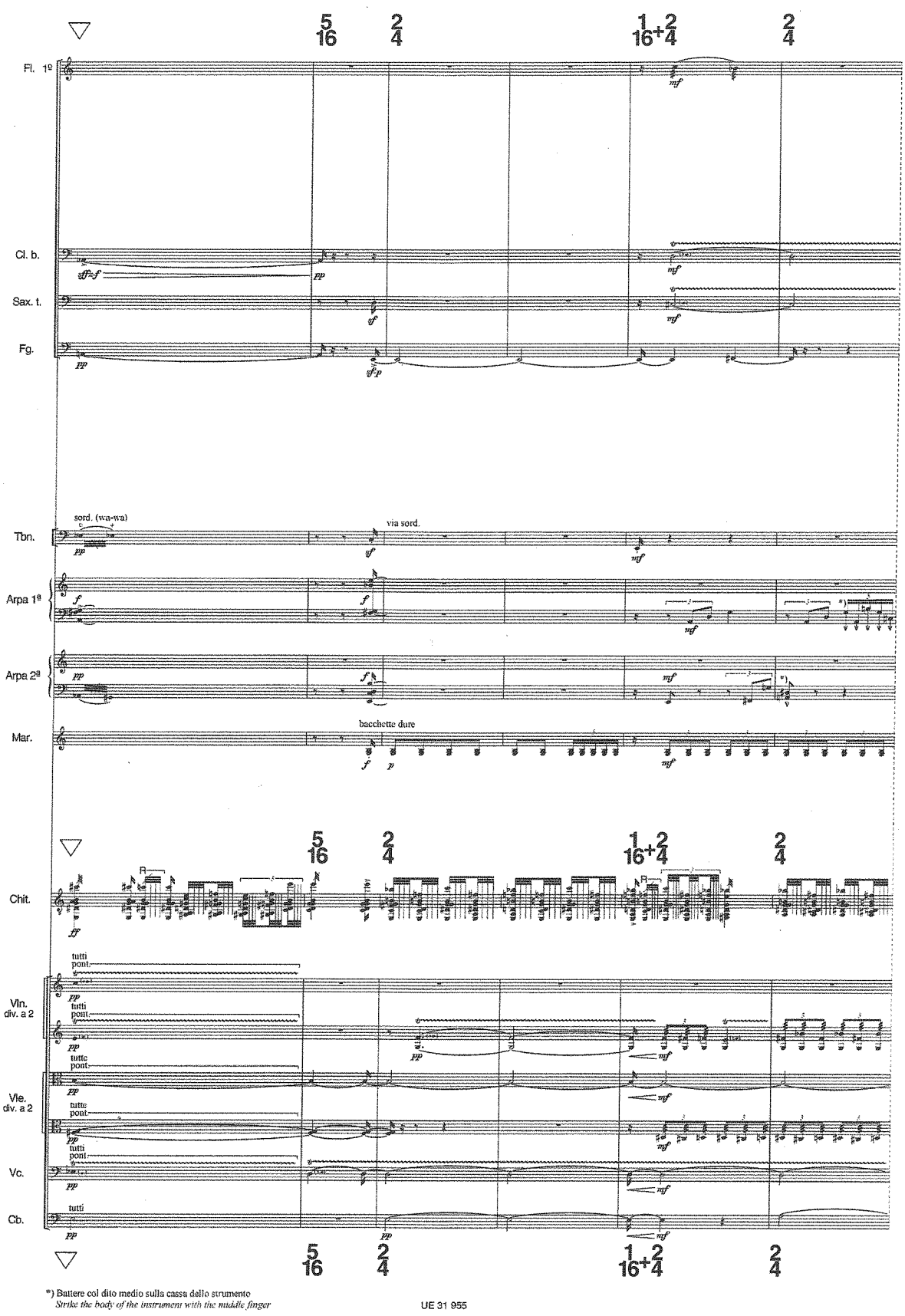
Example 1.111. Elliott Carter, *Syringa*, measures 167–169, Associated Music Publishers

In Example 1.112, Boulez orchestrates for the guitar (3rd stave from the bottom), piano, celesta, harp, vibraphone, glockenspiel, mandolin, cimbalom, and tubular bells. He uses these instruments to create interlocking flourishes whose percussive qualities together generate a scintillating effect.



Example 1.112. Pierre Boulez, *Eclat*, rehearsal 8, Universal Edition

Chemins V is an orchestral setting with solo guitar of Berio's *Sequenza XI*. In Example 1.113, the variegated strumming in the guitar—an important component of the *Sequenza*—is opposed by quiet trills and tremoli in the strings, sustained notes and trills in the winds, along with quiet iterations in the marimba, all of which are punctuated by accented notes that occasionally match the energetic rhythm of the guitar.



Example 1.113. Luciano Berio, *Chemins V*, page 9, rehearsal 4 (middle), Universal Edition (Tempo: ♩ = 60)

2

Guitar Harmonics

One common technique employed on the guitar is that of *harmonics*. Harmonics on the guitar produce a delicate, ethereal sound that expands both the pitch range of the instrument as well as its timbral palette.

2.1 What are harmonics?

Any pitch produced by the guitar is a complex tone, that is, a combination of many simple periodic waves or *partials,* each with its own frequency of vibration, amplitude, and phase. On a string instrument such as the guitar, where each end of the string is fixed, a fundamental frequency is produced whose wavelength is twice the string's length. As a complex tone, the fundamental frequency also contains partials that approximate whole-number multiples of the fundamental frequency. Because of the physical characteristics of a string, such as string tension, length, and mass, the partials of the string fundamental will exhibit some degree of *inharmonicity*, i.e., the partials will deviate slightly from whole-number multiples of the fundamental frequency.

The terms *partial, harmonic,* and *overtone* can refer to three different but overlapping phenomena. Indeed, partials on the guitar need not be whole-number multiples of a fundamental frequency, as is the case with many percussion instruments such as cymbals and gongs. All higher partials that exclude the fundamental are called overtones. When the partials do refer to whole-number multiples of a fundamental frequency, then they are called harmonics. The fundamental is the 1st harmonic.

2.1.1 Harmonic series

It was Pythagoras who putatively discovered that the most harmonious sounds are tones in simple ratios to each other, particularly the *3:2* ratio or the *perfect fifth*. This is the interval that is formed between the 2nd and 3rd harmonics.

A vibrating string on a musical instrument vibrates with its fundamental frequency and all harmonics of that frequency. The position of nodes, points where the string is at minimum vibration, and antinodes, points where the string is at maximum vibration, correspond to the equal divisions of the string length by each harmonic mode of vibration. For instance, the 3rd harmonic, whose wavelength is a third the length of the string, divides the string length into three parts creating two nodes (other than the fixed endpoints of the string) and three antinodes. Its frequency would then be three times that of the fundamental frequency.

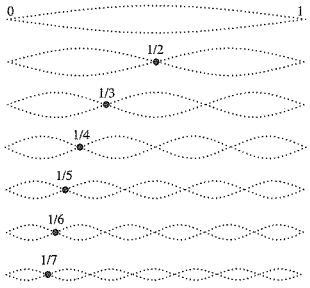


Figure 2.1. The first seven modes of vibration of a fixed string. The dots indicate harmonic nodes.

If the fundamental frequency is defined by A_2 = 110 Hertz, then the frequencies of the successive overtones are, in Hertz, $2A_2$ = 220, $3A_2$ = 330, $4A_2$ = 440, $5A_2$ = 550, $6A_2$ = 660, etc. These frequencies depart from the equal tempered tuning.

In Table 2.1, the fundamental pitch A^2 and its first nineteen harmonics in both natural and equal tempered frequencies are listed. Theoretically, the number of possible harmonics continues towards infinity.

Harmonic Number	Pitch Name	Harmonic Frequency (in Hertz)	Equal Tempered Frequency (in Hertz)
1 (fundamental)	A^2	110	110
2	A^3	220	220
3	E^3	330	329.63
4	A^4	440	440
5	$C^{\sharp 4}$	550	554.37
6	E^4	660	659.26
7	G^4	770	783.99
8	A^5	880	880
9	B^5	990	987.77
10	$C^{\sharp 6}$	1100	1046.50
11	$D^{\sharp 6}$	1210	1244.51
12	E^6	1320	1318.51
13	F^6	1430	1396.91
14	G^6	1540	1567.98
15	$G^{\sharp 6}$	1650	1661.22
16	A^6	1760	1760
17	$A^{\sharp 6}$	1870	1864.66
18	B^6	1980	1975.53
19	C^7	2090	2093

Table 2.1. Comparison of the natural harmonic series with the equal tempered series

In equal temperament, which divides the octave or the ratio of 2:1 into twelve equal semitones, the unit of measurement is usually performed in cents where the interval of the semitone r is equal to 100 cents:
$r = 100 \text{ cents} = \sqrt[12]{2} \approx 1.0594630943593$

The harmonic series can be represented in standard music notation with the pitch deviations from equal temperament written in cents above the notehead (Figure 2.2). Thus, the 7th harmonic sounds 31-cents flatter than its equal tempered approximation.

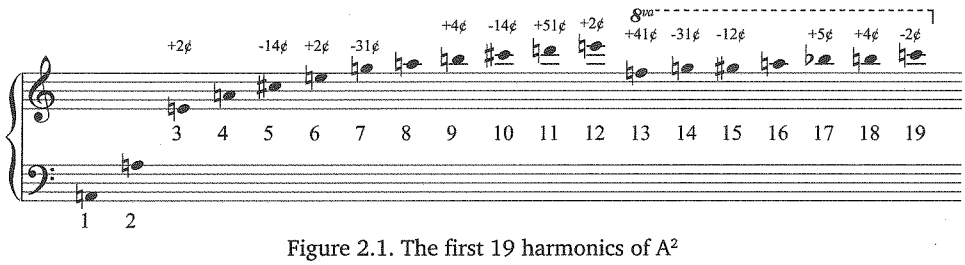


Figure 2.1. The first 19 harmonics of A^2

2.1.2 How are harmonics generated on a guitar?

If one touches a vibrating string at one of the harmonic nodes, one is effectively filtering out any mode of vibration that does not have a node at that position. For example, touching a vibrating string on the guitar at 1/4 the distance from either the nut or the bridge, allows only those modes of vibration that have a node at that position to sound, e.g., the 4th, 8th, and 16th overtones and so on. The lowest mode of vibration will have the strongest amplitude; in this case the 4th mode of vibration will dominate.

On a guitar string, one usually produces harmonics by *lightly* touching the string with the LH at one of the nodal points, and then playing the indicated note with the RH. Touching the vibrating sixth string lightly with a LH finger at the fifth fret, for instance, which is approximately 1/4 the distance of the string, causes the 4th harmonic (as well as the 8th, 16th, etc.) to sound. The amplitude of the 4th harmonic will be stronger compared to that of the higher overtones.

2.2 Harmonics on the open strings of a guitar

Harmonics can be played on any open string of a guitar. Those produced on an open string are typically called *natural* harmonics. The type of string and guitar will, in part, determine the timbre of the harmonic. With a classical guitar, harmonics are more readily available on the lower three strings, which have slightly less tension and which are wound, implying greater mass. Harmonics on the treble nylon strings (strings 1–3, which are unwound) have somewhat more difficulty "speaking".

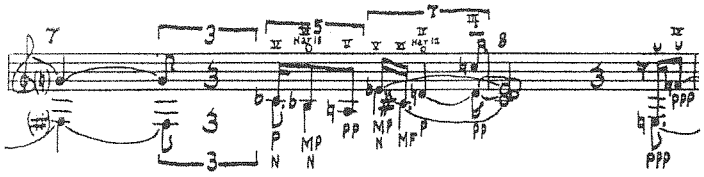
On a steel-string acoustic guitar, harmonics are most easily obtained on strings 6–3, provided string 3 is a wound string with more mass than an unwound string (unwound strings are always used for strings 1 and 2). In general, harmonics on a steel-string acoustic guitar have markedly greater amplitude and sustain than on a classical guitar. The use of steel, which has greater mass than nylon, as well as the increased tension on the string compared to that of the classical guitar, gives the harmonics more presence.

As a general rule, the amplitude and sustain of any harmonic on all guitars decreases as one moves across strings, i.e., from string 6 to string 1.

2.2.1 How high?

According to our experiments with a variety of guitars, as well as the guitar literature, it is largely impracticable to procure harmonics above the 19th harmonic on the bass strings (strings 6–4) and the 13th harmonic on the treble strings (strings 3–1). Harmonics beyond the 19th on strings 6–4 (or the 13th on strings 3–1) are nevertheless obtainable in the area closest to the bridge if one resorts to less orthodox methods of playing such as using a plectrum or fingernail. On occasion, on these same strings, harmonics higher than the 19th can be found in the area closest to the nut; however, they often do not speak effectively there and are obfuscated by a low thud due to the length of the string. In general, a plectrum tends to work better than the fingers for eliciting high harmonics since it provides a more incisive attack.

In Example 2.1, Young asks for the 18th harmonic on string 6 in a "tricky" position along the fretboard (slightly lower than the sixth position with the written $B^{\flat}$). For producing the 18th harmonic, this area is extremely volatile since several stronger harmonics are present in the immediate vicinity. In fact, it is more likely that a multiphonic consisting of several local harmonics will sound there.



Example 2.1. La Monte Young, *for Guitar*, measures 7–8, Just Eternal Music (Tempo: ♩ = 26)

Figure 2.3 presents the harmonic series in concert pitch up to and including the 19th harmonic on strings 6–4 and the 13th harmonic on strings 3–1, with each open string of the guitar as the fundamental.[75]

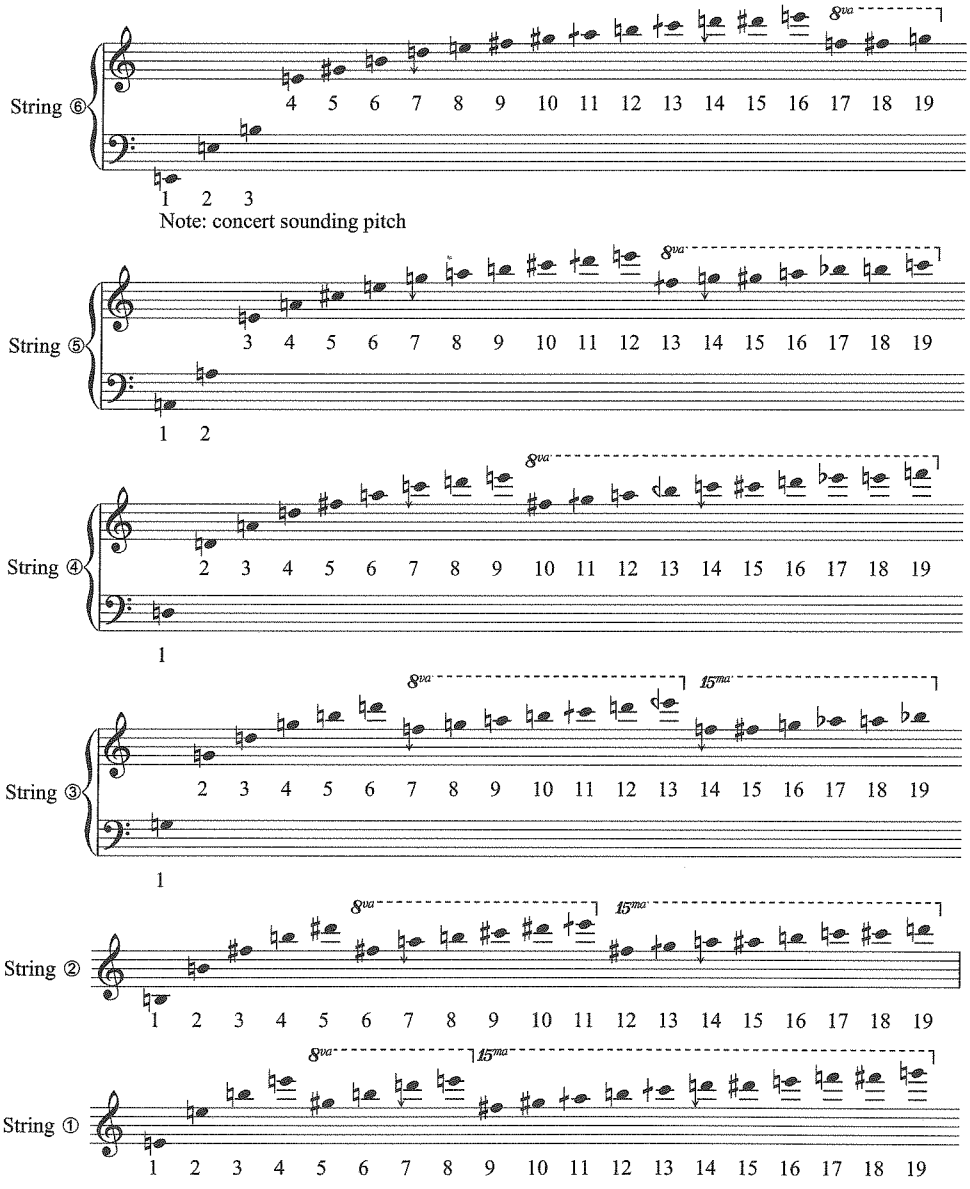


Figure 2.3. Harmonic series for each open string

75 For the harmonic series only: ♭ ♯ ≈ one eighth-tone flat, 𝄳 ≈ one quarter-tone flat, 𝄲 ≈ one quarter-tone sharp. Please refer to Figure 2.2 for the precise deviations in cents from equal tempered tuning.

Despite their complexity, it is possible to make some general observations about natural harmonics that hold for the entire guitar family:

(a) Harmonics lower in the series have greater amplitude and sustain than harmonics higher in the series.
(b) Amplitude and sustain of all harmonics decrease as one moves across strings, from string 6 to string 1.
(c) Harmonics higher than the 5th harmonic of the series have greater amplitude and sustain as one approaches either the nut or the bridge. Harmonics beginning with the 7th harmonic are weaker as one approaches the middle of the string since harmonics lower in the series begin to interfere. Very high harmonics are best obtained in the area closest to the bridge.
(d) The amplitude and sustain of any harmonic is greater when plucking close to the bridge, especially when using a plectrum or the fingernail as a plectrum).

2.2.2 Location of open string harmonics

The charts in Figure 2.4 indicate all occurrences of harmonics on the fretboard up through the 19th harmonic as well as any occurrences beyond the fretboard that apply to all six strings. As mentioned, certain positions for executing the same harmonic are more favorable than others. Very high harmonics (e.g., 20, 21, 22, etc.) are best found in the area of string closest to the bridge. Closer to the central portion of a string, where the strong 2nd and 3rd harmonics begin to interfere, harmonics higher than the 6th speak less cleanly than when they occur closer to the nut or bridge. Even when the relatively strong 7th harmonic is played close to the tenth fret, for example, the presence of the 2nd harmonic is slightly audible. Indeed, many of these higher harmonics, when executed in the central area of the string, begin to sound as multiphonics. Thus, there are timbral differences between each location of the same harmonic on the same string.

How many times does a given harmonic occur on the same string? Recall that a given harmonic ρ divides the string into $\rho - 1$ parts, creating $\rho - 1$ nodes, where the frequency in Hertz of the harmonic ρ is ρ times the fundamental frequency. However, some of the nodes of ρ will coincide with nodes of harmonics lower in the series and, when the string is touched at a node of ρ, the lower harmonic will be favored. Therefore, if ρ is prime, it will have no nodes that coincide with any other harmonic and thus occur $\rho - 1$ times on the string. If ρ is not prime, then it will occur $<m, \rho>$ times with $m = 1, \ldots, \rho - 1$ and m and ρ relatively prime (i.e., no common factors other than 1). For example, for the 12th harmonic, 1/12, 5/12, 7/12, 11/12 are the only pairs $<m, 12>$ with $m = 1, \ldots, 11$ where m and 12 are relatively prime. So the 12th harmonic occurs four times on a given string. One can, theoretically, continue the chart below to include harmonics higher than the 19th harmonic.

In Figure 2.4, the occurrences of harmonics are charted by number below the fretboard. The numbers in the bottom row (in bold) are those harmonics that are easiest to execute and speak with the most clarity and force. The numbers in the middle row (in italics) are those harmonics that are slightly more difficult to execute and speak with slightly less clarity and force. The numbers in the top row closest to the fretboard are those harmonics that are difficult to execute and require some time to prepare without other harmonics interfering. Recall that harmonics higher than the 13th are difficult to produce on strings 3–1.

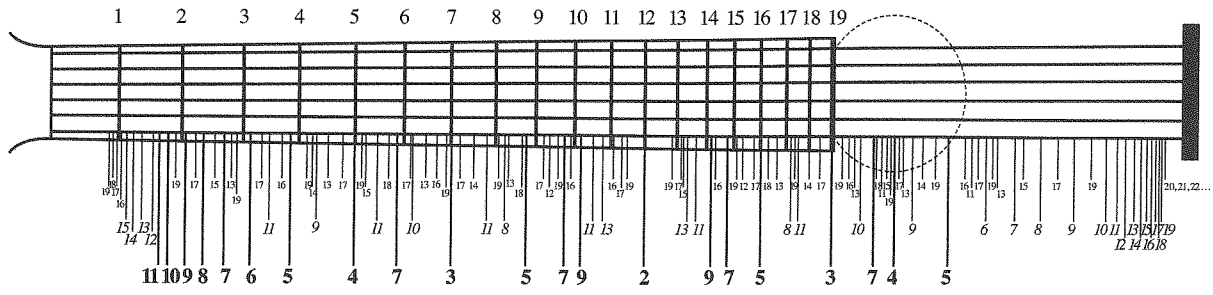
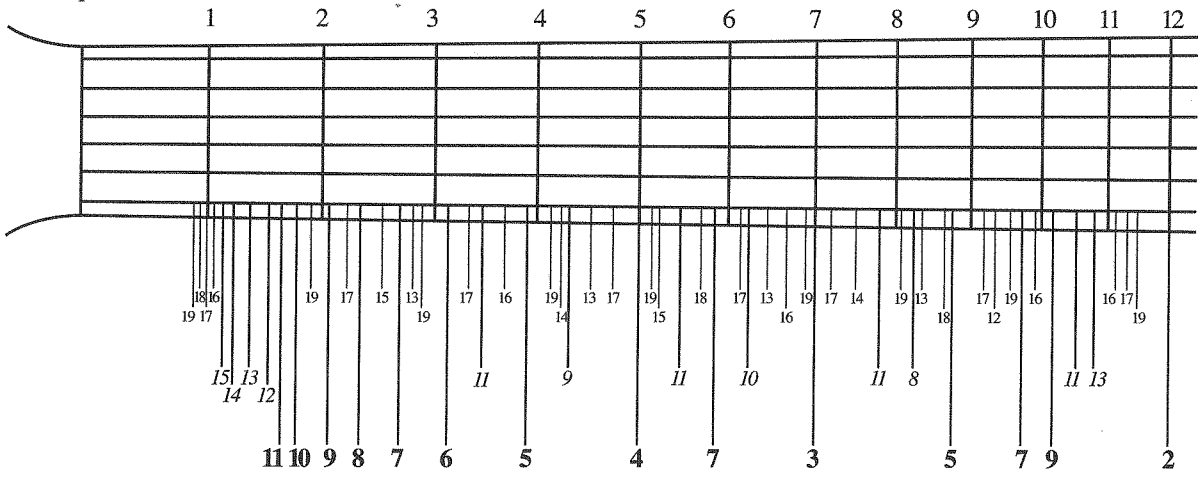


Figure 2.4(A). Location of open string harmonics

Close-up on the Fretboard below the 12th Fret



Close-up on the Fretboard above the 12th Fret

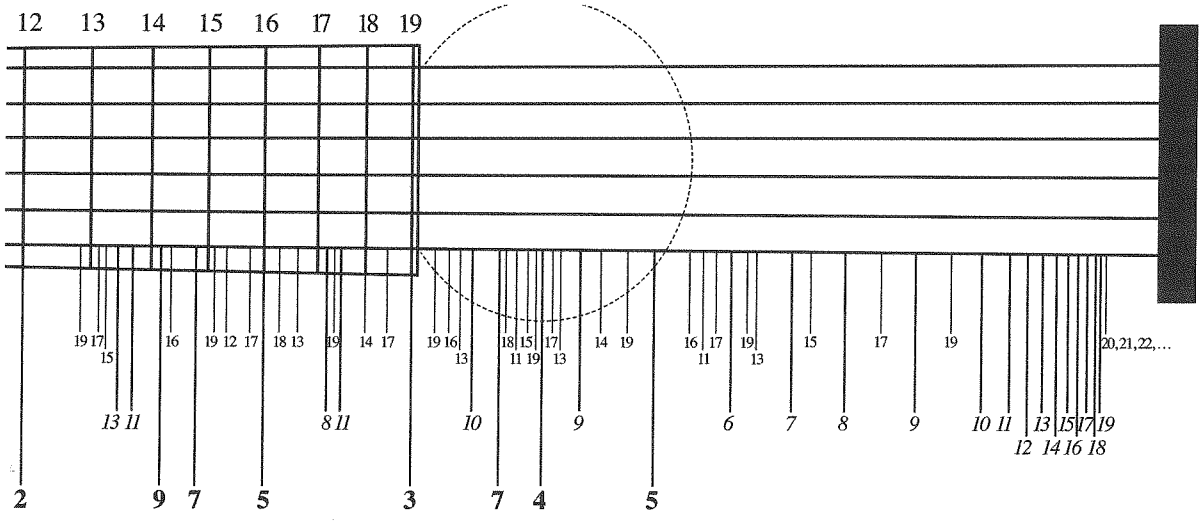


Figure 2.4(B). Location of open string harmonics in close-up

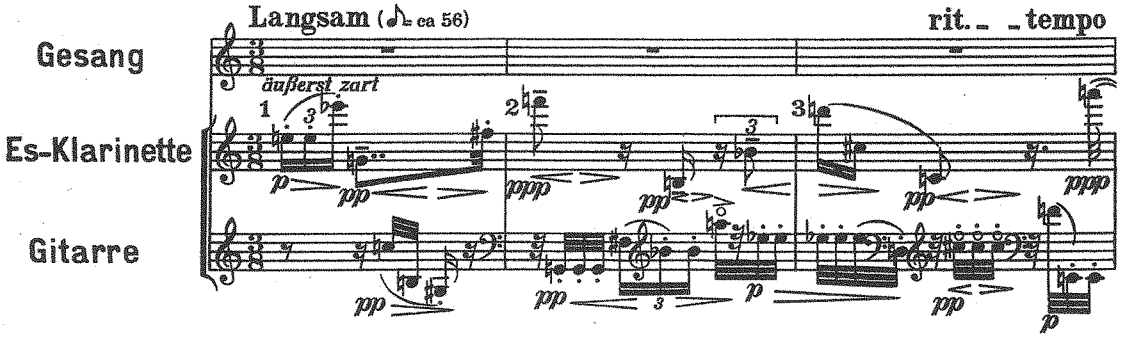
2.2.3 Harmonics on different strings

Since natural harmonics are derived from the open string fundamental, *harmonics on different strings are defined by different fundamental pitches*. For example, the 7th harmonic on string 6 and the 4th harmonic on string 4, both of which are notated in standard notation as D^5, differ from each other by 31 cents (the 7th harmonic on string 6 sounds slightly flatter than the 4th harmonic on string 4).

However, in standard practice repertoire, where often only the resultant harmonic pitch is notated in 12-tone equal temperament, important intonation issues arise. As a performer one must carefully select where on the string to execute the harmonic.

2.2.4 Harmonic dilemma in Webern's *Drei Lieder*, op. 18

Ave Regina is the last of the three songs comprising Webern's *Drei Lieder* op. 18, a work for voice, clarinet and guitar. Typically for Webern's music of this period, the song presents the listener with a "continually vibrating, buzzing" texture through which a vocal line emerges.[76] The instrumental prelude (Example 2.2), which is quite advanced historically from the standpoint of guitar composition, includes harmonics that confront the guitarist with certain quandaries, especially when considering Webern's stylistic tendencies at the time. There are three occurrences of notated harmonics in the prelude; however, Webern failed to indicate where and how these harmonics should be performed. This oversight makes the performer's approach to tuning problematic yet all the more critical.



Example 2.2. Anton Webern, *Drei Lieder*, op. 18, movement III, measures 1–3, Universal Edition

The A^5 guitar harmonic in the second measure (Example 2.2) can be articulated either as a natural harmonic or as an artificial harmonic, a technique discussed later in this chapter. If the A^5 were performed as a natural harmonic, then it could be performed either as the 8th harmonic on string 5 or as the 6th harmonic on string 4. Performing the A^5 as the 9th harmonic on string 3 or as the 11th harmonic on string 6 would depart too much from the 12-tone equal temperament that was standard practice for the performance of Webern's compositions. By contrast, the tunings of the 8th harmonic on string 5 and the 6th harmonic on string 4 would not present significant deviations. At the same time, however, the timbre that would result from playing the A^5 harmonic as a natural harmonic on either string 5 or 4 would not blend as well with the clarinet as the timbre that would emerge from playing an artificial harmonic on string 1 (i.e., fretting the A^5 on string 1 and plucking an octave above it with the RH). The timbre of string 1, as opposed to strings 5 and 4, would possess a delicacy matching the soft dynamic levels of the clarinet in the same measure and would therefore create that distinctive "vibrating, buzzing" texture.

2.2.5 Scordatura

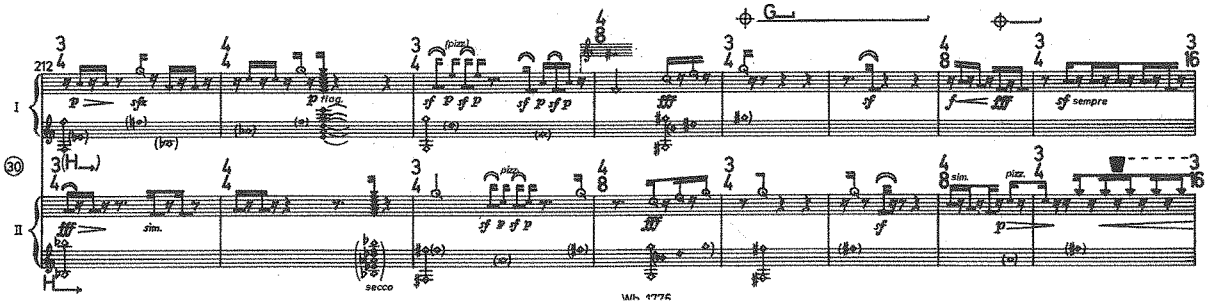
Often composers ask for harmonics on guitar strings with scordatura (i.e., non-standard) tunings. Assuming that the strings are not excessively slack or taught, the availability of harmonics on each string is the same in scordatura as when the guitar is in standard tuning.

76 Johnson, *Webern*, 163.

2.2.6 RH plucking techniques for harmonics

Natural harmonics can be plucked with the RH in all the various ways in which the RH can attack a string. Recall that plucking harmonics on a string by the bridge allows higher harmonics to sound than if it were plucked over the soundhole or fretboard. One effective method is to use a snap pizzicato with a fingered LH harmonic on the same string, yielding a percussive attack with a delicate harmonic resonance afterwards. The natural harmonic snap pizzicato can be notated in the following way: 

In Example 2.3, Lachenmann has the two guitarists bar harmonics while executing Bartók pizzicatos on various strings. These actions in conjunction produce an explosive, ringing sound.



Example 2.3. Helmut Lachenmann, *Salut für Caudwell*, system 30, Breitkopf & Härtel (Tempo: ♪= 126)

2.2.7 Harmonics produced by the LH alone

Although the RH customarily plucks as the LH gently prods the harmonic on the fretboard, it is also possible to produce harmonics with the LH alone. Tárrega reportedly used this technique in the late nineteenth century.[77] The idea is to stop the harmonic node with the LH little finger or ring finger and then to use the LH index finger to pluck the string behind that same node.

This technique only works successfully, however, if one actually gives an upstroke to the index finger of the LH while flicking the fingernail outward. Using the LH by itself to produce natural harmonics can reduce the amount of percussive attack on the guitar string, which can be very effective in quiet passages. Still, it does not work well beyond the twelfth fret, and needs time to execute since it is very fragile.

One can notate the LH harmonic in the following way:

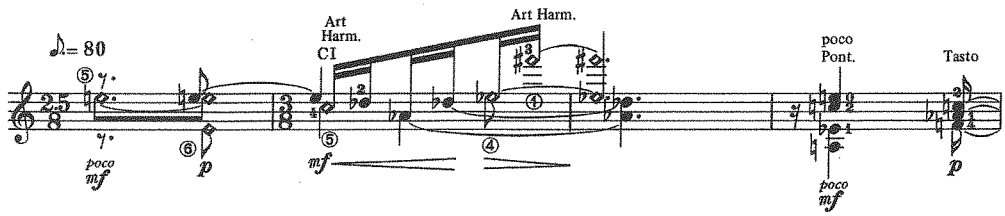
2.3 Examples from the literature

Harmonics are employed fairly widely in the guitar literature. Below are a few examples drawn from works for solo guitar, which have been selected to show particular aspects of harmonics and their use: (a) how harmonics *speak* well in specific areas of the instrument; (b) the extent to which harmonics can be executed rapidly in multiple contexts; and (c) how the choice and execution of harmonics contributes to the overall effect and sound world of the composition. Note that all of the examples sound one octave lower than written (including all harmonics and sounding pitches written in parentheses above the fingered pitches in Example 2.6).

In the opening measures of *All in Twilight* by Takemitsu (Example 2.4), an initial constellation of three occurrences of the pitch *E*, two of which

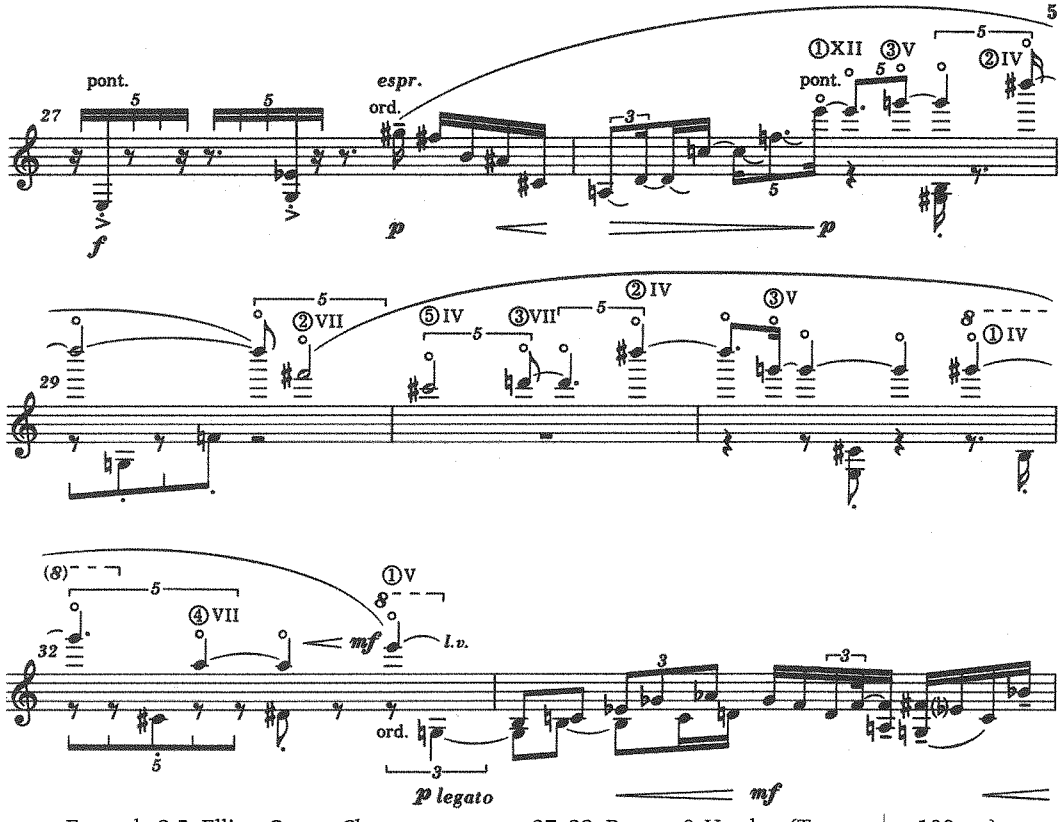
77 Roch, *Modern method for the guitar*, 101.

are harmonics, gradually opens the harmonic and registral space of the piece. The flickering timbral alternation between natural and artificial harmonics as well as ordinario notes sparks the principal opening gesture.



Example 2.4. Toru Takemitsu, *All in the Twilight*, measures 1–4, Schott Japan

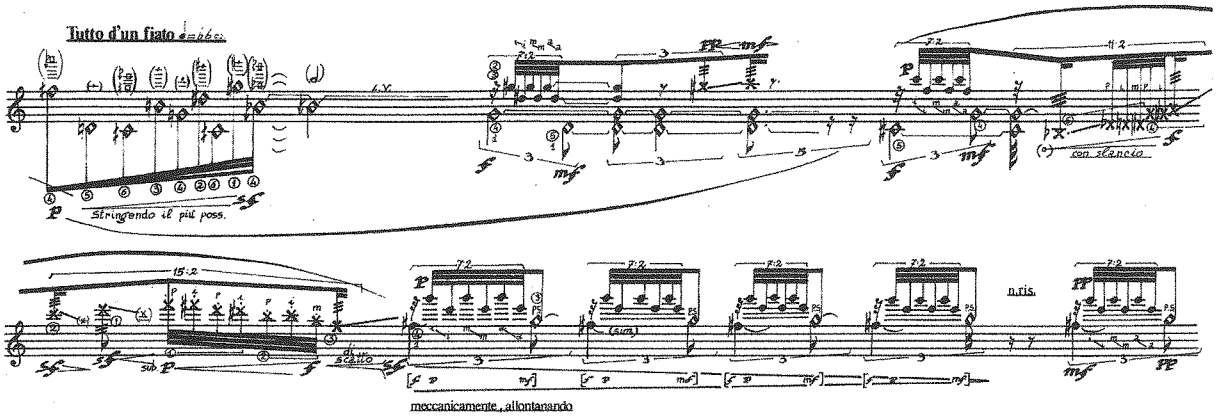
In Example 2.5, Carter combines both "*secco*-like" punctuations with fluid arpeggiations to create a textural counterpoint in the guitar. By using exclusively natural harmonics yet spreading them across five strings as well as multiple positions on the fretboard, Carter is able to retain the arpeggiated gesture in the upper notes while creating a sense of timbral contrast from the preceding material.



Example 2.5. Elliott Carter, *Changes*, measures 27–33, Boosey & Hawkes (Tempo: ♩ = 100 ca.)

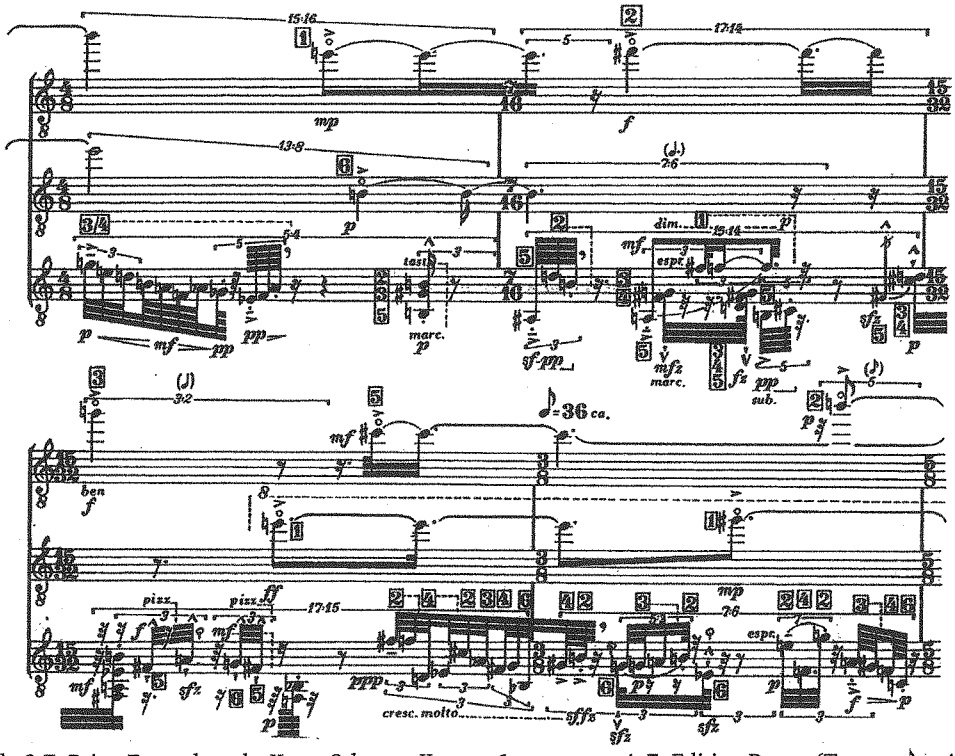
The opening gesture of Pisati's *Sette Studi* (*Studio 2*, Example 2.6) shows the rapidity with which natural harmonics can be executed in succession while still maintaining clarity, even when executed in atypical positions (such as the notated *F* at the beginning). In the second, third, and fourth figures, there is a combination of natural harmonics and half harmonics, the latter designated by the *x*-noteheads, a technique discussed below. The rapid tremolo movement at the beginning of

the second and third figures coalesces into "dangling" tremolo motives that involve extending the LH thumb across the fretboard, as in cello practice, to stop the written G^5 harmonic at the twelfth fret on string 3.



Example 2.6. Maurizio Pisati, *Sette Studi*, Studio 2, systems 1–2, Ricordi

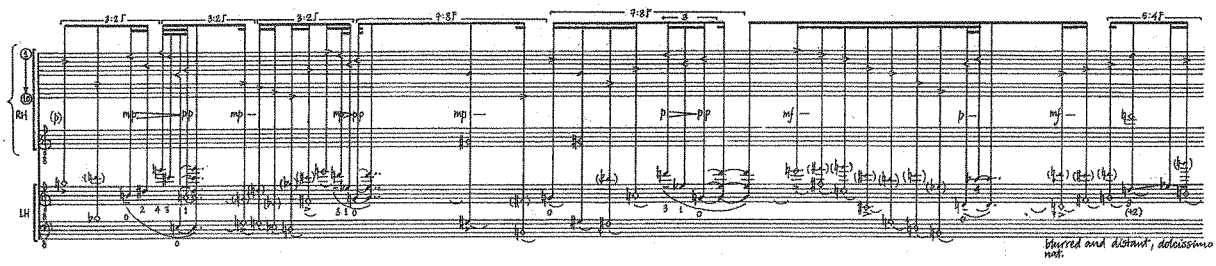
The opening eight measures of *Kurze Schatten II* (Example 2.7) uses harmonics in combination with ordinario figuration to create a sense of polyphony, not unlike the Carter example from above. Ferneyhough challenges the player to carefully choreograph the LH fingerings so that natural harmonics can sound between activities on adjacent strings. Toward the end of measure 5, natural harmonics are meant to ring on strings 1 and 5 while figuration is played between strings 2–4 and on 6. Performing such a passage requires precise execution involving a special curvature of the LH. This curvature prevents the LH fingers from interfering with the harmonic's resonance on strings 1 and 5.



Example 2.7. Brian Ferneyhough, *Kurze Schatten II*, page 1, measures 4–7, Edition Peters (Tempo: ♪= 44 ca.)

ANADOLU UNIVERSITESI
Mariton Kütüphanesi

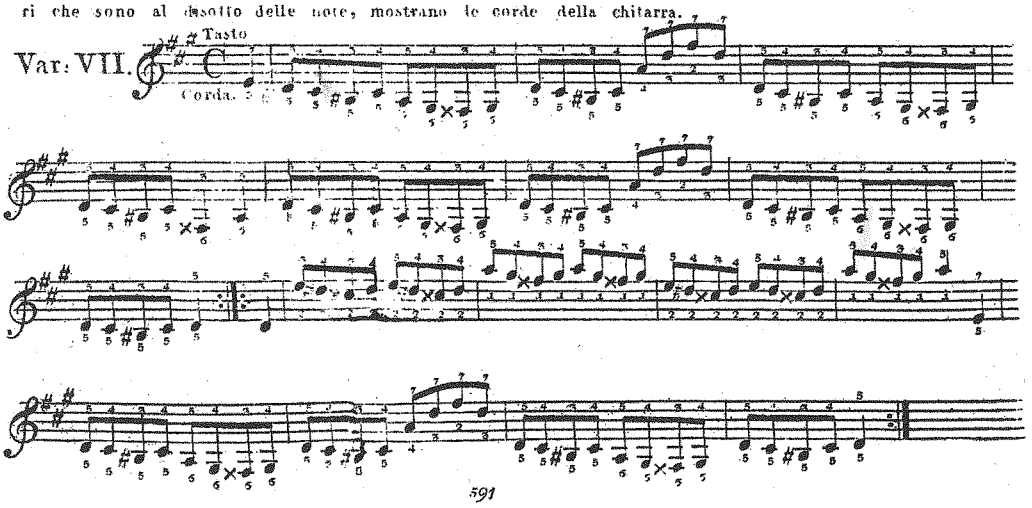
In Example 2.8, Barrett creates a complex texture of natural and artificial harmonics and ordinario notes on the ten-string guitar. The upper-stave notation acts as a filtering device by shifting the execution of harmonics between sul tasto ('<') and sul ponticello ('>'), allowing the harmonics to speak to varying degrees. In particular, where the string tension is greater and thus allows for a sharper attack with the RH, high harmonics played sul tasto ring less than when played sul ponticello. Furthermore, the inclusion of the open string pitch in much of the figuration builds the resonance of sound that shimmers with the timbres of sul ponticello and sul tasto harmonics and fingered pitches.



Example 2.8. Richard Barrett, *Colloid*, measure 3, United Music Publishers (Tempo: ♪= 104)

2.3.1 Use of harmonics as sole material for a composition

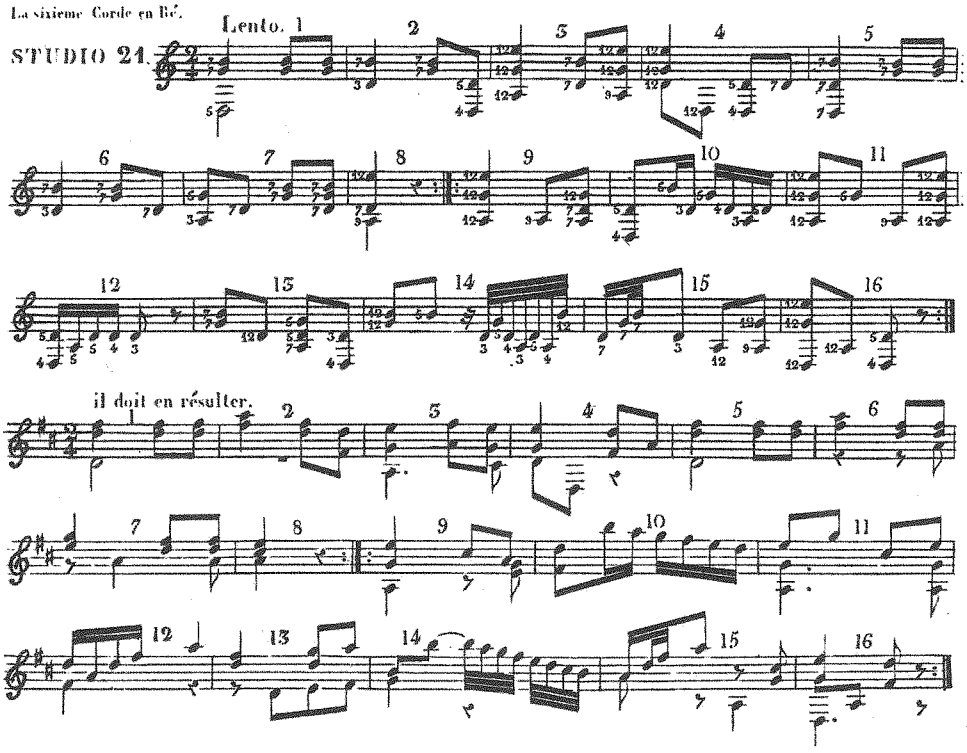
Two of the classical guitar's most formidable composer/performers of the early nineteenth century began laying the groundwork for the effective implementation of harmonics on the guitar. In Examples 2.9 and 2.10, one sees not merely the introduction of an isolated harmonic here and there, but the attempt to create an entire movement exclusively from their use. In the case of Giuliani's *Otto Variationi* op. 6 (1811), purportedly one of the earliest existing known guitar works with harmonics, the seventh variation is comprised entirely of natural harmonics. Giuliani regularly includes up to the 6th harmonic in that variation.[78]



Example 2.9. Mauro Giuliani, *Otto Variationi*, op. 6, Variation 7, Tecla Facsimile Edition (Tempo: "Allegretto")

78 For each note, the upper number shows the frets at which the sound is to be produced, i.e., 5 = fifth fret, the lower numbers are the string indicators.

An early study for classical guitar, Fernando Sor's *Étude*, op. 29, no. 21 (1827), shifts between two- and three-note chords composed entirely of harmonics, and also features harmonics in arpeggio figures. Sor uses the pitch notation to designate the appropriate string and the numbers to indicate positioning (note the drop D tuning). Sor also provides a sounding, or "resulting" version in concert pitch.

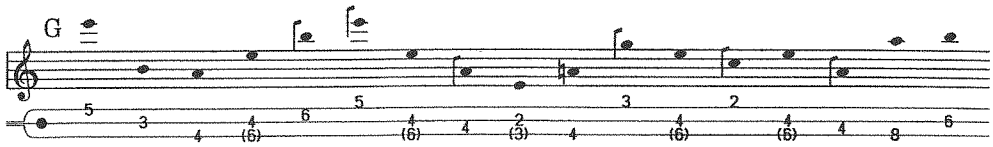


Example 2.10. Fernando Sor, *Étude*, op. 29, no. 21, Tecla Facsimile Edition

The idea of creating an entire composition solely from natural harmonics has been widely explored in contemporary works as well. Walter Zimmermann's *15 Zwiefache*, Klarenz Barlow's *...until...*, Horatio Radulescu's *Subconscious Wave,* and Michael Pisaro's *mind is moving (I)* are entirely composed of natural harmonics on open strings. All four compositions employ unique scordatura. Zimmermann, Barlow, and Pisaro utilize harmonics up to and including the 6th, 8th, and 17th harmonic, respectively. Radulescu's composition utilizes harmonics up to the 32nd (i.e., five octaves above the fundamental pitch).

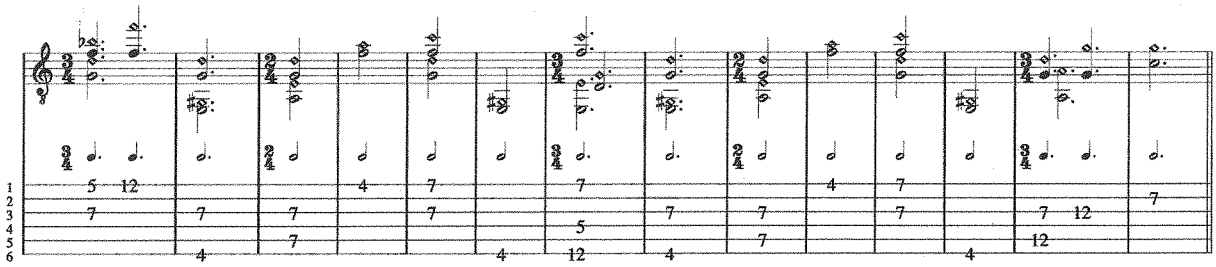
Barlow's *...until...* (Example 2.11), a work that juxtaposes a pure sine tone on an accompanying tape part with plucked natural harmonics on the guitar, is notated on two staves: the upper stave represents sounding pitch and the lower stave is a modified tablature that indicates the string and harmonic number. The three lines represent the strings 6, 4, and 2 with the lowest line as string 6. Numbers appearing on these lines represent harmonics on these respective strings. Numbers appearing above these lines represent harmonics on strings 5, 3, and 1, respectively.[79] The superimposition of the conflicting timbres of the sine tone and the natural harmonics generates a shimmering sound, fraught with subtly varying acoustic interference.

79 This scordatura, in which each pair of strings (6–5, 4–3, and 2–1) is tuned approximately a quarter-tone apart, is explained in more detail in Chapter 1.



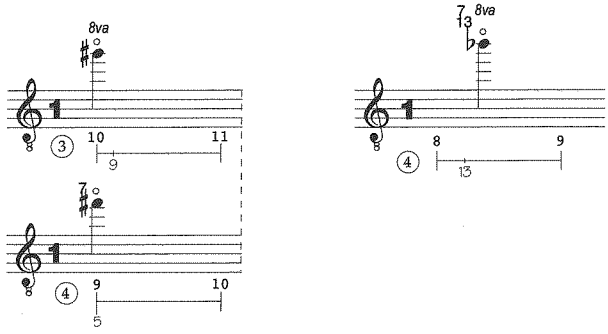
Example 2.11. Klarenz Barlow, *...until...*, system G, feedback studio verlag (Tempo: left up to the performer)

Derived from his *Lokale Musik T2.4*, Zimmermann's *15 Zwiefache* (Example 2.12), uses harmonics as a way to suggest a reluctant nostalgia for the folk music of his native Franconia, some of which he transcribes for this work. Zimmermann's composition, like Barlow's, is also notated on two staves. The upper stave indicates on which open string the harmonic is to be fingered. The lower stave, as in traditional tablature notation, represents string and position. Zimmermann includes this lower stave so that a performer need not mentally transpose the upper stave to standard tuning.



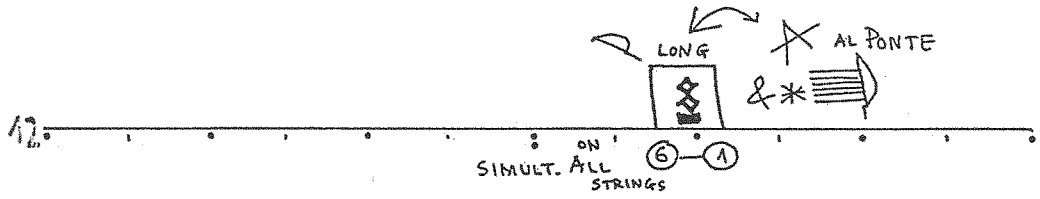
Example 2.12. Walter Zimmermann, *15 Zwiefache*, measures 15–28, manuscript (Tempo: ♩ = 168)

Pisaro's *mind is moving (I)* (Example 2.13) demands intense focus on the part of the performer, for they must execute very high harmonics exactly. The delicate and fragile harmonic events are punctuated by silences that allow a performer to prepare for the next event's execution. Pisaro asks that the amplitudes of all harmonics be balanced, which in practice implies that the amplitudes of the high harmonics on the first string determines the amplitude of the entire piece. For each harmonic, the notation on the stave indicates sounding result. The linear graph below the stave designates finger positioning, with the relevant fret numbers at each end and the harmonic number tagged below. The appropriate string number appears in a circle to the left. This modified tablature notation is highly recommended when employing harmonics higher than the 6th, since higher harmonics often occur between frets and multiple harmonics occur between the same two frets. Pisaro's notation is remarkably clear in that it literally maps where to place the LH finger as well as which harmonic to execute.



Example 2.13. Michael Pisaro, *mind is moving (I)*, d/1 (left) a/1 (right), Edition Wandelweiser (Tempo: ♩ = 3 seconds)

Radulescu's *Subconscious Wave* (Example 2.14) utilizes an accompanying tape part in combination with natural harmonics. To achieve harmonics that extend to the 32nd harmonic, he often employs a violin bow on the sixth string or across all six strings.[80] Note that harmonics beyond the 19th can only realistically be achieved in the area adjacent to the bridge.



Example 2.14. Horatio Radulescu, *Subconscious Wave*, system 12, Lucero Print
(Tempo: each dot = ten seconds; each vertical dash = five seconds)

2.4 Notation of harmonics

Natural harmonics on the guitar can be notated in many different ways including: (a) fingered pitch, (b) concert pitch, (c) pitch transposed up one octave (as typical for ordinario notes on the guitar) and (d) the inclusion of the string number.

2.4.1 Inclusion of the string number

For any natural harmonic, the string number must be included in the score since the open string defines the fundamental pitch on which the harmonic is built. Traditionally, the string number is notated using a circled Arabic numeral above or below the notated pitch, depending on the notated context. In the following example, if the string number were *not* indicated, the same pitch, a fingered E^4, could result in three sounding pitches, each one acoustically distinct (Figure 2.5):

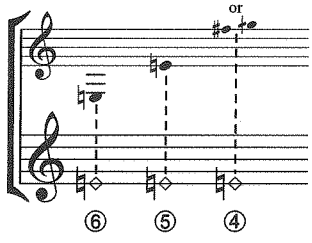
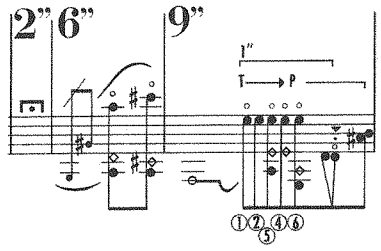


Figure 2.5.

Some composers have notated the string number as a pitch, usually in parentheses, under the notated harmonic pitch. In *Faites Votre Jeu I* from *Sonant* (1960–...), Mauricio Kagel notates not only the open string as a pitch under the fingered harmonic but also adds the sounding pitch above it. Because all three notations appear on the same stave, the sounding pitch actually sounds one octave lower than written.

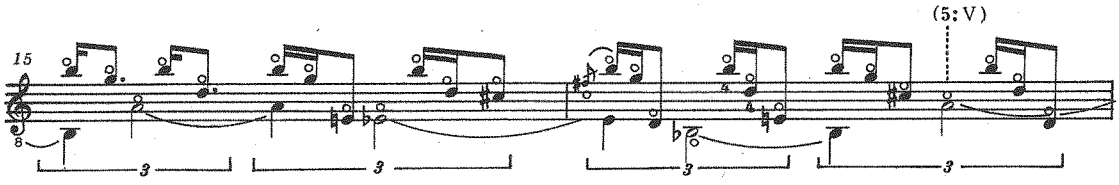
80 Radulescu indicates in the performance notes that "metal strings might be better for the high harmonics and bowing techniques." (Radulescu, *Subconscious Wave,* 2). Geoffrey Morris, who has worked with Radulescu and performed *Subconscious Wave*, writes "in my workshop session with the composer, he showed a clear preference for the use of an electric guitar over the steel-string (while not excluding the latter)." Morris, "Contemporary Guitar Repertoire," 198.



Example 2.15. Mauricio Kagel, *Faites Votre Jeu I* from *Sonant*, measures 9–11, Edition Peters

2.4.2 Harmonics notated at concert pitch

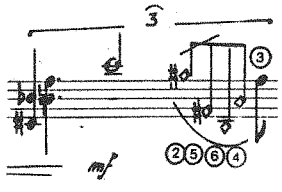
In Corbett's *Prelude* to *Arien IV*, natural harmonics are written at sounding pitch (note the clef). In this case, the guitarist must find the appropriate fingerings on the guitar to produce the written harmonics. The dangers of this approach, as explored with the Webern example above, lie in the microtonal deviations between the seemingly same harmonic pitches on different strings.



Example 2.16. Sidney Corbett, *Arien IV: Solo Music for Guitar*, Prelude, measures 15–16, Moeck Verlag (Tempo: ♩ = ca. 52)

2.4.3 Harmonics notated as fingered pitches

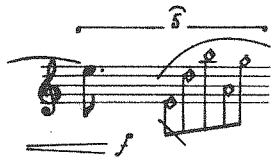
Some composers notate only the fingered pitches for harmonics as a kind of tablature.[81] The following excerpt, from Luca Francesconi's *Alborada*, features harmonics notated as fingered pitches with only the accompanying string numbers. It is interesting that Francesconi asks for the harmonics in this passage to be executed at the 8th position where harmonics do not speak clearly.



Example 2.17. Luca Francesconi, *Alborada*, page 3, system 1, manuscript (Tempo: ♩ = 60)

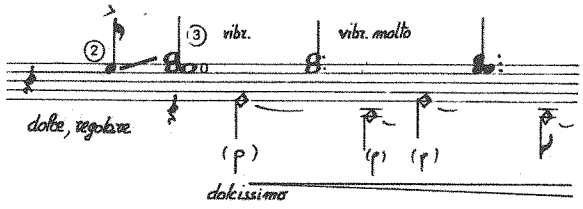
If a composer indicates only the fingered note for harmonics but does not provide the string numbers, they risk misinterpretation, or at least alternative readings, of the score. In a prior passage from *Alborada*, string numbers do not accompany the initial four notes of the fingered harmonic passage. Consequently, the notes can be played either at the 7th position or at the 12th position. If played at the 12th position, they will sound one octave lower than when played at the 7th.

81 For example, Salvatore Sciarrino will often notate only the fingered pitches, implying that a guitarist perform passages of notes with light LH pressure (as the execution of harmonics would require) even in areas of the fretboard where there are no clearly speaking harmonics. This notation creates an effect that borders on half harmonics, where only a shadow of the fretted note sounds. Half harmonics will be discussed in more detail later.



Example 2.18. Luca Francesconi, *Alborada*, page 2, system 2, manuscript (Tempo: ♩ = 44)

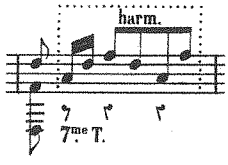
Consider another passage from the same piece. If the notated harmonic E^4 is played at the 7th position on string 5 and the notated harmonic A^3 is played at the 5th position on string 6, then the sounding pitch is the same, a result that is not clear given the context of the passage. If the notated harmonics indicate sounding pitch (i.e., E^4 followed by A^3, which can be executed at the 5th position of string 6 followed by the 12th position of string 5), then it would conflict with the notation of the ordinario notes above, which sound an octave lower.



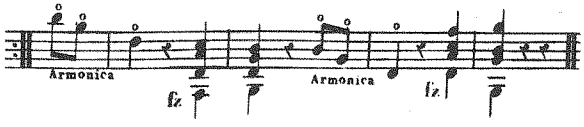
Example 2.19. Luca Francesconi, *Alborada*, page 1, system 2, manuscript (Tempo: ♩ = 44)

2.4.4 Brief overview of harmonics notation

Composers and performers in the nineteenth century began notating harmonics simply by using the word *harmonic* or its abbreviation *harm.* and indicating the position on the guitar at which the harmonic was to be executed. This was sometimes augmented to include the *o* symbol above the harmonic note. Some composers and performers, such as Giuliani, were more precise in that they also indicated the string number. In the examples below, Coste and Sor indicate the sounding pitch along with the fingered position on the fretboard (i.e., the fret number).



Example 2.20. Napoléon Coste, *Six Pièces Originales*, op. 53, no. 4, measure 34 (1832), Chanterelle Facsimile Edition (Tempo: Allegretto)

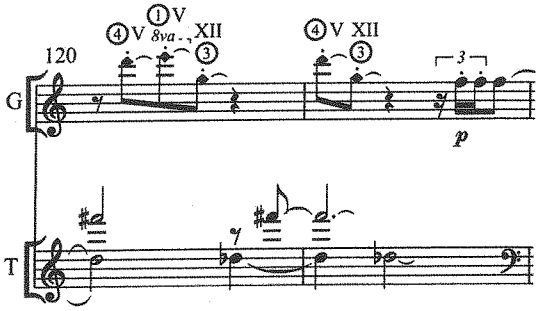


Example 2.21. Fernando Sor, *Thema Varie*, op. 3, no. 21, measures 24–27 (ca. 1810), Tecla Facsimile Edition (Tempo: Menuet)

2.4.5 More notational confusions

How does one notate a harmonic that is as small as an eighth-note? Some composers will shade a diamond notehead for rhythmic values of a quarter note and smaller, since, in standard notation, these noteheads are filled in. For example, in Davidovsky's *Synchronisms No. 10* for guitar and

electronics (Example 2.22), all shaded diamond noteheads refer to harmonics whose duration is one quarter or less. Customarily, however, the shaded diamond notehead is used by composers to indicate the half-harmonic effect.



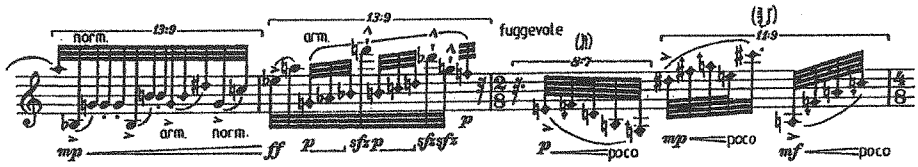
Example 2.22. Mario Davidovsky, *Synchronisms No. 10*, measures 120–121, Edition Peters (Tempo: ♩ = 120)

2.5 Half harmonics

In Aguado's *Escuela* (1825), there is a section entitled "Sonidos Apagados" in which Aguado describes a handful of ways to mute the guitar's strings. He explains that the muting effect can be accomplished either by lifting the LH finger from the string, or by touching the vibrating string with a finger of the LH.[82] The contemporary literature enlarges considerably upon this technique in that it mandates subtle variations in the pressure applied to the strings.[83]

Half harmonics result when the LH does not apply full pressure on a string over the fretboard; however, they require slightly more pressure in their execution than normal harmonics. The sounding result is a muffled pitch at the fingered note. Regulating the pressure precisely is crucial if a harmonic is not to sound instead. Half harmonics should sound as "shadow" counterparts to the normal fretted note in the same position. They have been notated in a variety of ways.

The score of Ferneyhough's *Kurze Schatten II* distinguishes layers of activity by juxtaposing half harmonics with normally played notes. Designated by shaded diamond noteheads, the half harmonics seem to move like shadows among the normally played figures, which literally appear more audible. The effect is one of a counterpoint of musical lines, but with the lines set in relief.



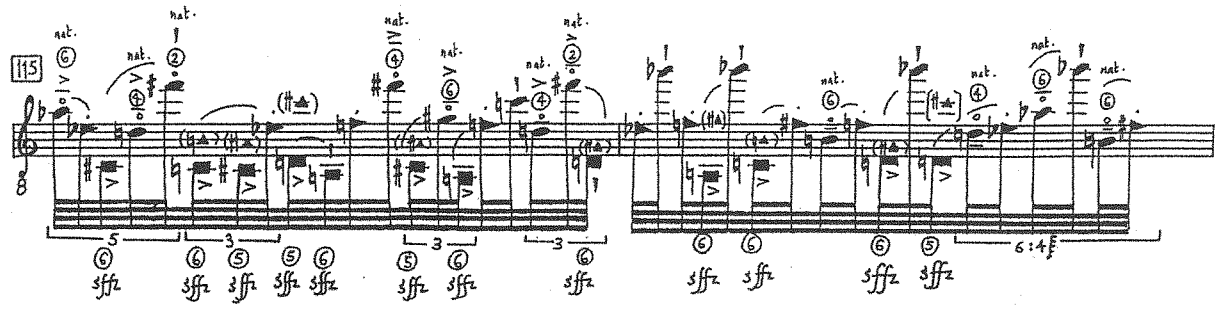
Example 2.23. Brian Ferneyhough, *Kurze Schatten II*, movement 6, page 18, system 4, Edition Peters (Tempo: ♪= 96.7)

In Sam Hayden's *AXE(S)*, a kaleidoscopic shifting between half harmonics in the mid-register (the triangle flag noteheads), LH hammer-ons in the low register (the square noteheads), ordinario notes in the very high register, and natural harmonics (the circle above an ordinary notehead) again brings to mind Beethoven's comment that the guitar constitutes a "miniature orchestra."[84]

82 Sor also refers to the light LH pressure for a muted sound and calls it "étouffé". Sor, *Méthode pour la guitare*, 23.

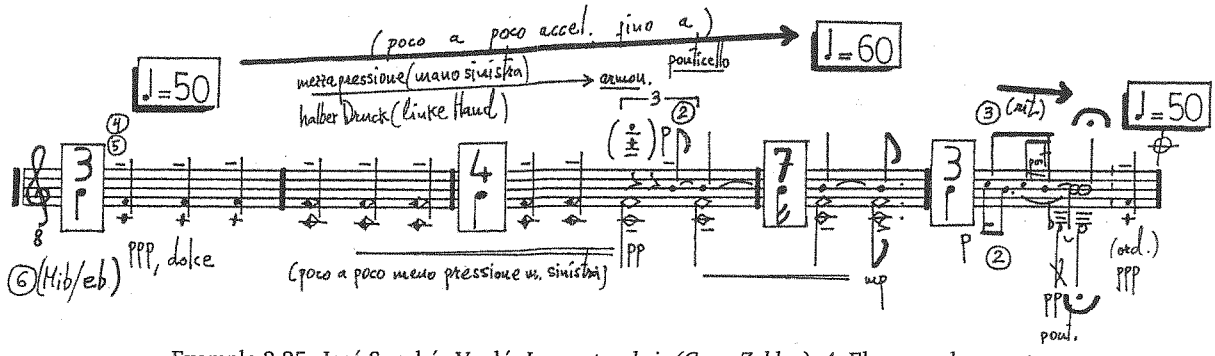
83 Morris, "Contemporary Guitar Repertoire," 175.

84 Segovia, "Romance of the Guitar," 318.



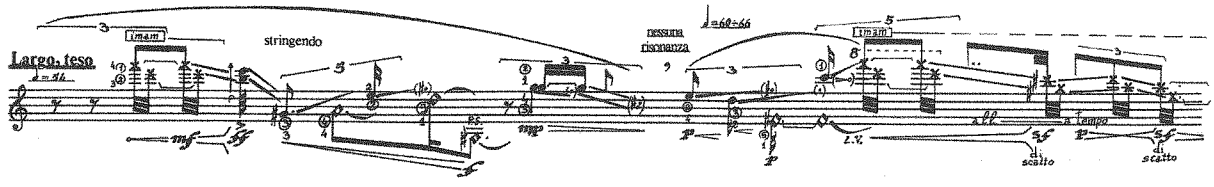
Example 2.24. Sam Hayden, *AXE(S)*, measures 115–116, British Music Information Centre (Tempo: ♪ = 48)

Composers have explored further gradations of muted sound through prescribed variations in the pressure exerted by the LH as it stops notes. Example 2.25, taken from the opening measure of José Sanchéz-Verdú's "El amor y la muerte" from *Lux ex tenebris*, asks the performer to gradually lighten the LH pressure from normal to harmonic.



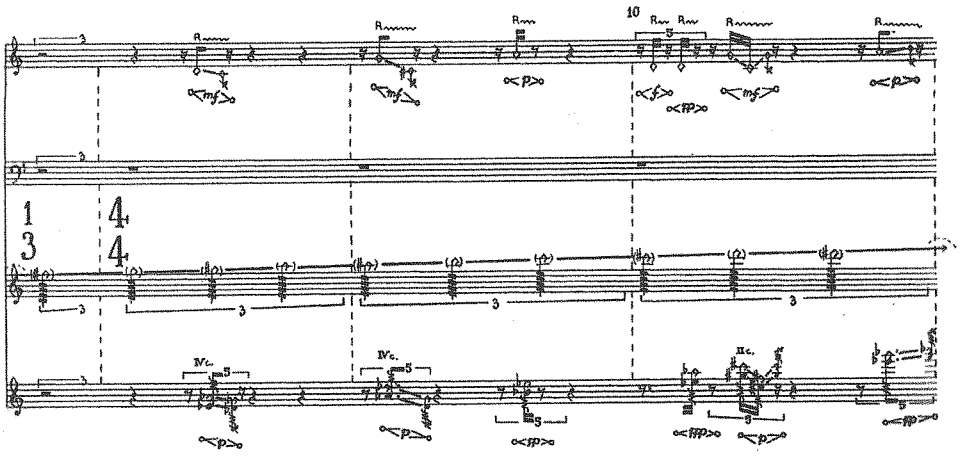
Example 2.25. José Sanchéz-Verdú, *Lux ex tenebris (Goya-Zyklus)*, 4. El amor y la muerte, measures 1–5, Breitkopf & Härtel

In Example 2.26, Pisati has the performer move imperceptibly from half harmonic pressure to normal pressure and visa versa, as notated by the glissandi lines extending from the normal noteheads to the *x*-noteheads.



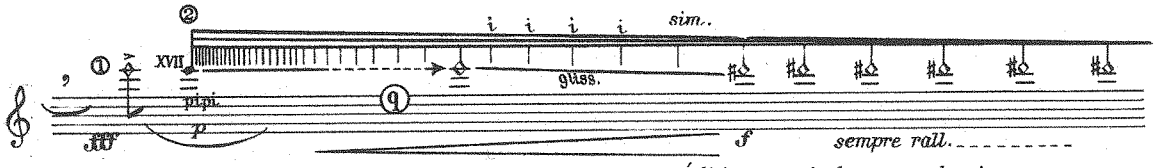
Example 2.26. Maurizio Pisati, *Sette Studi*, Studio 1, system 1, Ricordi

Glissandi can also be performed with light harmonic pressure in the LH, as Salvatore Sciarrino does in the beginning of his *Esplorazione del bianco II* (Example 2.27, second stave from the bottom). In this glissando, the LH travels over areas of the fretboard where no harmonics sound, creating an effect that is not dissimilar to the half harmonic. The difference, however, lies at the nodes where the harmonics do begin to speak, for here a "sparkling" aura surrounds the otherwise highly subdued glissando.



Example 2.27. Salvatore Sciarrino, *Esplorazione del bianco II*, measures 8–11, G. Ricordi & C (Tempo "Assai lento")

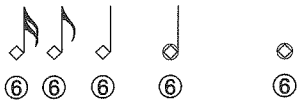
Murail also employs an effective transition from normal to harmonic pressure in the LH, only in this case with a retarding tremolo in the RH, and passing through the half harmonic sound along the way. This transition is accompanied by a slight glissando that supports only the half harmonic effect, gradually settling upon the production of the 5th harmonic on the second string.



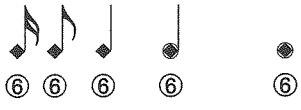
Example 2.28. Tristan Murail, *Tellur*, page 9, system 1, Éditions musicales transatlantique
(Tempo: entire system to last ca. 10 seconds, see Example 1.3)

2.6 Notation of natural harmonics and half harmonics

Clear and precise notation of harmonics is essential. The following system (Figure 2.6) provides an effective way to signal natural and half harmonics at various rhythmic values. The string number should always be indicated with each notehead, as is string 6.



Harmonics at various rhythmic durations



Half harmonics at various rhythmic durations

Figure 2.6. Harmonic and half harmonic notations

The system also prescribes the following notation:

(a) The string number is always indicated in a circle above or below the notehead
(b) The notehead for a natural harmonic is an open diamond
(c) The notehead for a half harmonic is a shaded diamond
(d) The diamond notehead (shaded or open) indicates fingering position
(e) A smaller stave above the open diamond noteheads to indicate concert pitch is advisable[85]

85 Note: for clarity, sounding pitches on the upper stave can be connected with a dashed, vertical line to fingered pitches on the lower stave.

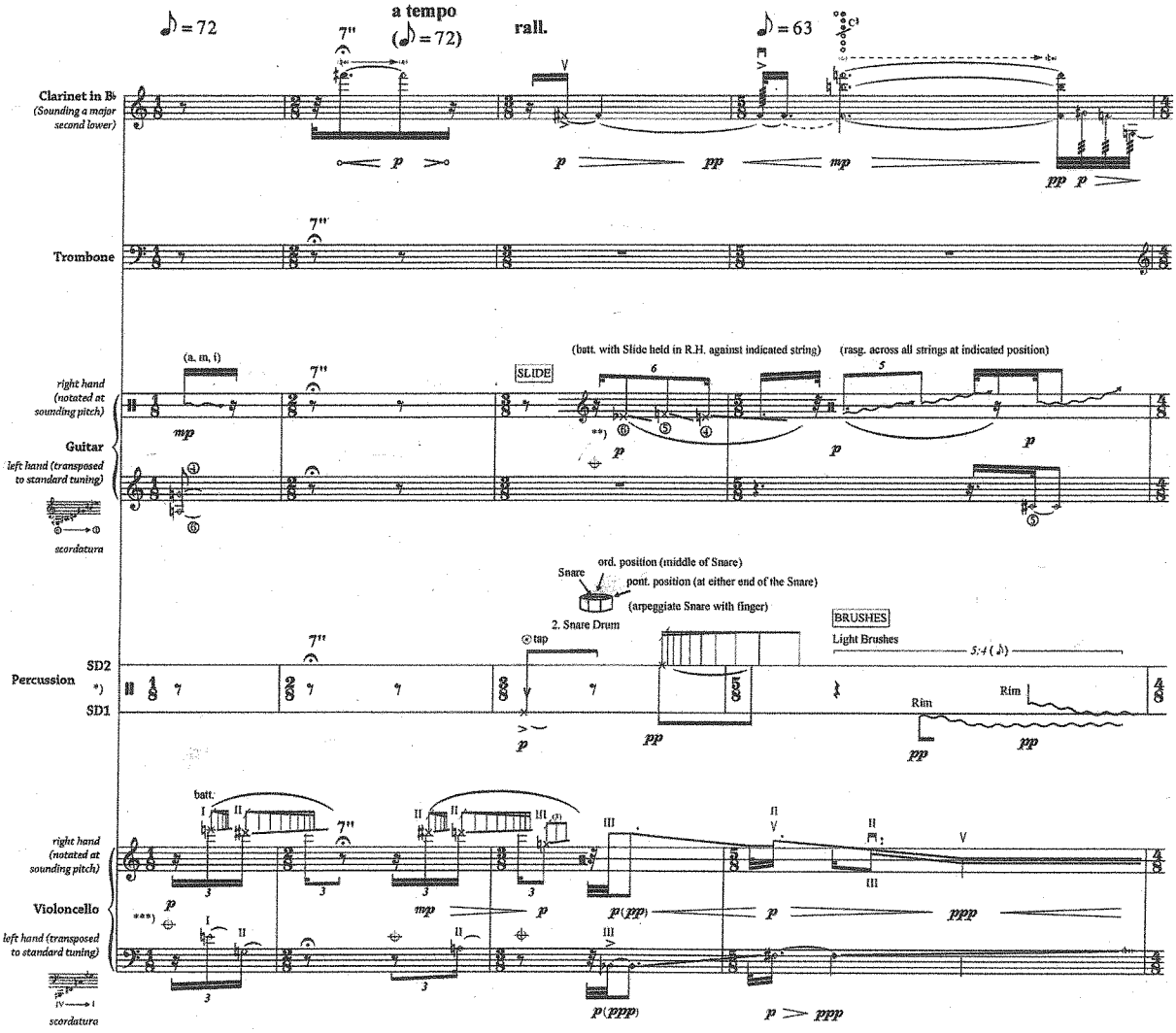
If a natural harmonic is to be produced by the use of the RH only, then a diamond with "RH" above it is recommended:

Figure 2.7. Notation for a natural harmonic played solely by the RH.

2.6.1 Notation of harmonics on scordatura strings

The scoring of both natural and half harmonics is best transposed to standard tuning. We suggest notating them just as in the scordatura where the sounding pitches are notated on a smaller upper stave, as discussed in Chapter 1.

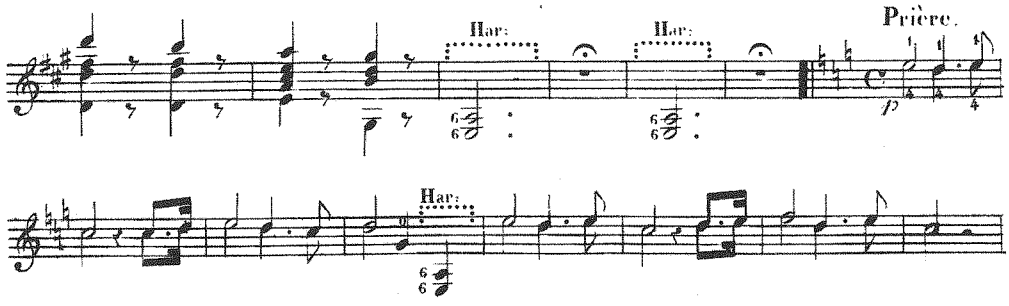
In the score for Tsao's *Not Reconciled*, where the guitar is detuned, barred harmonic chords are transposed to standard tuning (Example 2.29, measure 1).



Example 2.29. Ming Tsao, *Not Reconciled*, measures 1–4, Edition Peters

2.7 Multiphonics[86]

A multiphonic occurs when at least two pitches are made to sound simultaneously. One of the earliest instances of multiphonics in guitar music is found in Sor's *Fantasie Villageoise* (Example 2.30). Here, the dotted brackets above the stave indicate an unspecified multiphonic chord between the 3rd and 4th harmonics (6th position) on strings 6 and 5 (the notated *E* and *A*), which is intended to replicate the complex sound of church bells. In order to produce the multiphonics at this juncture, one must coax the LH finger into the just the right position so that several harmonics sound at once.



Example 2.30. Fernando Sor, *Fantasie Villageoise*, op. 52, page 8 (1832), Tecla Facsimile Edition (Tempo: "Andantino")

Multiphonic technique has been most thoroughly explored and developed by wind and brass players. On the guitar, multiphonic phenomena most closely resemble "split tones" on brass instruments. Split tones result from adjusting the speed of lip vibrations to the vibrating frequency of the pipe length. This adjustment "decenter[s] the note while keeping the pressure in the mouth constant" in such a way that it produces two distinct pitches in the same harmonic series.[87]

Similarly, if one touches a guitar string lightly with the LH, using harmonic pressure between two consecutive nodes on the string, the string vibrates in at least two modes that contain nodes in the same general area. The string vibrates simultaneously in both modes but with conflicting periodicity. For instance, when ones plays lightly with harmonic pressure between the third and fourth fret, the string vibrates in modes 5, 6, 11, and 16 (since these modes have nodes in this area of the fretboard) thus producing a chord that contains the 5th, 6th, 11th, and 16th harmonics.[88] The amplitude of the lower harmonics will usually be greater than that of the higher harmonics. As a rule, *every multiphonic will be some combination of natural harmonics on a given string; this combination will be determined by those harmonics that have nodes near where the finger touches the string.*

We recommend that a multiphonic be notated in terms of its fingered position on the guitar, including the string number, and with a separate stave showing the concert pitches above the fingered note. The recommended notation for the fingered notes is a diamond-shaped notehead (to indicate harmonic left-hand pressure) with an "×" through the notehead to distinguish it from a natural harmonic:

86 Guitar multiphonics were first discussed in Schneider, *The Contemporary Guitar,* 135–38 and have recently been expanded upon in Torres and Ferreira-Lopes "Multiphonics as a Compositional Element," 61–69.

87 Sluchin, *Contemporary Trombone Techniques,* 13–16.

88 Between the third and fourth frets, many other harmonic nodes (higher than the 16th) are present but are usually too faint to be discerned.

Figure 2.8. Multiphonic notation

The strongest and most reliable multiphonics are produced on the bass strings, i.e., strings 4–6 on the classical guitar. On the steel-string acoustic guitar, the round-wound G string (string 3), which is commercially available as an option, responds as effectively as strings 4–6. A normal stainless steel G string, like the B and e strings (strings 2 and 1), will tend to respond with less satisfying results.

The charts that appear in the next section (Figure 2.9 A–B) map reliable multiphonics. Each multiphonic appears between two harmonic nodes. When one of the multiphonics is executed, adjacent harmonics, as well as other possible harmonics in the general area, should sound. For example, with *Multiphonic V.5*$^{+}$, which is situated between harmonics 11 and 18 (between the fifth and sixth frets), both the 11th and 18th harmonics should sound, as well as the 4th and 7th harmonics, which have a strong presence in that locality. Higher harmonics are rarely audible although they may well lie in the adjacent areas (e.g., the 15th and 19th harmonics that lie to the left of *Multiphonic V.5*$^{+}$, etc.). Each multiphonic in Figure 2.9 is accompanied by a position number (i.e., *I.5*, *II* $^{-}$, etc.). Each position number correlates to a chord, which is annotated in Figures 2.10–2.12 as follows:

(a) The concert pitches of each multiphonic chord (all of which will be harmonics based on the open string)
(b) Beneath each chord, the numbers of the harmonic series of the pitches involved
(c) To the right of each chord, the stopped pitch for executing the multiphonic
(d) The string number at the beginning of each figure
(e) The relative amplitude of the pitches in the chord

The charts are not exhaustive. Their purpose here is merely to give possible multiphonic chords for a composer or performer to use. Theoretically, multiphonics can be executed between *any* two harmonic nodes on a string. We have indicated only multiphonics that are relatively responsive. The response time and resonance of each multiphonic can vary widely and depends on the type of instrument, the strings, and the method of execution. Precisely locating each multiphonic demands practice. Some of the essential parameters in multiphonic production, at least for the multiphonics represented here, are listed below:

a) *Position of the LH finger*: finding the exact spot on the fretboard to draw out the desired harmonics requires some searching. Very slight movements of the LH finger in either direction will elicit different harmonics that lie in the vicinity. Angling the finger slightly may help it to isolate the particular harmonic "sweet spot".[89]

b) *RH plucking position and manner of plucking*: the RH plucks the string either *apoyando* with the thumb or as a quasi-plectrum stroke with the fingernail of the index finger. Key to the manner of each stroke is a very incisive and forceful attack. The plucking is performed best sul ponticello in order to extract the higher harmonics.[90]

89 The very lightest touch possible in the LH is a prerequisite—even more so than when playing a natural harmonic. The little finger has the least amount of flesh at the tip and, when extended, makes a taught skin surface; thus, it is the finger best suited for accurately locating the mid-way points between the harmonic nodes.

90 On the steel-string guitar, it is advisable to use a plectrum near the bridge.

2.7.1 Positions of selected multiphonics on the fretboard

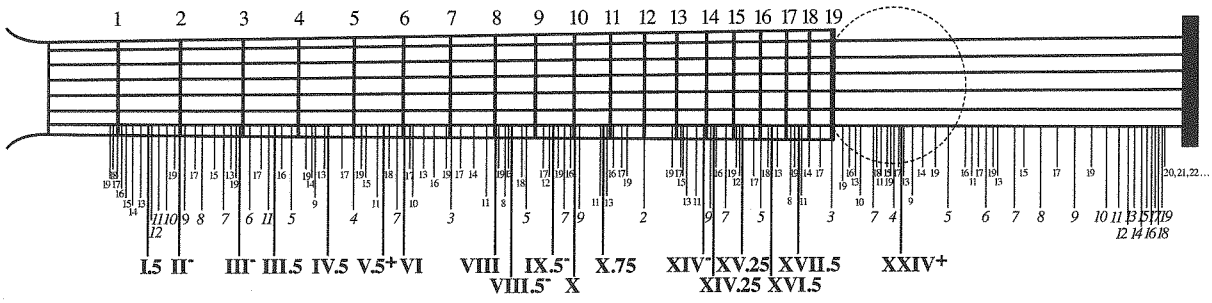
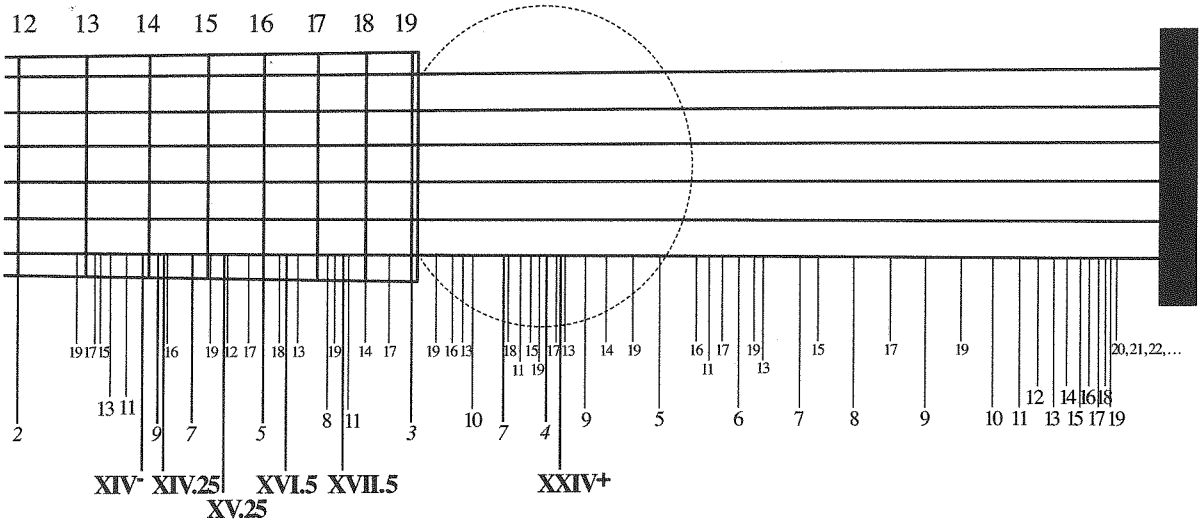


Figure 2.9(A). Location of select multiphonics

Close-up on the Fretboard above the 12th Fret



Close-up on the Fretboard below the 12th Fret

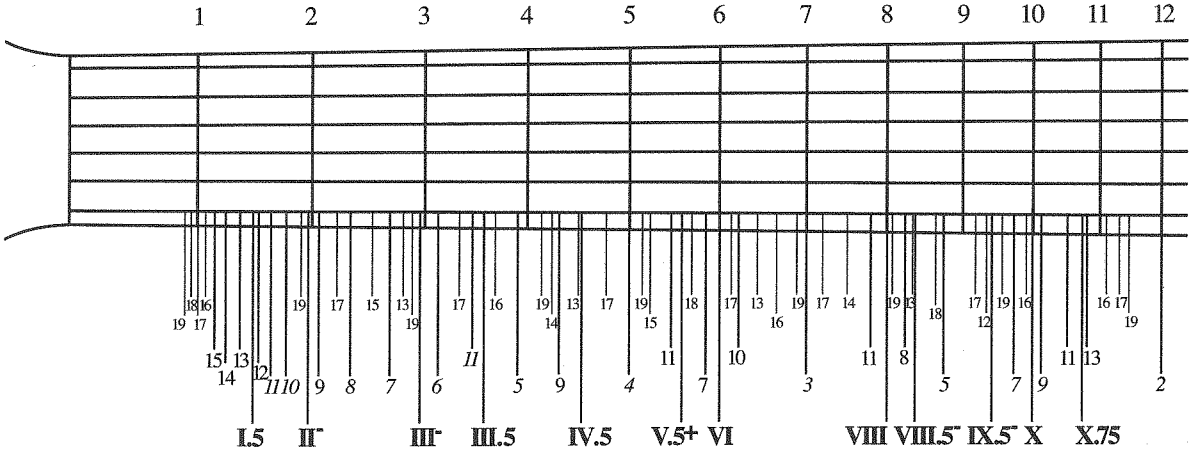


Figure 2.9.(B). Location of select multiphonics in close-up

2.7.2 Corresponding multiphonic chords

1. Note on the position number for each multiphonic:

Roman Numeral = Fret Number
Arabic Numeral = 1/4, 1/2, 3/4 of the distance up (towards the bridge) between the two neighboring frets
- , + = slightly to the left or right respectively of the indicated fret position

2. Note on the accidental for the multiphonic notation:

quarter-tones = placing the LH finger midway between the two neighboring fret positions
accidentals with arrows = raising or lowering slightly the placement of the LH finger from the indicated fret position

3. General note on the accidentals for the resultant harmonics:

♮ = natural 7th (or 14th) harmonic (31 cents flat)
♯,♭= close to a quarter-tone difference (for the natural 11th and 13th harmonics)

The notation of all other harmonics are approximated to equal tempered tuning.
All resultant harmonics are notated as sounding pitch.

The amplitude of the harmonics is differentiated by either strong or weak where:
<o in amplitude.

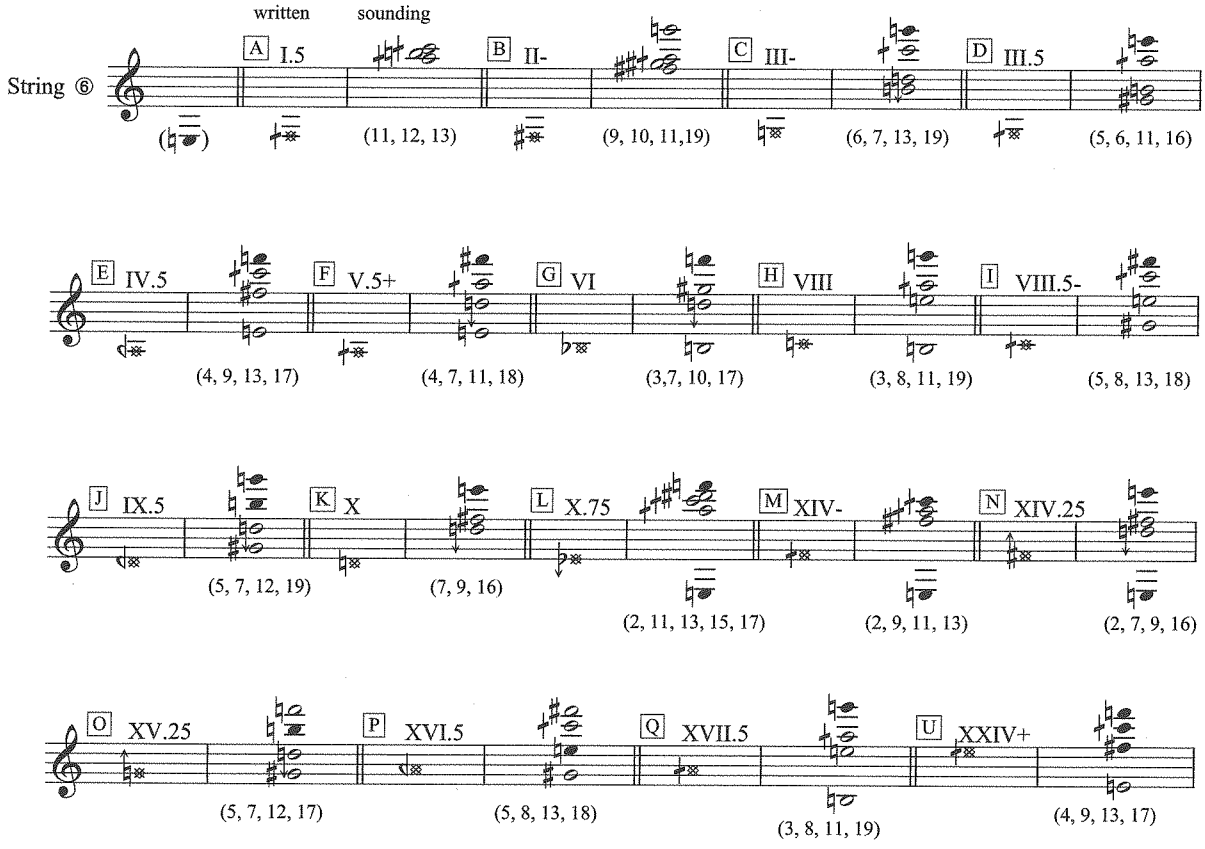


Figure 2.10. Select multiphonics on string 6

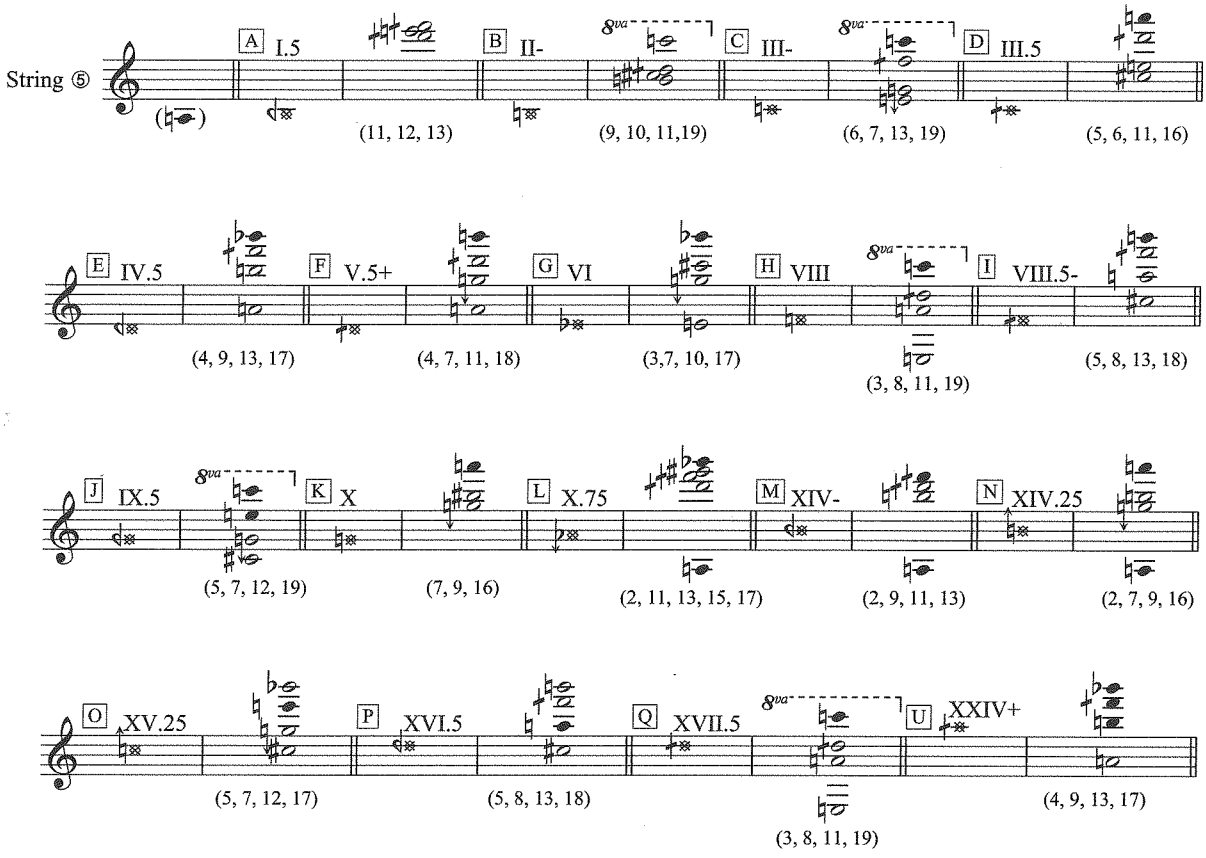


Figure 2.10. Select multiphonics on string 5

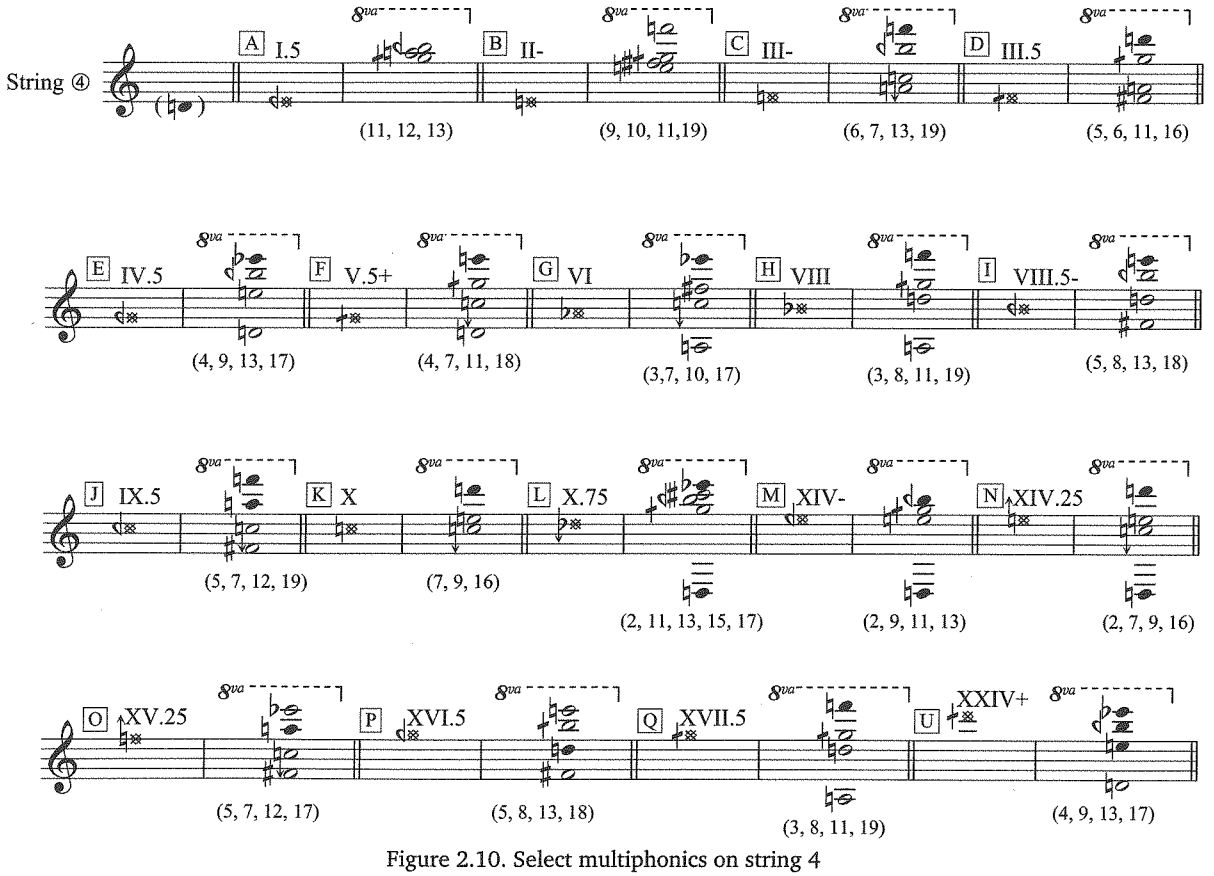


Figure 2.10. Select multiphonics on string 4

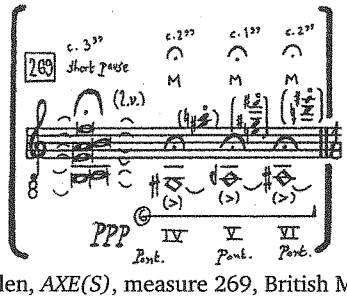
Factors other than the harmonics proximal to the finger stopping the multiphonic can affect the sounding result:

(a) The fundamental frequency that varies with each guitar can affect the resonance of the multiphonic and even cause other harmonic nodes to resonate slightly.
(b) The presence of harmonics that are lower in the harmonic series, not necessarily very close but still near the finger (e.g., the 3rd and 2nd harmonic nodes) can often accompany the multiphonic sound.
(c) Octaves of harmonics, particularly lower harmonics, may be audible.
(d) On occasion, undertones (the inverse of the harmonic series) can be heard.

The morphology of a multiphonic can also change: some harmonics may disappear while others gradually emerge. The harmonic content of a multiphonic chord can thus change subtly with time.[91]

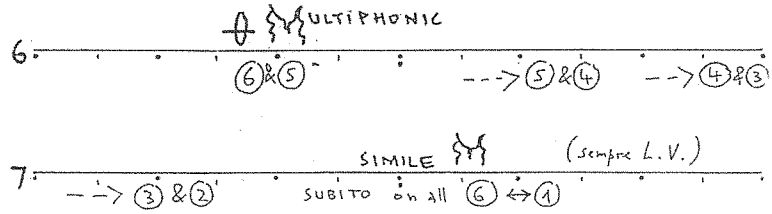
2.7.3 Examples from the literature

Few composers until recently have exploited guitar multiphonics in their compositions, with some notable exceptions.[92] Today, however, several composers have begun utilizing this technique, although in very distinctive ways. In *AXE(S)*, Hayden uses guitar multiphonics in an isolated passage that represents a further variation of the harmonic techniques utilized elsewhere in the composition (Example 2.31). Hayden designates the multiphonics with an uppercase *M*. He indicates the appropriate fingered position with quartertones to suggest playing between two frets, and also adds the concert pitches in parentheses above.



Example 2.31. Sam Hayden, *AXE(S)*, measure 269, British Music Information Centre

In *Subconcious Wave*, Radulescu specifies the string number but leaves the choice of the multiphonic up to the performer. At times he asks that the multiphonic be performed with a violin bow. In the following passage, multiphonics are explored on successive pairs of strings (Example 2.32).

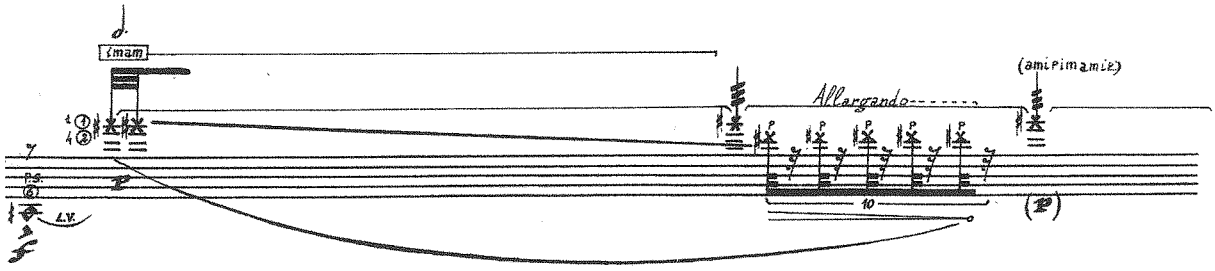


Example 2.32. Horatio Radulescu, *Subconscious Wave*, systems 6–7, Lucero Print
(Tempo: dots = ten seconds; dashes = five seconds)

91 See Appendix A, Part 2 for multiphonic analysis, including spectrographs.

92 William Bland was one of the first composers to use guitar multiphonics. In his composition *Untitled Compositions in Three Sections* (1975) the multiphonics, which he calls "complex harmonic partials" are executed in rapid succession. Schneider, *The Contemporary Guitar*, 136.

With the accented $A^{\dagger}$ indication above middle *C*, Pisati proposes another unorthodox means of eliciting a multiphonic: a passage from his *Setti Studi* (Example 2.33) instructs the guitarist to bring the LH thumb around to the fretboard to stop string 6 between the fifth and sixth frets. As it does this, the width of the thumb in itself guarantees that many harmonics lying in that area of the fretboard will sound.



Example 2.33. Maurizio Pisati, *Setti Studi*, Studio 4, page 15, system 4, Ricordi (Tempo: ♩ = 44)

Ambrosini signals the use of the multiphonic through what he calls *meta posizione* (meta position)—as opposed to normal position—of the LH finger. The meta position appears above the stave and indicates which two frets to place the finger between and how far from each fret it should sit. In Figure 2.13, for example, "½ III" denotes a position halfway between frets II and III, first on string 4, the lowered *F* natural, and then on string 5, the lowered *C* natural.

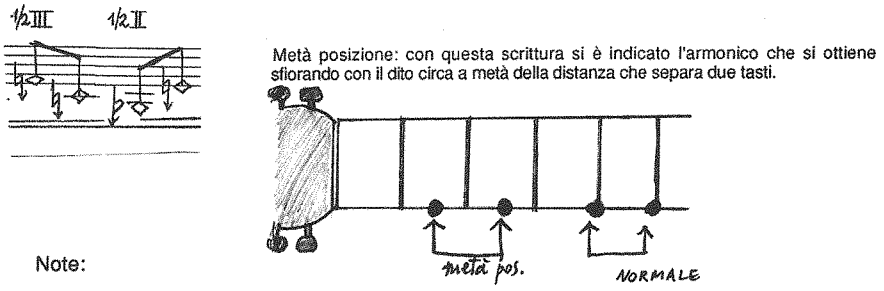
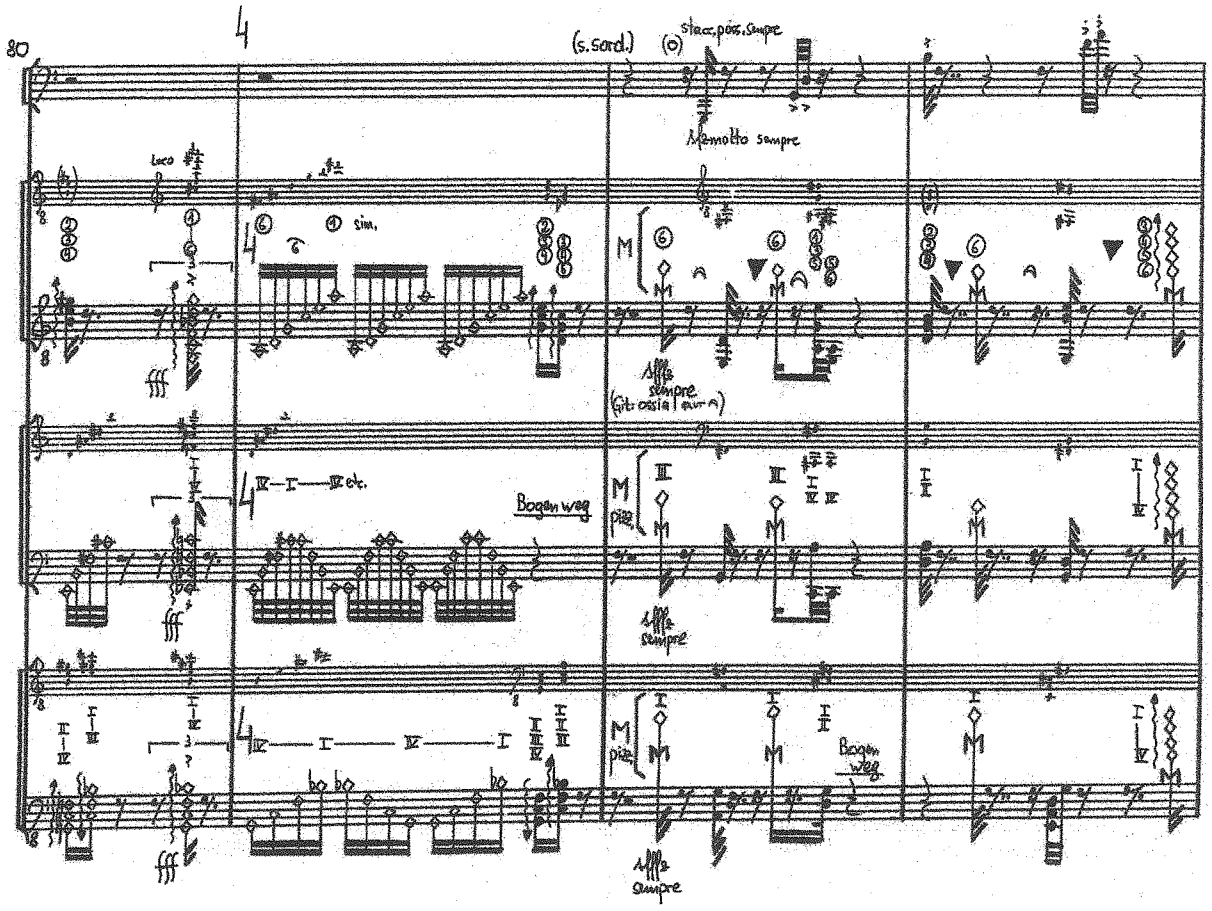


Figure 2.13. Claudio Ambrosini, RAP, legend, manuscript[93]

Clemens Gadenstätter's *variationen und alte themen* contains a passage scored for trombone, guitar, cello, and contrabass (Example 2.34) in which all three string instruments are to produce multiphonics (*M*). The guitarist (fourth and fifth systems from the bottom) is to play unspecified multiphonics on string 6 in an area of their choosing, but under the condition that they must find the multiphonics with the richest sound possible.[94] Note that the last multiphonic is performed in a barré manner across strings 6–3, rather than on 6 alone.

93 Legend translates as follows: Meta position: the indicated notation asks for the harmonic that is achieved by placing the finger about half the distance between two frets. Ambrosini, legend for *RAP* (translation Ambrosini/Seth Josel).

94 "Die genauen Berührungsstellen sind frei wählbar, sollten aber immer ein möglichst charakterisisches Klangbild erzeugen." Gadenstätter, *variationen und alte themen*, legend.



Example 2.34. Clemens Gadenstätter, *variationen und alte themen*, measures 80–83, Ariadne Verlag (Tempo: ♩ = 76)

2.8 Artificial harmonics[95]

Any fretted note creates a new fundamental pitch on the guitar and, by implication, a new harmonic series. *Artificial*, *false*, or *prepared* harmonics, three common terms that denote the same phenomenon, are harmonics derived from fretted pitches rather than open strings. Artificial harmonics allow one to produce harmonics using any fretted pitch as a fundamental. They thus considerably expand the harmonic possibilities of the instrument beyond the confines of natural harmonics, which stem exclusively from the fundamental pitches of the open strings.

Artificial harmonics on the guitar are executed in a manner similar to classical string techniques employed on the violin and cello. In general, the LH little finger stretches past the fretted note and *lightly* touches the string at a certain interval or node above it. Some harmonics will emerge at intervals not far above the fretted note and therefore involve less of a stretch: to trigger the 5th harmonic requires reaching only a major third, and the 9th harmonic only a major second. Touching the string a perfect fourth above the note will produce the 4th harmonic. Similarly, touching a perfect fifth above it will elicit the 3rd harmonic, but only if the guitarist can extend the little finger that far.

95 See Mas's section on "prepared harmonics." Mas, *Sonorités Nouvelles Pour Guitares*, 31–32.

Paradoxically, the most common interval at which to trigger the harmonic—the octave—is physically untenable, at least for the LH. Composers favor the octave because, as the strongest harmonic other than the fundamental, it can be a reliable harmonic to execute. At the same time, the LH little finger cannot extend an octave above a fretted note. Consequently, whenever the octave interval is called for, guitarists tend to use the RH index finger in place of the LH little finger to touch the harmonic node, while simultaneously plucking the string with the RH ring finger, *a*, or thumb, *p*, behind it.

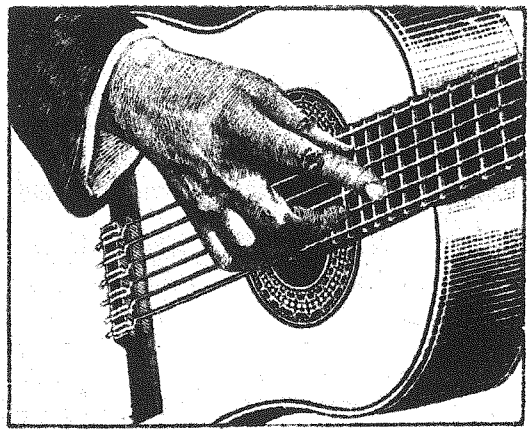


Figure 2.14. Emilio Pujol, *Escuela Razonada de la Guitarra*, vol. 3, (Ricordi Americana, 1954), 92.

2.8.1 Timbral differences

Depending upon how one executes artificial harmonics, slight timbral differences will emerge.

The methods of execution are as follows:

(a) Use the LH little finger to lightly touch the harmonic node above the fretted note. The maximum distance is a perfect fourth in the upper register of the guitar (above the 7th position) and a major third in the lower register (beginning with 1st position).

(b) Use the RH index finger to lightly touch the string above the fretted note while plucking the string behind the index finger with the RH ring finger. Any harmonic interval is possible above the fretted note but the most common are the octave and the perfect fifth. Less common are the perfect fifteenth and two octaves above the fretted note. This RH technique can also be applied to the open string as is commonly done when combining natural and artificial harmonics.[96]

(c) The same technique described in (b) but using the thumb of the RH to pluck the string behind the index finger. This technique has a louder and sharper attack than plucking with the ring finger.

(d) Use the RH thumb to lightly touch the string above the fretted note while plucking the string behind the thumb with the RH index finger. This technique can be louder and sharper in attack than (c).

Note: Artificial harmonics can be executed semi-rapidly. *Depending upon the nature of the material (i.e., scalar materials versus arpeggios with difficult string crossings), the speed of execution should not exceed sixteenths at quarter-note = ca. 72 M.M.*[97]

96 Natural harmonics executed by the RH alone are also sometimes referred to as "artificial harmonics" but, strictly speaking, this is a misnomer given that the open string in such instances remains the fundamental.

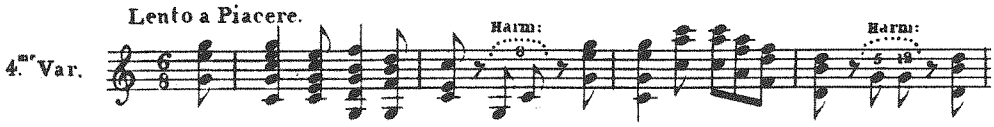
97 Note: scales in artificial harmonics can be plucked with the RH thumb (*p*) at speeds up to ca. 72 M.M. and with the RH ring finger (*a*) slightly more slowly.

Some minimal time is required for a performer to prepare the positioning of the RH in order to execute an artificial harmonic, particularly if the RH must execute it over the fretboard. Mixing artificial harmonics and ordinario plucked notes is very difficult to do at a quick tempo, since the RH must position itself differently over the strings in each case.

2.8.2 Examples from the literature

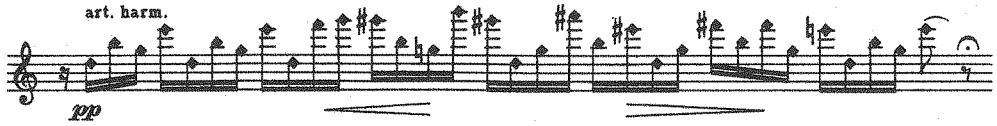
In the literature, artificial harmonics may occur alone, but often passages contain both artificial and natural harmonics, since the two can be executed in the same manner—i.e., by touching a harmonic node with the RH index finger. The following excerpts represent some very effective uses of artificial harmonics in works from different eras.

Example 2.35, which comes from an early nineteenth century piece by Sor, includes an artificial harmonic in the second measure. Here the guitarist is to finger a partial barré in the 3rd position on strings 6 and 5 while touching the LH little finger lightly on the eighth fret (indicated by the number 8 above). This gesture with the LH produces artificial harmonics two octaves above the fingered *G* and *C*.



Example 2.35. Fernando Sor, *Cinquieme Fantaisie*, op. 16, Variation 4 (1823), measures 1-4, Tecla Fascimile Edition

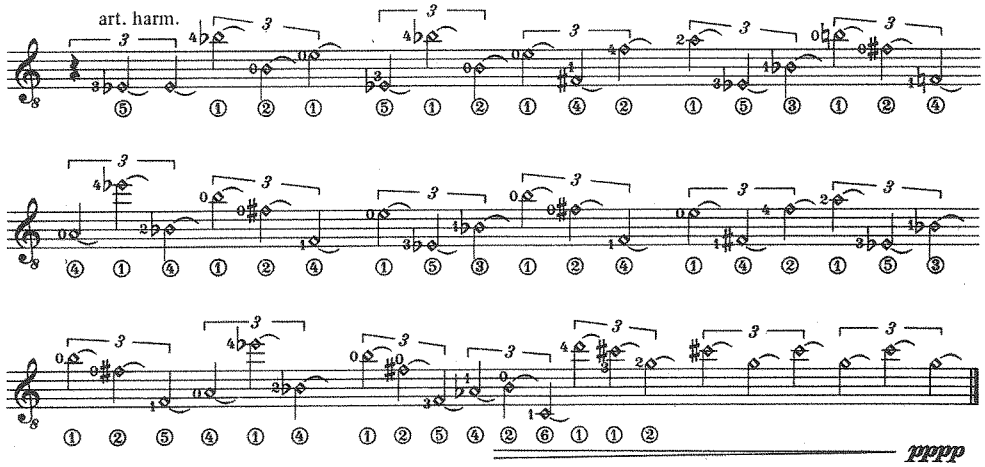
Britten's *Nocturnal* employs artificial harmonics in running sixteenths (shaded diamond noteheads) at a moderato tempo (Example 2.36).[98] As an indicative measure, one could not expect to perform this passage faster than quarter-note = 56 M.M. and still have the harmonics ring clearly. Although Britten combines artificial and natural harmonics in this passage (i.e., harmonics whose fundamental is either a fretted note or an open string), all harmonics are played with the RH index finger so as to keep the timbre of the passage consistent and dreamlike. This passage sounds an octave lower than written.



Example 2.36. Benjamin Britten, *Nocturnal*, op. 70, VI Dreaming, page 8, system 3, Faber Music (Tempo: "slow quarter-note")

Hans Werner Henze uses artificial harmonics as a dream-like, ethereal postlude for his movement *Ariel* from *Royal Winter Music* (Example 2.37). Like Britten, Henze combines artificial and natural harmonics that are all played by the RH. The natural harmonics, where the fundamental is the open string, help to create a resonant glow around the artificial harmonics, where the fundamental is fretted with the flesh of the LH finger. The sound of the artificial harmonic is comparatively weak because the fretting effectively shortens the string and reduces its resonance. With the indicated octave transposition on the clef, this passage is at concert pitch.

98 The first 2.5 beats are actually natural harmonics (although played with RH) since they assume the fundamental of an open string.



Example 2.37. Hans Werner Henze, *Royal Winter Music First Sonata on Shakespearean Characters*, Ariel, page 21, systems 6–9, B. Schott's Söhne (Tempo: "tempo guisto")

2.8.3 Notation of artificial harmonics

Artificial harmonics are best notated in the following manner:

(a) Give the position of the LH stopped (i.e., fretted) note in parentheses. This notehead is written as a normal notehead.

(b) Designate the interval above the stopped note with an open diamond notehead. This interval designates which node above the stopped note is to be touched. The notehead by itself gives no indication of which finger to use, however, although it may be obvious from the node's distance from the stopped note. It is thus important to specify RH or LH in order to prompt use of either the RH index finger or LH little finger as needed. Also, if the timbre of plucking the harmonic node with either the RH thumb or index is desired, then notate *p* or *i* respectively above the note.

(c) Indicate the string number in a circle above or below the notehead, as with string 4 in Figure 2.15. In this figure, the 2nd harmonic above the stopped note is produced with the first note, the 3rd harmonic above the stopped note is produced with the second, and the 5th harmonic is produced with the third.

(d) Notate concert pitch on an upper stave (usually in a smaller font size).

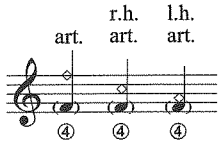
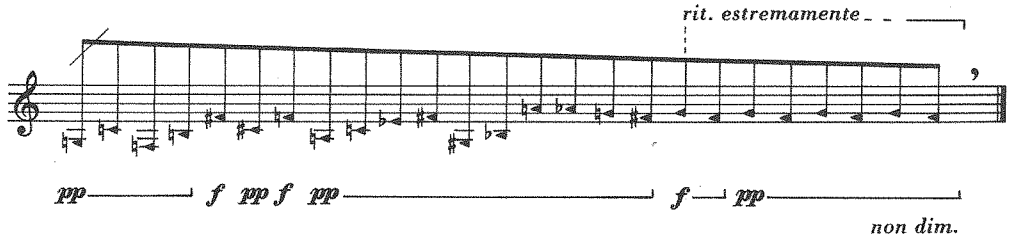


Figure 2.15. Three examples of artificial harmonic production

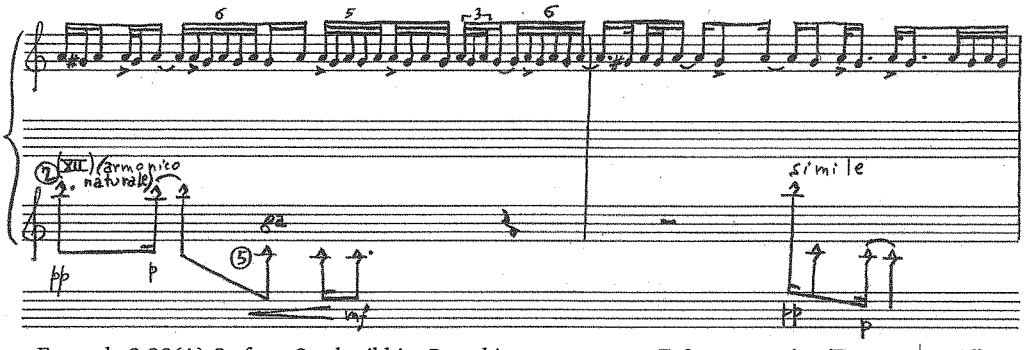
2.8.4 Extensions of artificial harmonics

On occasion, composers have devised some interesting means of extending artificial harmonics. Hübler has developed a technique referred to as *pizzicato non-appuyé* (non-pressured), which he calls for in the concluding bar of his piece *Reißwerck* (Example 2.38). The guitarist achieves a muted plucked sound by applying half harmonic pressure with the RH index finger against the string while simultaneously plucking that string with the RH thumb. The RH half-harmonic pizzicati are notated with the shaded "beak" noteheads. The LH remains inactive during this passage.

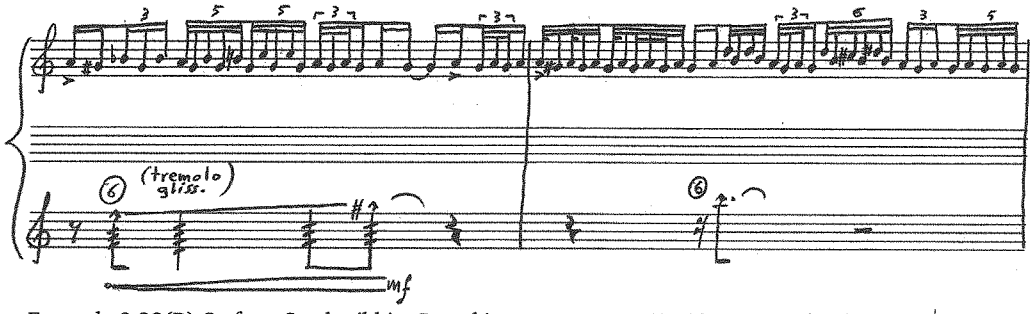


Example 2.38. Klaus K. Hübler, *Reißwerck*, measure 16, Breitkopf & Härtel (Tempo: ♪= 38 ca.)

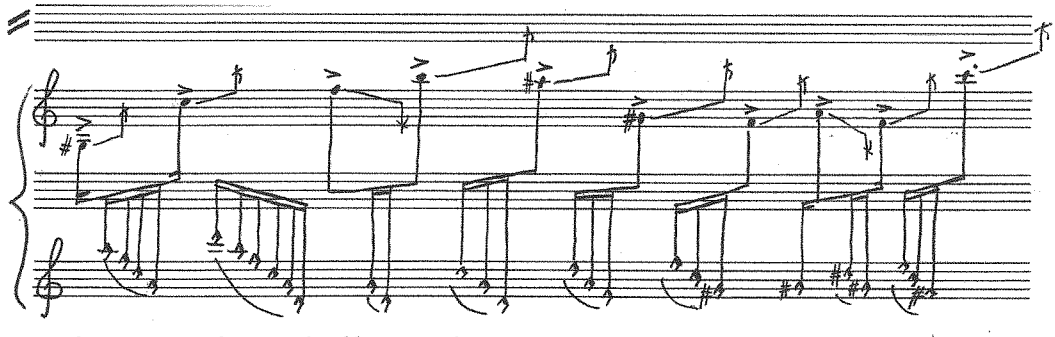
Stefano Scodanibbio combines LH slurring with natural harmonics plucked by the RH, but in the manner of artificial harmonics (Example 2.39A). The natural harmonics, notated in the lower stave, chime every so often under a flurry of LH hammer-ons and pull-offs. In Example 2.39B, Scodannibio has the RH rapidly pluck natural harmonics as it glides along the string. Yet a further extension can be seen in Example 2.39C where the RH breezes swiftly across the strings as it simultaneously stops the harmonic nodes at various positions, creating harmonic "sweeps". This action is complemented by aggressive LH taps followed by rapid glissandi on various strings.



Example 2.39(A) Stefano Scodanibbio, *Dos abismos*, measures 7–8, manuscript (Tempo: ♩ = 46)



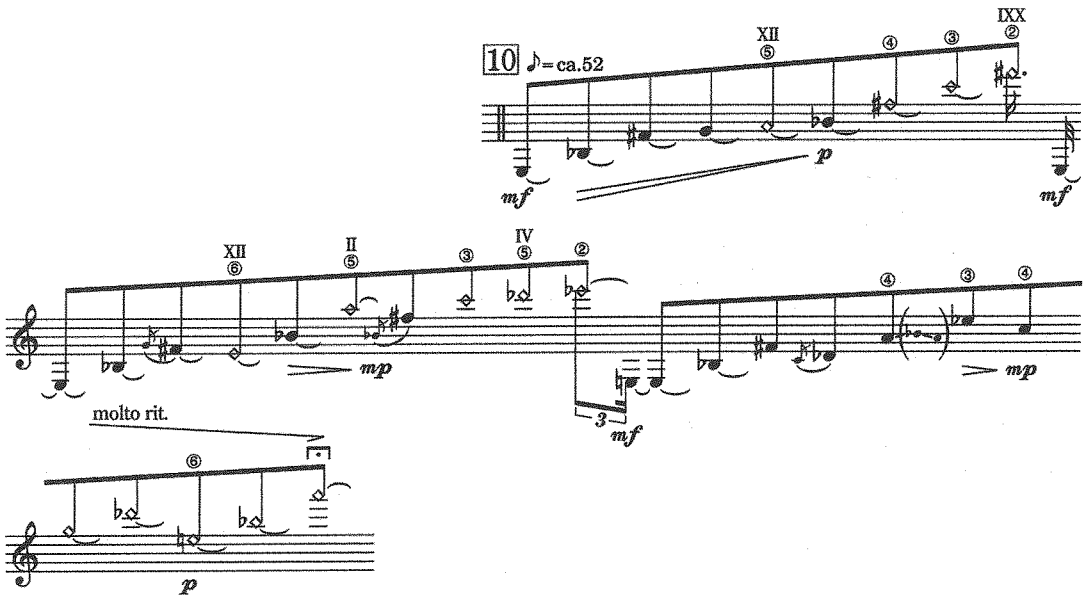
Example 2.39(B) Stefano Scodanibbio, *Dos abismos*, measures 17–18, manuscript (Tempo: ♩ = 46)



Example 2.39(C) Stefano Scodanibbio, *Dos abismos*, page 13, system 4, manuscript (Tempo: ♩ = 108 ca.)

2.8.5 Notational reframing

At times, a score appears in which the notational scheme fails to express the musical content adequately. Consider the following *musically* striking passage from Toshio Hosokawa's *Serenade* for solo guitar (Example 2.40).



Example 2.40. Toshio Hosokawa, *Serenade*, page 7, systems 4–6, Schott Japan

In this passage, which features both ordinario pitches and harmonics, the harmonics are notated in ways that raise several questions. Hosokawa indicates in the performance notes that harmonics are at sounding pitch, or *suono reale*. However, while the composer specifies the string on which a particular harmonic is to be played, there is no indication as to whether the harmonic is artificial or natural.[99]

This omission leads to certain quandaries in performance, especially because what the notation implies does not always coincide with what is musically plausible. For example, in the conclusion of the second arpeggiation, the concert harmonic pitch C^5 should actually be played on string 3 as an *artificial* harmonic since C^5 does not occur there as a natural harmonic. The next concert harmonic pitch is ostensibly a $C^{\sharp 5}$, based on the string number and fingering position; however, the pitch has to be a $D^{\flat 5}$, which must be played on string 5 at position *IV*, that is, the 5th natural harmonic. Finally, the $E^{\flat 5}$, played on string 2, must be played as an artificial harmonic in order to maintain the registral position of *this E flat,* since playing the $E^{\flat}$, or $D^{\sharp}$ rather, as the 5th harmonic on string 2 would bring the pitch one octave too high. Moreover, playing three false harmonics, rather than one false, one natural and one false again, as is implied in the original notation, would actually be consistent with the indicated slurring of the figure. It would also obviate the need to dampen string 5 after playing the $D^{\flat 5}$, an action that would, in addition, break the organic flow of the line.

99 In addition, there are position misprints in the Schott edition: above the $F\#^5$ there should be a '*XIX*' and above the A^5 harmonic there should be a '*V*' and not a '*II*'.

Such discrepancies might well confuse the performer and lead to a misreading of the passage. For this reason we propose "reframing" this portion of Hosokawa's score (and scores notated like it) within the parameters of harmonic notation set forth earlier in this chapter. Our revised notation (Figure 2.16) should both clarify Hosokawa's musical intentions and facilitate their interpretation:

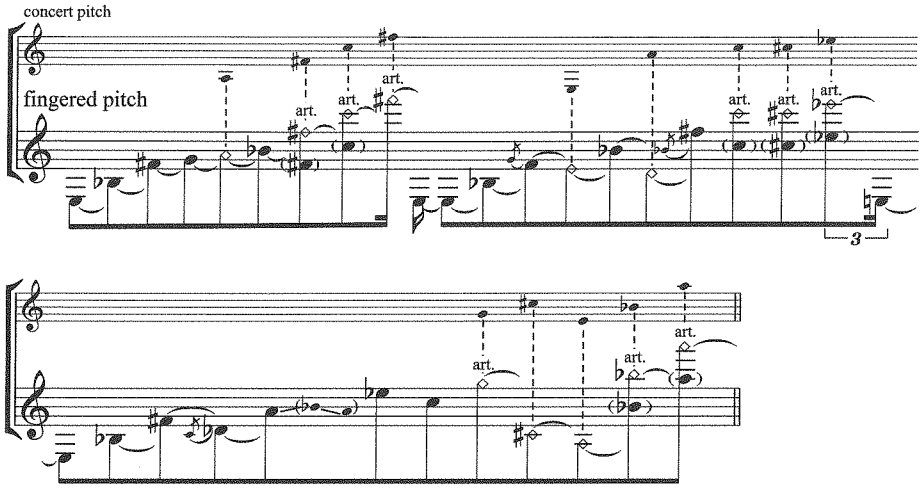
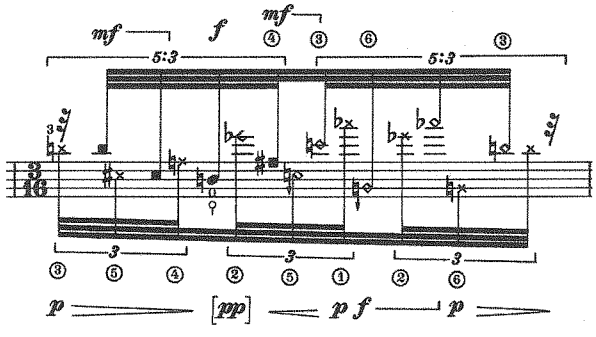


Figure 2.16. Possible re-notation of the harmonics in Hosokawa's *Serenade* (systems 4–6)

2.9 "Attackless" harmonics

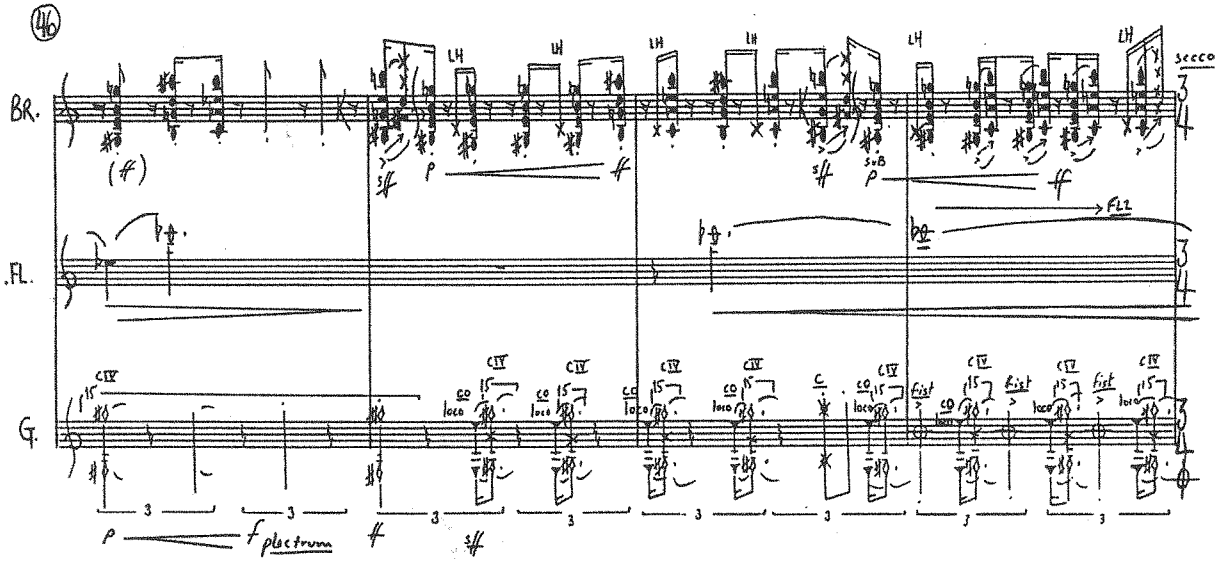
After an open string has been plucked on the guitar, the fingers can stop the vibrating string at any particular harmonic node to allow for the harmonic at that node to sound. With this technique, no attack on the harmonic pitch is audible. This approach works best on the lower nodes such as the 2nd, 3rd, 4th, and 5th harmonics. Higher harmonics can be activated but they gradually decrease in amplitude. Such "attackless" harmonics are particularly effective en masse, when all open strings of the guitar are forcefully strummed and then stopped at a harmonic node, usually by barring a LH finger across all six strings. The more forceful the attack on the string, the more resonant the harmonic is when the string is stopped.

A passage from Hübler's *Reißwerck* (Example 2.41) combines normal and attackless harmonics with LH tapping and plucked auxiliary tones behind the stopped notes. The guitarist performs a snap pizzicato on the open second string and then elicits an attackless harmonic by lightly stopping the string at the 5th harmonic ($D^{\sharp}$ or $E^{\flat}$) node. Hübler notates this harmonic with an incomplete diamond notehead. Notice that while both the normal and attackless harmonics are notated at sounding pitch, the open second string sounds an octave lower than written.



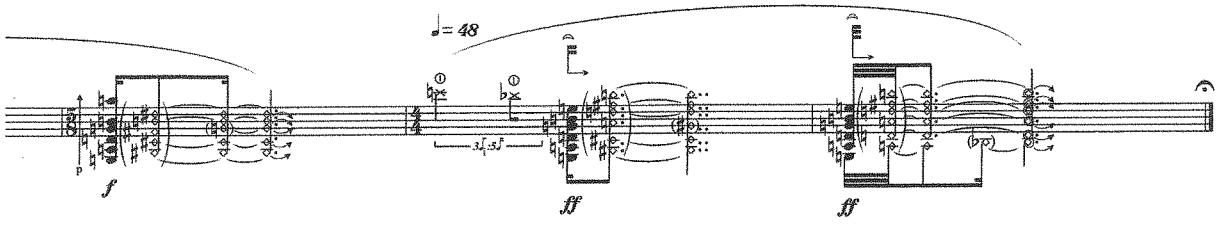
Example 2.41. Klaus K. Hübler, *Reißwerck*, measure 6, Breitkopf & Härtel (Tempo: ♪= 38 ca.)

The composer Rebecca Saunders uses the attackless harmonic in her composition *Molly's Song 3: Shades of Crimson*, a work for the steel-string acoustic guitar. In Example 2.42, she asks that the open strings of the guitar be strummed heavily for the attack and then stopped with LH harmonic pressure (i.e., very lightly) at the 4th position. This gesture allows the 5th harmonic on all six strings to ring out after the attack.



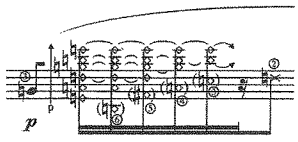
Example 2.42. Rebecca Saunders, *Molly's Song 3: Shades of Crimson*, measures 46–49, manuscript (Tempo: ♩ = 92)

In a passage from *if ears were all that were needed...*, Tsao could have notated the attackless harmonics with a slur from a previously attacked note or with incomplete diamond noteheads. Instead he has chosen to enclose open diamond noteheads in parentheses. This method of notation reminds the performer that producing the harmonic involves only light pressure from the LH fingers and is not articulated in any way by the RH.



Example 2.43. Ming Tsao, *"if ears were all that were needed...,"* measures 32–34, Edition Peters

Harmonics can also be gradually filtered out once sounding. In another excerpt from *if ears were all...*, the RH forcefully strikes a harmonic chord and then follows with attackless harmonics, which are notated in parentheses (Example 2.44). The notation suggests a silent movement of the fingers across the strings, an action that essentially prevents previous strings, and consequently previous harmonics, from ringing, thus effectively filtering out those harmonics from the sounding chord.



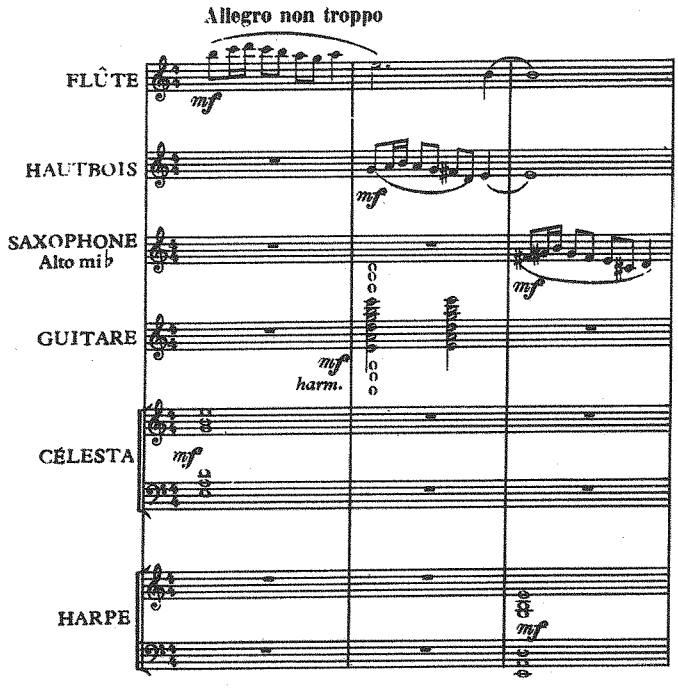
Example 2.44. Ming Tsao, *"if ears were all that were needed...,"* measure 7 (middle), Edition Peters (Tempo: ♩ = 56)

2.10 Guitar harmonics in context

The delicacy in sound of guitar harmonics poses particular challenges for the composer, the most difficult of which lies in how to deploy—and yet preserve—such fragile acoustics in chamber and orchestral contexts. Even when harmonics are not in play, the guitar's voice may not withstand competition. With this in mind, composers have tended to orchestrate guitar parts in combination with "like" instruments, most often the harp and mandolin, and occasionally the celesta. Works ranging from Webern's *Fünf Stücke*, op. 10, Schönberg's *Serenade*, op. 24 to Goffredo Petrassi's *Seconda Serenata* and Michael Finnissy's *Obrecht Mottetten II* all incorporate two or three of these instruments together with the guitar, in one array or another. Unlike many more forceful instruments, this "trio" effectively supports rather than subsumes the guitar sound, which could otherwise be so easily overwhelmed.

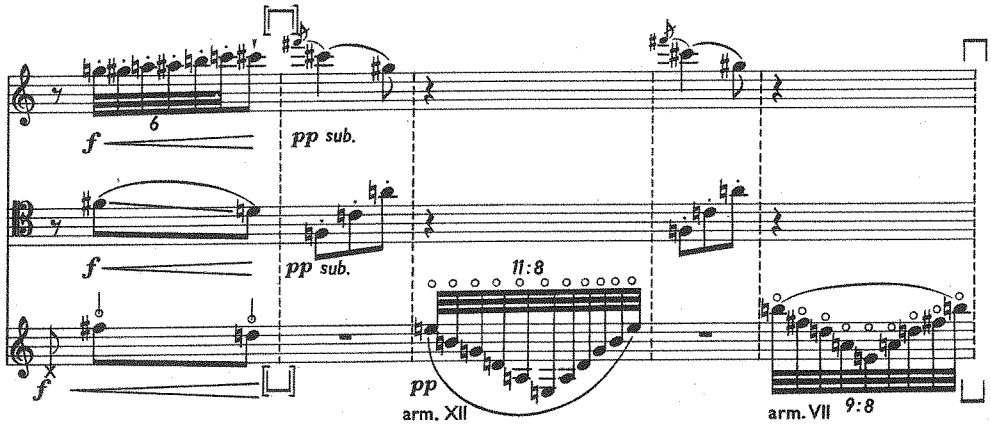
What is true for the guitar in general is even truer for guitar harmonics. In orchestral works, as the instrumental texture becomes denser, the viability of guitar harmonics diminishes. Whatever the instrumentation, therefore, it is crucial that the orchestrating composer who enters this ethereal (and highly ephemeral) harmonic world work with the utmost sensitivity if they are to avoid completely marginalizing the instrument. We have selected several examples from pieces where we find that composers have succeeded in letting the guitar harmonics function effectively.

In the opening measures to *Sextuor mystique* (1917), Heitor Villa-Lobos uses the tuning and the resonance of the guitar, via the harmonic barré chord at the 7th position, to open the registral, harmonic, and textural space of the composition (Example 2.45). The ringing harmonics on the guitar echo the celesta, and these, in turn, are echoed an octave lower by the harp. In 1917, using the guitar primarily for its sonorous quality rather than for its allusions to folk music was novel in itself, but the integration of harmonics also creates, even to the modern ear, a breathtakingly sensual atmosphere. As is typical for guitar notation, the harmonics sound one octave lower than written.



Example 2.45. Heitor Villa-Lobos, *Sextuor mystique*, measures 1–3, Editions Max Eschig

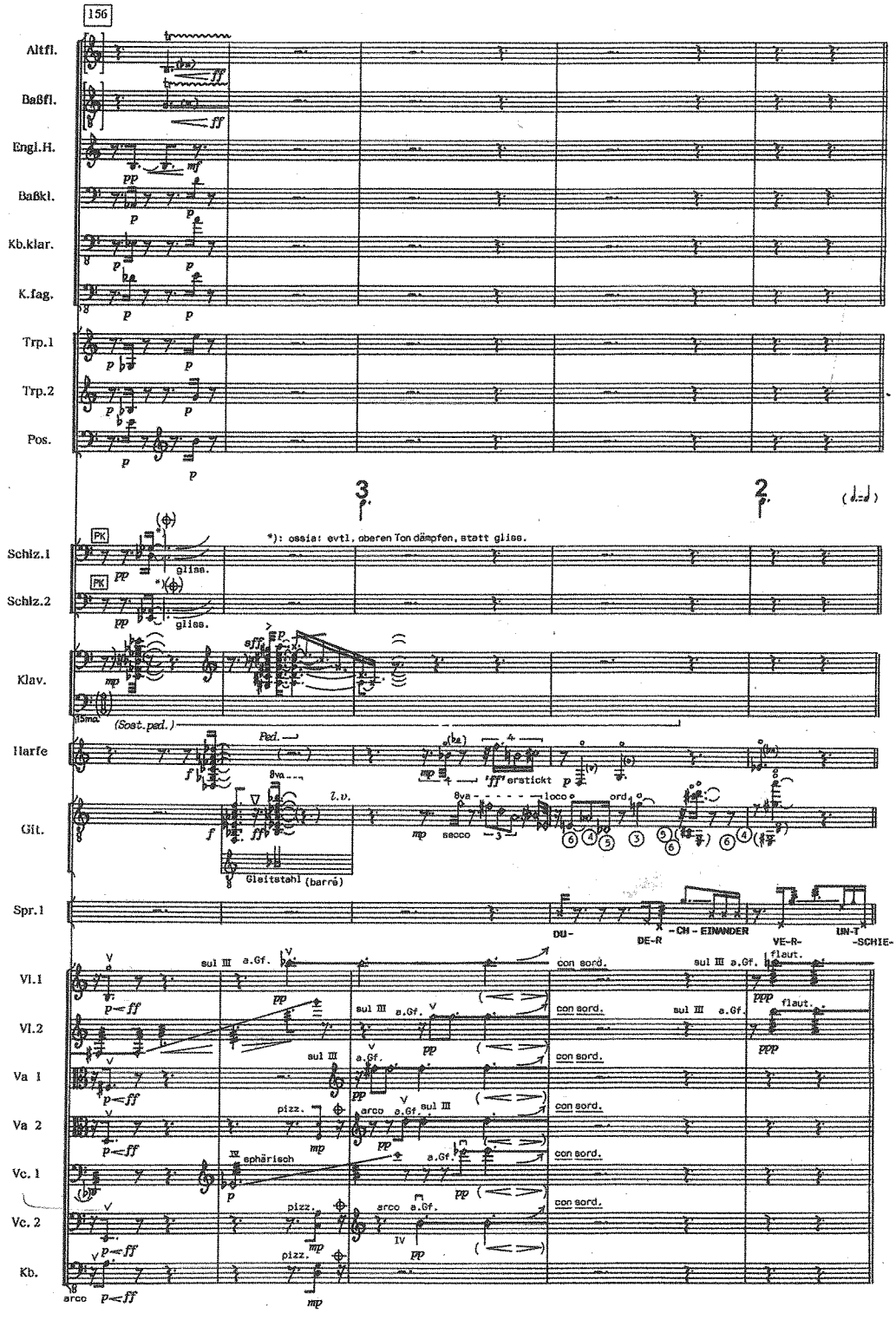
The combination of piccolo, trombone, and guitar in György Kurtág's trio *A Kis Csáva* makes for some interesting contrasts (Example 2.46). The guitar part, notated in the bottom stave, features barré arpeggiation across five or six strings in the two strongest harmonic positions, namely, frets 7 and 12. In effect, the guitar acts as an ersatz harp, particularly in the ringing arpeggiation of its harmonics. The juxtaposition of these delicate guitar sonorities with the piccolo and trombone intensifies the "broken" quality that Kurtág creates within this Classical scherzo form. Kurtág writes the harmonics in concert pitch.



Example 2.46. György Kurtág, *A Kis Csáva*, op. 15.b, movement III (Scherzo), page 7, system 3, Editio Musica Budapest (Tempo: "vivacissimo")

In a passage from ...*zwei Gefühle*..., Lachenmann uses a mix of half harmonics (*erstickt*) and natural harmonics in both the guitar and harp that might be more precisely described as a jumble (Example 2.47). This *Durcheinander* (confusion) of timbres is generated through the varied use of harmonics that accompanies the "DU-(DE)-R-CH-EINANDER" enunciated by the speaker. The combination of the *secco* (dry) timbre of the half harmonics with the ringing timbre of the natural

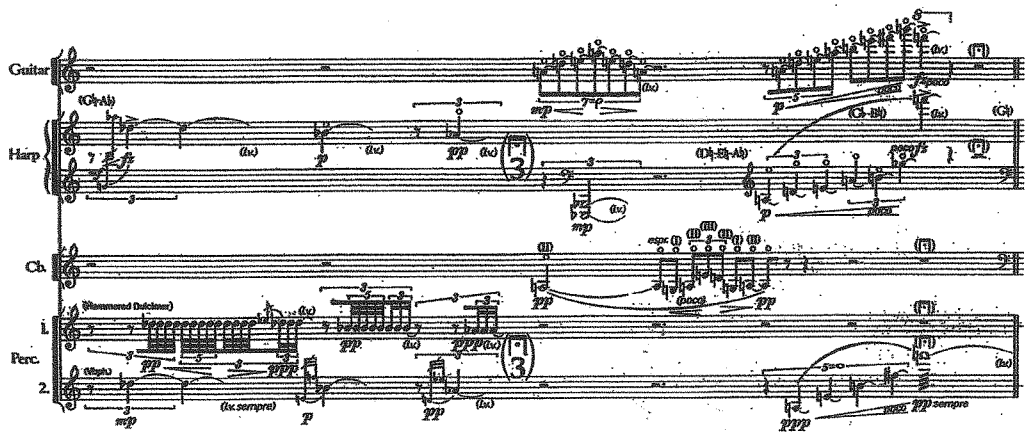
harmonics gives the guitar and harp parts a nearly vocal quality that mirrors the twisting timbres of the spoken text. Lachenmann uses the diamond notehead in fingered position to indicate half harmonics and sounding pitches to indicate natural harmonics.



Example 2.47. Helmut Lachenmann, *"...zwei Gefühle...," Musik mit Leonardo*, measures 156–160, Breitkopf & Härtel (Tempo: ♩. = 63)

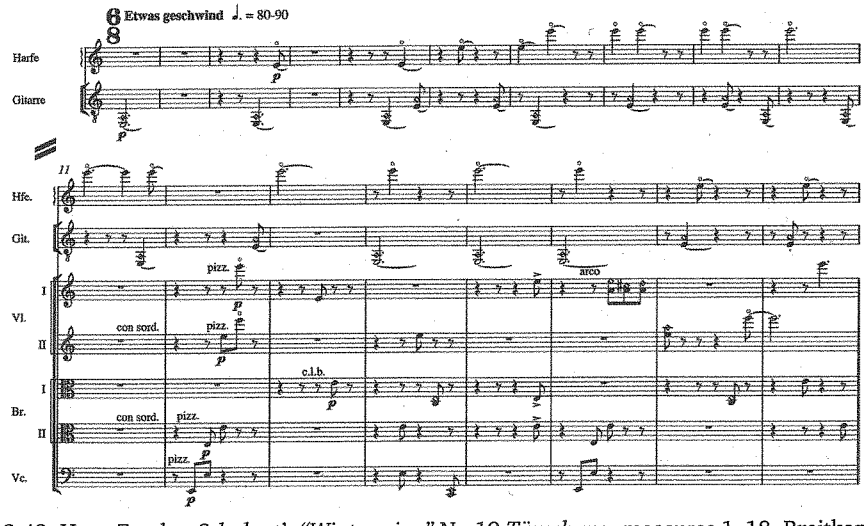
The *Nocturnal* movement of George Crumb's *Quest* combines guitar with harp, vibraphone (as a surrogate celesta) and contrabass. The natural harmonics on the guitar are played at the 12th, 7th, and 5th positions, which coincide with the 2nd, 3rd, and 4th harmonic nodes. Similar harmonic nodes are used on the contrabass, as well as on the harp.

In Example 2.48, Crumb constructs a multifarious "echo" by timing the notes with their homologous timbres differently in each part. The asynchronous attacks in the respective instruments generate sonic "ripples" that momentarily disturb the dreamlike, nocturnal state that Crumb has conjured. The guitar harmonics sound an octave lower than written.



Example 2.48. George Crumb, *Quest,* V. Nocturnal, page 20, system 1, Edition Peters (Tempo: ♩ = 50)

The music in Example 2.49 is drawn from the "Täuschung" movement in Hans Zender's *Schuberts "Winterreise"*. Here, Zender combines the guitar's natural harmonic on string 6 (i.e., the 4th harmonic) with a false harmonic on string 4 in order to create unisons with the harp. (The artificial harmonic is executed by fretting the notated E^3 and touching a perfect fourth above it with the LH little finger.) With the combined guitar harmonic serving as an ostinato, a rich timbral sound world gradually unfolds, based on the *dominant* of *A*, the starting key of the original Schubert lied. The music consequently develops but without making progress, as if to suggest an *illusion* of change—the very essence of *Täuschung* (deception). Notice that Zender writes the fingered position of the harmonic only.



Example 2.49. Hans Zender, *Schubert's "Winterreise,"* Nr. 19 *Täuschung*, measures 1–18, Breitkopf & Härtel

3

Guitar as Percussion

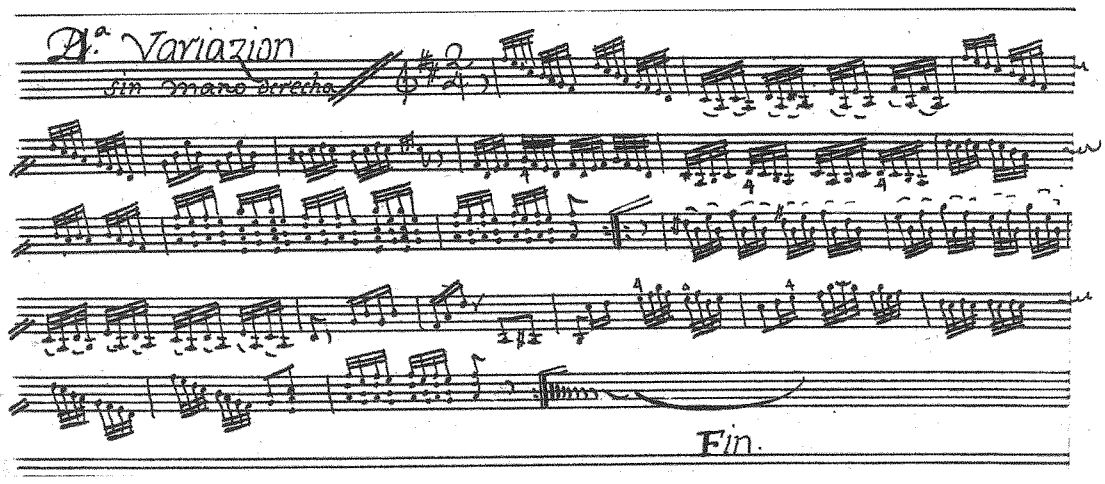
With the advance of *new music* after World War II, and as the guitar has gained wider acceptance in composition, there has been a concomitant increase in the development of non-traditional playing techniques on the instrument. Like the growing prominence of percussion instruments, the guitar's rising currency has developed through the introduction both of new techniques and novel instruments, some barely more than routine objects. The sounds associated with these unconventional methods and devices have often been inspired by other, usually non-western, musical traditions or simply urban noise. Even prior to this era, the guitar was accorded a degree of musical freedom usually associated with "solo" instruments like the piano. Now that status has reinforced the innovative impulses already primed by broader postwar trends. It has encouraged composers and performers to experiment widely with approaches that—in one way or another—have set the instrument's reverberative powers into motion. Cumulatively, these quasi-percussive techniques have led to a different conception of the guitar and its musical potential.

3.1 Historical precedence

Long before the twentieth century, one way that guitarists found to achieve greater expressive nuance was through the use of LH techniques essentially identical to the contemporary hammer-on and pull-off. These techniques provided convenient methods of slurring a phrase (see 1.7.8) and, what is more, effectively liberated the LH from the RH. First developed by Renaissance lutenists, they became favorite ornamental devices in the hands of Baroque guitarists and were further exploited by guitarists of the Classical era, especially in France. Players at this time even experimented with LH hammer-ons and pull-offs while suspending the RH entirely to produce rapid legato passages for virtuosic effect. In 1836, in his book on guitar methods, Carcassi wrote of using the LH fingers alone to stop pertinent notes with some force, as if imitating a hammer, with the intention of making the strings vibrate: "Let the fingers of the LH fall in a hammer fashion, upon the notes so designated, with the force enough to set strings vibrating, without pinching or snapping them."[100]

However, producing sounds through the actions of the LH alone was by no means an entirely new approach and had in fact been used frequently decades before Carcassi's book was published. As early as 1799, Fernando Ferandiere employed LH techniques exclusively throughout the tenth variation of his *Thema: con diez Variaciones para Guit.a / música caracteristica y propia de este ynstrumento*. In this highly virtuosic work not only scales, but also three- and even four-note chords, are articulated by the LH alone. Appropriately, perhaps, without the RH to articulate the notes in any forceful manner, this final variation has such a limited dynamic range that it leaves an almost ghostly impression.

100 Carcassi, *Méthode Complète pour la Guitare*, 102.

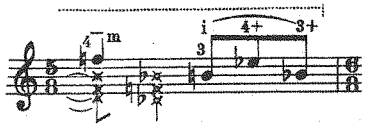


Example 3.1. Fernando Ferandiere, *Thema: con diez Variaciones para Guit.a/ música caracteristica y propia de este ynstrumento*, Variation 10 (1799)

3.1.1 Contemporary examples: LH tapping

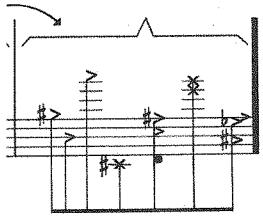
Interest in the musical possibilities afforded by using the left and right hands independently has intensified during the last several decades. Contemporary composers have persistently juxtaposed sounds that are produced by the LH both with and without the use of the RH so as to exploit their timbral differences. The technique known as *LH tapping*, for instance, is among many extended techniques that have been invoked for their modulating impact. As mentioned briefly in Chapter 1, LH tapping is essentially a more percussive hammer-on, in that it involves tapping the finger on a string against the fret, but without a prior plucked attack.

In Company's *Las Seis Cuerdas*, LH tapping (indicated by the + sign) exerts a soft dynamic and staccato effect that together offset a brusque chord struck percussively in the tambora manner (indicated by the *x*-noteheads) (Example 3.2).



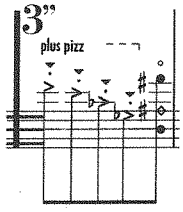
Example 3.2. Alvaro Company, *Las Seis Cuerdas*, Movement II, measure 8, Edizioni Suvini Zerboni (Tempo: ♩ = 112)

Other composers have made more extensive use of LH tapping as a means of inflecting timbre, as Example 3.3 suggests. Here Kagel uses LH tapping in simultaneous combination with plucked half harmonics (the *x-noteheads*) and a plucked open string.



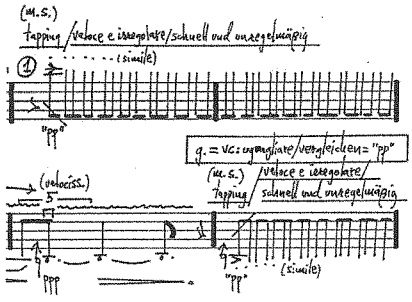
Example 3.3. Mauricio Kagel, *Fait votre Jeu I* from: *Sonant*, system 5, last measure, Edition Peters (Tempo: ca. 7 seconds)

In the same piece, Kagel also uses LH tapping in conjunction with RH plucking ("plus pizz.") of the string in order to give the plucked note a greater percussive feel (Example 3.4).



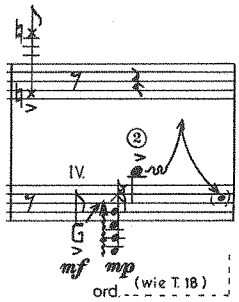
Example 3.4. Mauricio Kagel, *Fait votre Jeu I* from: *Sonant*, system 2, measure 4, Edition Peters (Tempo: ca. 3 seconds)

Sánchez-Verdú has the guitarist repeatedly tap an LH finger against the first string at the indicated pitch (the "beak" noteheads), which gives a "typewriter-like" effect to the overall sound (Example 3.5).



Example 3.5. José M. Sánchez-Verdú, *Lux ex tenebris (Goya-Zyklus)*, 5. Nada, measures 3–4, Breitkopf & Härtel (Tempo: ♩ = 60)

In *Foxfire Eins*, a piece that predominantly uses tapping effects, Oehring has the guitarist tap their LH forcefully at the fourth position (indicated by the "G" and "IV" above the stave) and then follow this with a glissando up the fretboard toward the bridge (Example 3.6).



Example 3.6. Helmut Oehring, *Foxfire Eins <natriumpentothal>*, measure 68, Bote & Bock (Tempo: ♩ = 30)

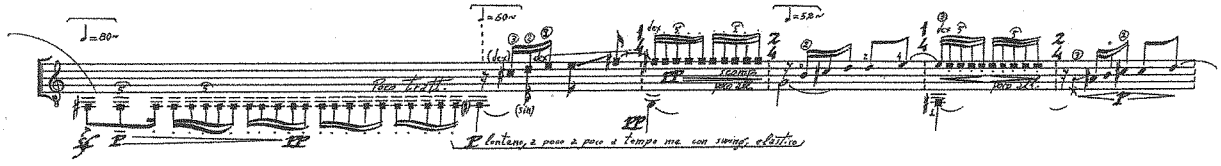
3.2 RH tapping

Much as the RH can extend LH trilling through occasional hammer-ons and pull-offs, as it does in Berio's *Sequenza XI*, it can extend percussive tapping by producing—either delicately or forcefully—pitches along the fretboard. A composer should be aware that, in general, executing extensive passages with forceful RH tapping is difficult, since guitarists have not built up the calluses on their RH fingers. Furthermore, because the guitarist's long RH nails force them to attack the strings

UNIVERSITÄTS Wartesaal Bibliothek

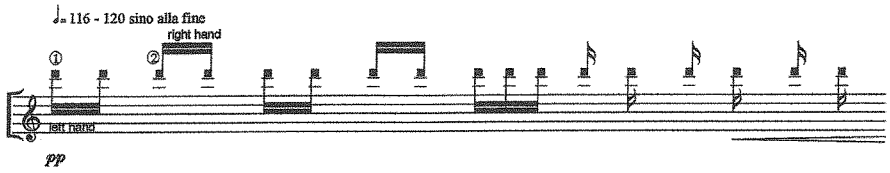
with a semi-flattened hand and consequently less stability, tapping with precision can sometimes prove challenging: inaccurate pressure can occasionally cause the string to "buzz" noisily against the fret. Where tapping is concerned, in fact, the RH tends to be altogether less agile than the left.

In Example 3.7, Pisati has the guitarist articulate a rapid passage of $F^{\sharp}$ quintuplet sixteenths on string 2 with RH tapping (square noteheads stems up). The performer executes this figure in combination with LH tapping (the square noteheads with stems down).



Example 3.7. Maurizio Pisati, *Poem della Luce*, page 5, system 2, Pisati-Zone

Pisati also creates very direct counterpoint between RH and LH tapping (Example 3.8).



Example 3.8. Maurizio Pisati, *Poem della Luce*, page 5, system 2, Pisati-Zone

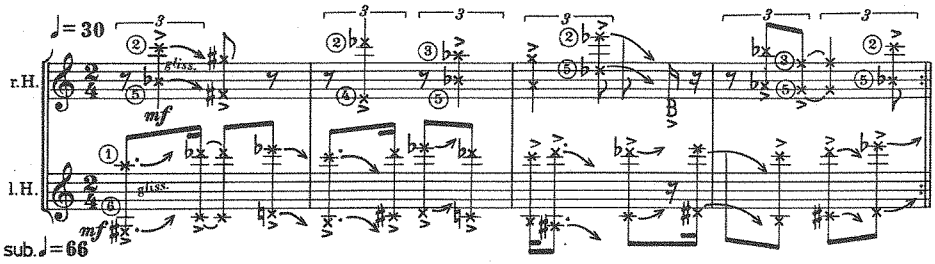
Forceful tapping will always be softer in result than what the printed dynamics suggest. For forceful RH and LH tapping actions, we therefore recommend that loud dynamics be placed in quotation marks to indicate that the sounding result may not match the extremity of the performer's effort.

3.2.1 Tapping combinations

The addition of RH tapping to the gestural repertoire has urged many composers to combine RH and LH tapping in "polyphonic" combinations, in which the two hands work independently. Moreover, the purposes to which composers have put such tapping actions have both expanded and deviated from their more traditional use as a means of slurring, often to the extent that the guitar virtually functions as a percussion instrument. The examples below demonstrate some of the many inventive approaches to tapping, as well as to the guitar as a whole. Note that tapping actions on the guitar work best with strings of lower tension and low action; tapping on the steel string guitar should generally be avoided because the higher tension and greater mass of its strings make the action very difficult.

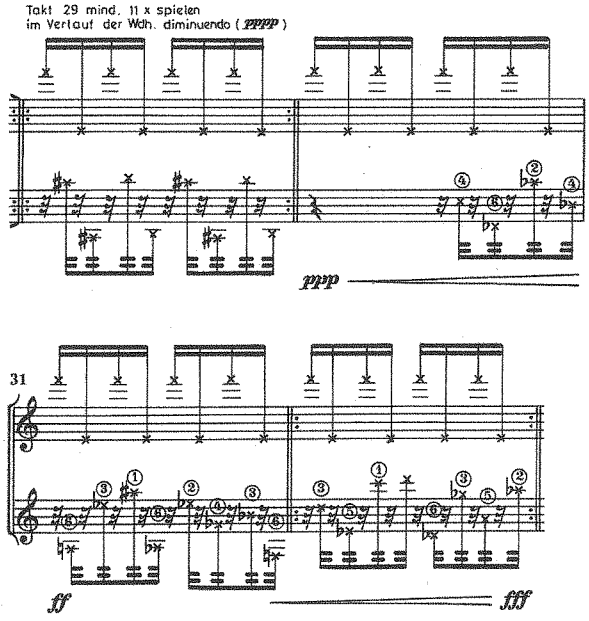
For a passage in *Foxfire Eins* (Example 3.9), Oehring uses the upper stave to indicate RH tapping and the lower to indicate LH tapping actions (both designated by *x*-noteheads). That both hands tap dyads makes executing the figures doubly challenging. Afterwards, the RH and LH must go on to execute glissandi up and down the fretboard.[101]

101 Oehring has recently shifted the tuning to a scordatura in which all six strings are tuned a major 2nd downward so as to facilitate the extensive—and exhausting—tapping actions.



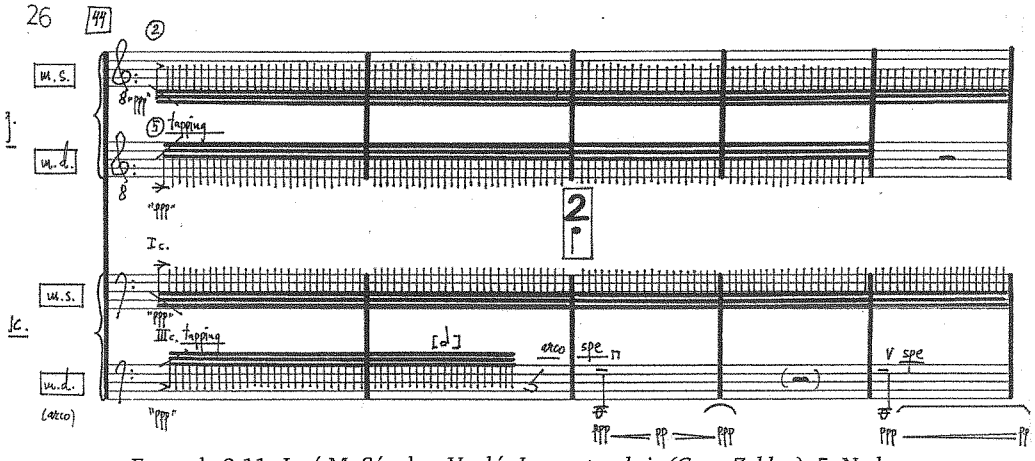
Example 3.9. Helmut Oehring, *Foxfire Eins <natriumpentothal>*, measures 1–4, Bote & Bock (Tempo: ♩ = 30)

Elsewhere in the same piece, the LH and RH each mechanically tap on alternate strings, creating a rhythmic pulsation (Example 3.10). The RH moves between strings 1 and 6, whose different compositions generate two distinct percussive timbres.



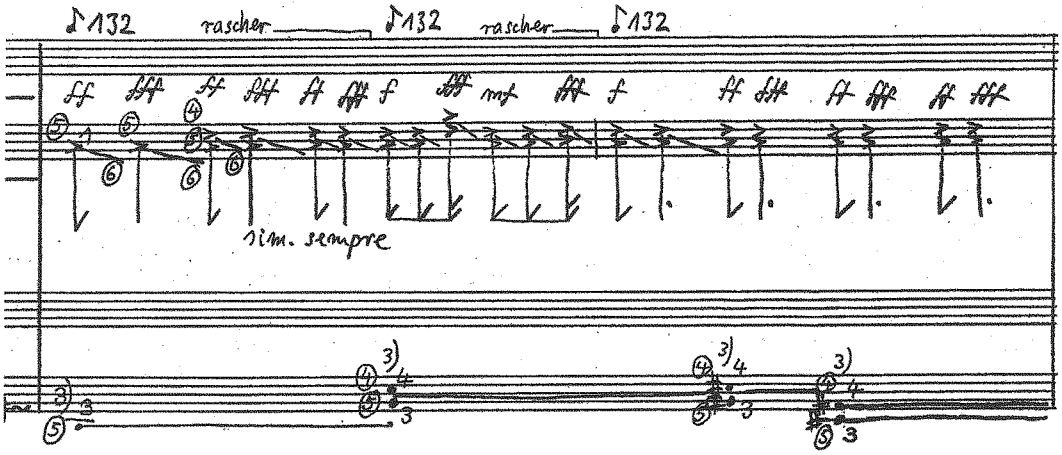
Example 3.10. Helmut Oehring, *Foxfire Eins <natriumpentothal>*, measures 29–32, Bote & Bock (Tempo: ♩ = 60)

In Example 3.11 (upper two staves), Sánchez-Verdú has the guitarist create an intense spate of delicate yet agitated LH and RH tapping.



Example 3.11. José M. Sánchez-Verdú, *Lux ex tenebris (Goya-Zyklus)*, 5. Nada, measures 44–48, Breitkopf & Härtel (Tempo: ♩ = 60)

Riehm has the guitarist pivot the RH (top stave) in the direction of the nut after tapping strings 4–6, a maneuver that "bends" the tapped pitch (Example 3.12). The LH (bottom stave) occasionally plucks strings behind the RH in order to accentuate the RH tapping as well as to elicit further resonance of the auxiliary tones.



Example 3.12. Rolf Riehm, *Toccata Orpheus*, system 10, measure 2, G. Ricordi & Co

3.2.2 Case study: Rolf Riehm's *Toccata Orpheus*

As Example 3.12 suggests, one of the more extensive studies of tapping techniques on the guitar to date has been Riehm's *Toccata Orpheus*. The composition represents a virtual encyclopedia of possible combinations of LH and RH tapping and strumming techniques. Virtually every event in the score affords insight into the ways the two hands can interact on the fretboard, whether it be completely independently of each other or in combination, and also offers a sense of how to choreograph the movements in real time.

Percussive actions in *Toccata Orpheus* can be broken out as follows:

(a) Actions performed by the two hands independently of each other.

(b) Coordinated actions executed either to the left (i.e., behind) or to the right (i.e., in front) of each hand (Figure 3.1).

(c) Actions performed according to the specific dictates shown in Figure 3.2.

Figure 3.1. Action positioning for the two hands[102]

102 Legend translates as follows: Additional supporting reference to: Position *left* to L or R/ Position *right* to L or R Riehm, legend for *Toccata Orpheus* (translation Seth Josel).

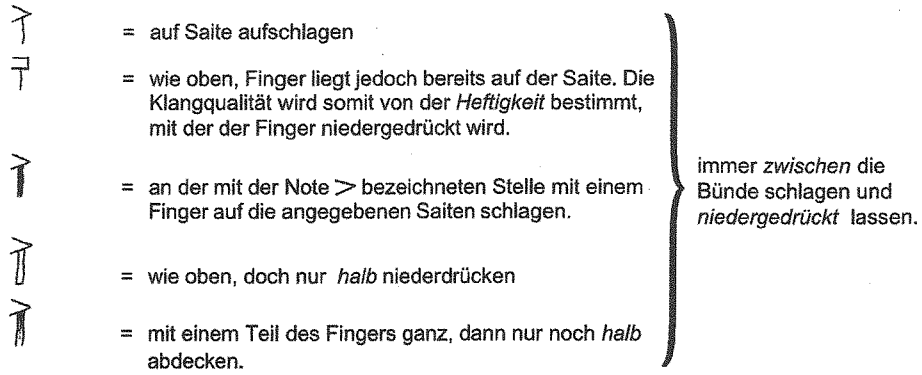


Figure 3.2. RH and LH tapping indications[103]

(d) Percussive barré tapping, performed by one hand or the other, either straight across the fretboard or at an angle.

(e) Tapping that is followed by glissandi along the fretboard.

(f) Plucking with one finger while another finger on the same hand depresses the string, often until the score says to do otherwise (Figure 3.3).

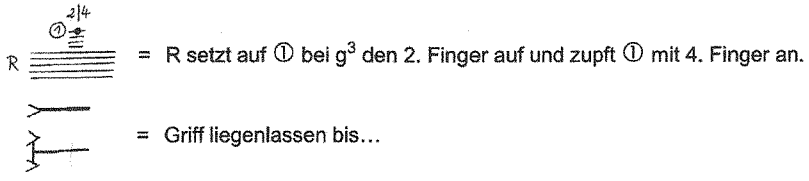
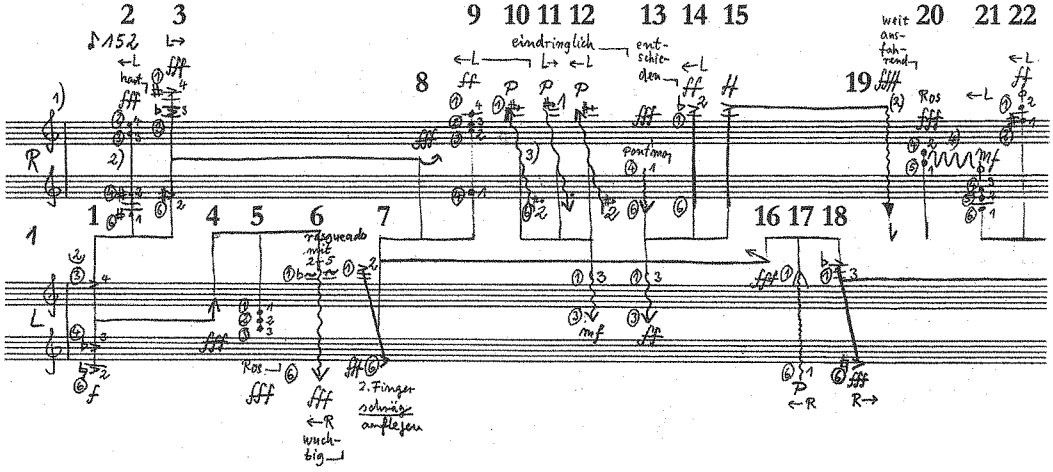


Figure 3.3. Placement and duration of a fingering[104]

Table 3.0 presents a detailed description of each event in the first system of a passage from *Toccata Orpheus* (Example 3.13). This compilation should help to clarify the complexity of action that the score demands.



Example 3.13. Rolf Riehm, *Toccata Orpheus*, system 1, G. Ricordi & Co

103 Legend translates as follows: Strike string (hammer-on) / As above, but finger is already on the string. The sound quality determined by how vigorously the finger is pressed down / Hammer with the entire length of the finger on indicated strings at the place indicated with the note / As above, but pressing strings down only half way / Cover strings completely with one part of the finger, then only partially / Always beating between the frets and leaving strings pressed down. Riehm, legend for *Toccata Orpheus* (translation Seth Josel).

104 Legend translates as follows: R places second finger on 1 at g3 and plucks 1 with the fourth finger, leave fingering in position until .... Rolf Riehm, legend for *Toccata Orpheus* (translation Seth Josel).

Rolf Riehm's *Toccata Orpheus*, System 1: a breakdown
0. The segment is scored on two double staves: the bottom set indicates LH actions and the top RH actions (denoted by the letters *L* and *R* respectively). Within each double stave, the upper staff indicates strings 1–3 and the lower, strings 4–6. The string numbers are stipulated in the traditional manner by circled Arabic numerals. Riehm separates out the strings in this way so that the notational information does not become too dense. Unenclosed numerals to the right of an event indicate fingering, counting up from the thumb (1) to the little finger (5). This numbering applies to both hands.
1. **Event 1** requires a LH percussive hammer-on on strings 6–4–3 (designated by the "beak" noteheads) as well as muting string 2 (indicated by the half-circle underneath the 2) to prevent it from sympathetically vibrating. The hammer-ons will produce bi-tones on each of these strings.
2. **Event 2** requires ordinario plucking with the RH behind the LH (indicated by the ←L above the event) while the LH continues to depress the strings from Event 1 (the horizontal arrow emerging from the middle of the stem indicates how long that event is to be depressed). The plucking occurs at the positions indicated by normal noteheads: for example, the RH plucks string 6 at the $G^{\sharp}$ position, string 4 at $F^{\sharp}$, string 3 at *B* and string 2 at *E*. Indicating position numbers on the fretboard as to where to pluck a given string is somewhat idealistic. What Riehm wants in this particular situation is for the RH to pluck behind the LH approximately midway between the LH and the nut. Note that plucking strings 6, 4, and 3 will produce the auxiliary tones of the initial bi-tones in Event 1, whereas plucking string 2 will elicit a percussive sound since the LH finger is only muting it.
3. **Event 3** requires a RH percussive hammer-on in front of the LH on strings 1, 3 and 6 (indicated by the L→ above the event). Note that the LH continues to hold the position from Event 1. (It should be clear that the bi-tones produced on strings 6 and 3 will produce auxiliary tones determined by the length of string between the LH and RH. The auxiliary tone on string 1 is the usual one when tapping at that position since the LH does not affect that string.) Event 3 is maintained by the RH throughout Events 4 through 7.
4. **Event 4**, denoted by the upwards pointing arrow on the stem in the lower stave, requires the LH to audibly release its position on the strings in the manner of a violent pull-off, but at a right angle, so as to affect only the strings that it was just fingering.
5. **Event 5** requires plucking strings 1 through 3, with the thumb plucking string 3, the index finger string 2 and the middle finger string 1 (note that the fingering is incorrectly reversed in the score) with the LH in the Rosette area (Ros.) in front of the RH (which is still depressing the strings as stipulated for Event 3).
6. For **Event 6**, the LH moves back behind the RH (indicated by the ←R below the event). The LH performs a *rasgueado* in an upward motion across the strings beginning with string 1 while the RH continues to hold the hammer-on from Event 3. The *rasgueado* is performed approximately between the 8^{th} and 6^{th} positions, indicated by the $B^{\flat}$ and *C* noteheads with squiggly lines. Note that performing a *rasgueado* can present a challenge for the LH since it is not accustomed to doing so.
7. **Event 7** requires a barré tap with the LH where the index finger (2) is struck violently at a diagonal across the fretboard while the RH continues to maintain Event 3.
8. With **Event 8**, the RH finally releases Event 3 by pulling the fingers off the strings toward the body, activating the neighboring strings. The LH continues to depress the barred chord from Event 7.
9. In **Event 9**, the LH continues to hold the diagonal barré and the RH plucks strings 4–1 to the left of the LH at the fifth position (where the notes *G, C, E, A* are stopped). It is important to remember that normal noteheads indicate positions at which to pluck on the fretboard and not actual pitches.
10. In **Event 10**, the LH continues to hold the diagonal barré, and the RH index fingernail moves downward in an arpeggiated diagonal motion across the strings, behind the LH barré at the given position (i.e., from $D^{\sharp}$ to $C^{\sharp}$ or from the 11^{th} position on string 6 to the 9^{th} position on string 1).
11. In **Event 11**, the action is that of Event 10, except that the RH thumbnail arpeggiates upward across the strings in front of the LH at the indicated position.
12. In **Event 12**, the LH continues to depress the barré from Event 7. The RH arpeggiates the strings downward with the index fingernail behind the LH at the same position as Event 10, while simultaneously the middle fingernail of the LH flicks in an upward motion across strings 1–3.
13. In **Event 13**, the LH continues to hold the diagonal barré from Event 9. The LH middle fingernail performs the same action in Event 12 across strings 1–3 as the RH thumbnail simultaneously arpeggiates up across strings 4–6.
14. In **Event 14**, the LH continues to hold the diagonal barré from Event 9. The RH index finger strikes across all six strings—i.e., performs a barré tap—at the sixth position (indicated by the high $B^{\flat}$ on string 1) behind the LH.
15. **Event 15** repeats Event 14 but depressing the barré after striking.

16. In **Event 16**, the RH continues to depress the barré while the LH audibly releases its diagonal barré, but brushing the strings by pulling the finger away at an angle.
17. In **Event 17**, the RH continues to depress the barré while the LH thumbnail strums all six strings, from lowest to highest, to the left of the RH (←R).
18. In **Event 18**, the RH continues to depress the barré while the LH strikes with the middle finger diagonally across all six strings to the right of the RH (R→).
19. In **Event 19**, the LH continues to depress the diagonal barré (Event 18) while the RH index fingernail arpeggiates all six strings from highest to lowest behind the LH.
20. In **Event 20**, the LH continues to depress the diagonal barré (Event 18) while the RH plucks strings 4 and 5 with the thumb and index finger over the soundhole. This attack is immediately followed by a quick vibrating motion of the RH palm above the soundhole that affects the resonance of the plucked chord.
21. In **Event 21**, the LH continues to depress the diagonal barré (Event 18) while the RH performs a snap pizz. on strings 4–6 behind the LH at the 7th position (indicated by the *B*, *G*, *A* normal noteheads). Note that since the LH is depressing the barré chord, the RH will only produce auxiliary tones behind the LH.
22. In **Event 22**, the LH continues to depress the diagonal barré (Event 18) while the RH performs a snap pizz. on strings 1 and 2, behind the LH at the 7th position (indicated by the $F^{\sharp}$, *B* normal noteheads).

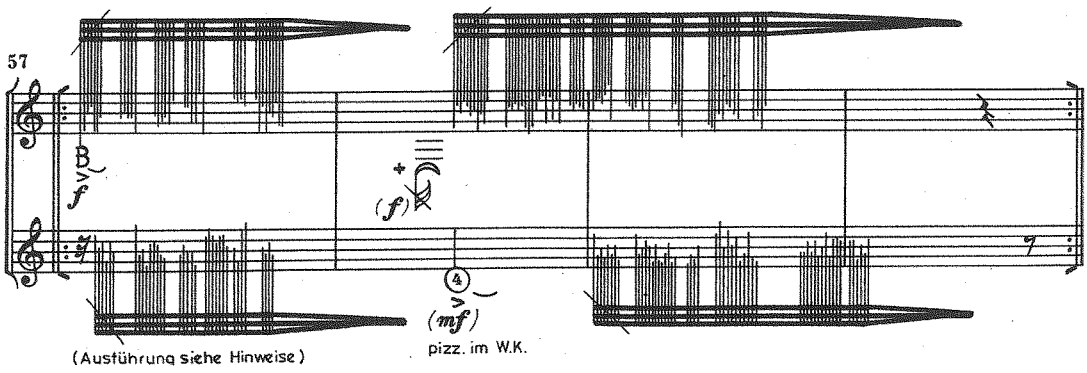
Table 3.0.

The preceding analysis should suggest both the intricacies of learning such a work and the exquisite manual choreography that playing it involves. No matter how skilled the execution, however, some of the actions will have difficulty speaking, at least when combined in the overall chain of events at the given tempo. In particular, several actions, while appearing differentiated on the page, actually prove less than distinct in their aural impact. Some of RH plucking positions, for example, are unnecessarily precise in view of the sounding result: in fact, it would suffice to stipulate "close to the nut," "midway between the LH and nut," and "close to the LH," for beyond these three parameters the differences in position have negligible effect, especially when playing the piece at the proper speed.

3.2.3 Unpitched tapping

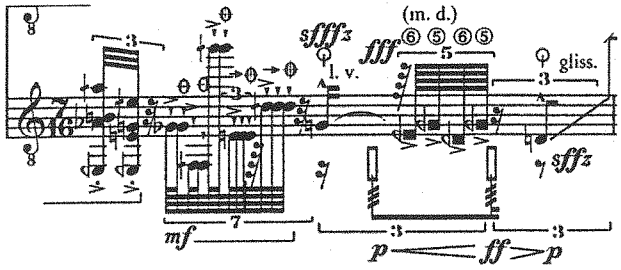
Composers have also used RH and LH tapping for general percussive effect rather than to elicit specific pitches. Techniques may include tapping randomly on the fretboard or tapping while muting the strings with the other hand.

In Example 3.14, Oehring has the guitarist strike the strings with the bottom of the palm at the very end of the fretboard, keeping the rest of the palm affixed to the strings (the symbol B in the score). The performer is then to tap successively on every string in a rapid manner using every finger on both hands (the upper stave denotes RH actions and the lower stave, LH actions). The sounding result resembles the sound of typing on an electric typewriter, or the sounds of an electric printer or Morse code. This cluster of activity is interrupted first by a scratch sound produced by the RH thumb on string 6 (represented by the fingernail symbol in the upper stave) and then by the LH plucking string 4 behind the nut (the circled 4 indication in the lower stave). The tapping then continues.



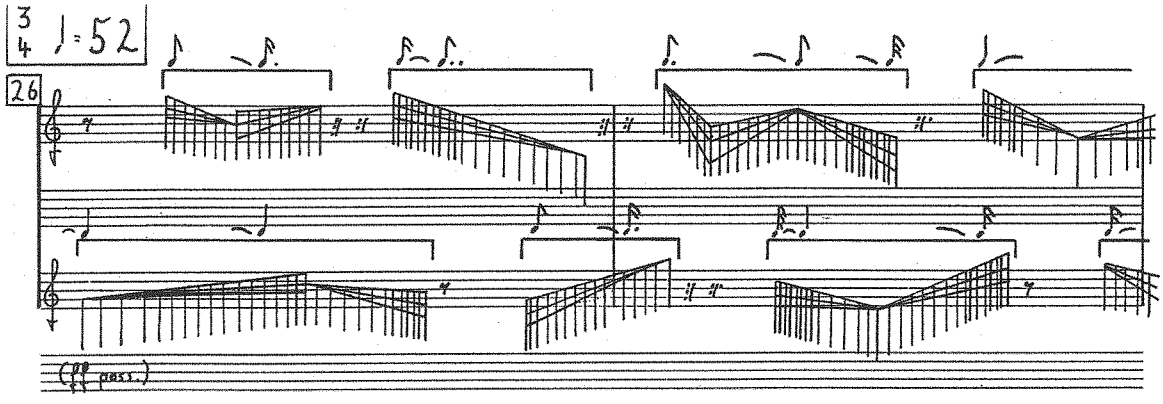
Example 3.14. Helmut Oehring, *Foxfire Eins*, measures 57–60, Boosey & Hawkes (Tempo: ♩ = 30)

A passage from Mahnkopf's *Kurtág-Duo* calls for the guitarist to perform rapid tremolo with the flat of the LH against the fretboard (Example 3.15). This gesture, referred to in the performance notes as a "tambour" and denoted by the open box below the stave, shifts to finger tapping in which the RH accompanies the left.



Example 3.15. Claus-Steffen Mahnkopf, *Kurtág-Duo*, measure 19, CSM (Tempo: ♪= 30)

For a percussive effect (Example 3.16), Oehring asks the guitarist to rapidly "pat" the RH fingers against the strings, using the fingers on several or all strings. At the same time, the LH glides up and down between the 12th and 19th positions within a given time frame (as indicated in the performance notes).



Example 3.16. Helmut Oehring, *Nr. 1* (aus: *Koma*), measures 26–27, Bote & Bock

Although tapping can be notated in various ways, we recommend using an *x*-notehead pitch to indicate where on the fretboard to tap. It is also important always to include the string number unless it is clear from the musical context. In general, unless "RH" appears above the relevant note(s), tapping action shown on only one stave presumes LH execution.

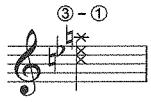


Figure 3.4. Suggested notation for tapping

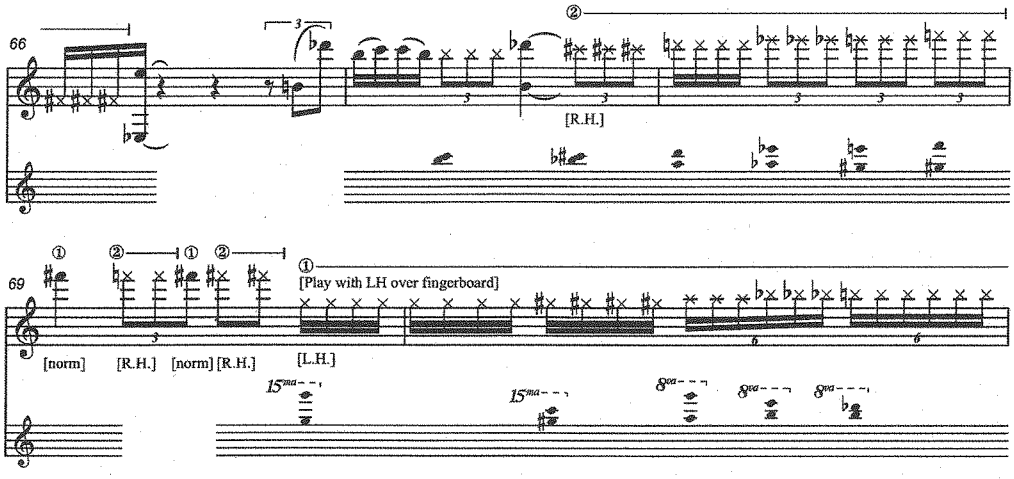
When tapping in both hands is called for, it is advisable to use two staves, an upper for the RH and a lower for the LH.

3.3 Bi-tones

RH tapping consistently generates a secondary but audible tone softer than the tapped pitch. When rendered audibly, the dual sound of the stopped pitch and its adjunct is called a *bi-tone*. In theory any striking action on the fretboard, whether involving the left or right hand, can summon two pitches at once as vibrations extend from it along the string both toward the bridge and toward the nut. A tapping action, however, intensifies the effect so that the secondary pitch is heard more readily. This secondary or *auxiliary pitch* arises at a frequency determined by the distance between the stopped pitch and the nut. A higher string action correlates to more audible bi-tones, because it allows the strings to resonate more freely behind a stopped note.

Auxiliary pitches ascend the closer a stopped note sits to the nut and conversely descend as the distance increases. Hence, since the string length to the nut is shorter, higher auxiliary pitches emerge from notes stopped on or below the twelfth fret. Furthermore, there is an inverse relationship between where notes stopped on the fretboard fall on the chromatic scale and the frequencies of the auxiliary pitches "behind" them: as notes move up the scale, their auxiliary frequencies decline logarithmically and vice versa.

Thus, since bi-tones are largely predictable, it is possible to stipulate them precisely within a composition. For the score of her work *'Los Caprichos'...*, a piece that features both RH and LH tapping, Catherine Milliken adds a second stave where she specifies the resultant pitches for those actions along with the auxiliary tones that they should produce (Example 3.17).



Example 3.17. Catherine Milliken, *'Los Caprichos' No. 61 Volaverunt*, measures 66–70, manuscript (Tempo: ♩ = 96–100)

3.3.1 Bi-tone chart

Although bi-tones are very consistent, they do have microtonal nuances that are *not* uniform among guitars. A guitar with a scale length of 656 mm. will produce auxiliary tones that sound

flatter than those produced on a guitar with a scale length of 650 mm., on which the tones can vary by a quarter-tone to a half-tone (Figure 3.5).[105]

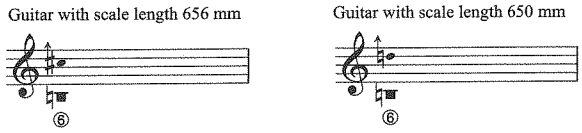


Figure 3.5. Deviation of bi-tones with respect to scale length

A chart of the available bi-tones on each string from the second to the nineteenth fret appears below (Figure 3.6). The chart assumes a guitar with a scale length of 656 mm. The notes in parentheses refer to the extended fretboard on strings 1–3. The normal noteheads indicate the sounding result of the auxiliary tone. The square noteheads indicate the fretboard position where the left or right hand taps, beginning with the second fret. The resultant pitches are rounded to the nearest eighth tone.[106]

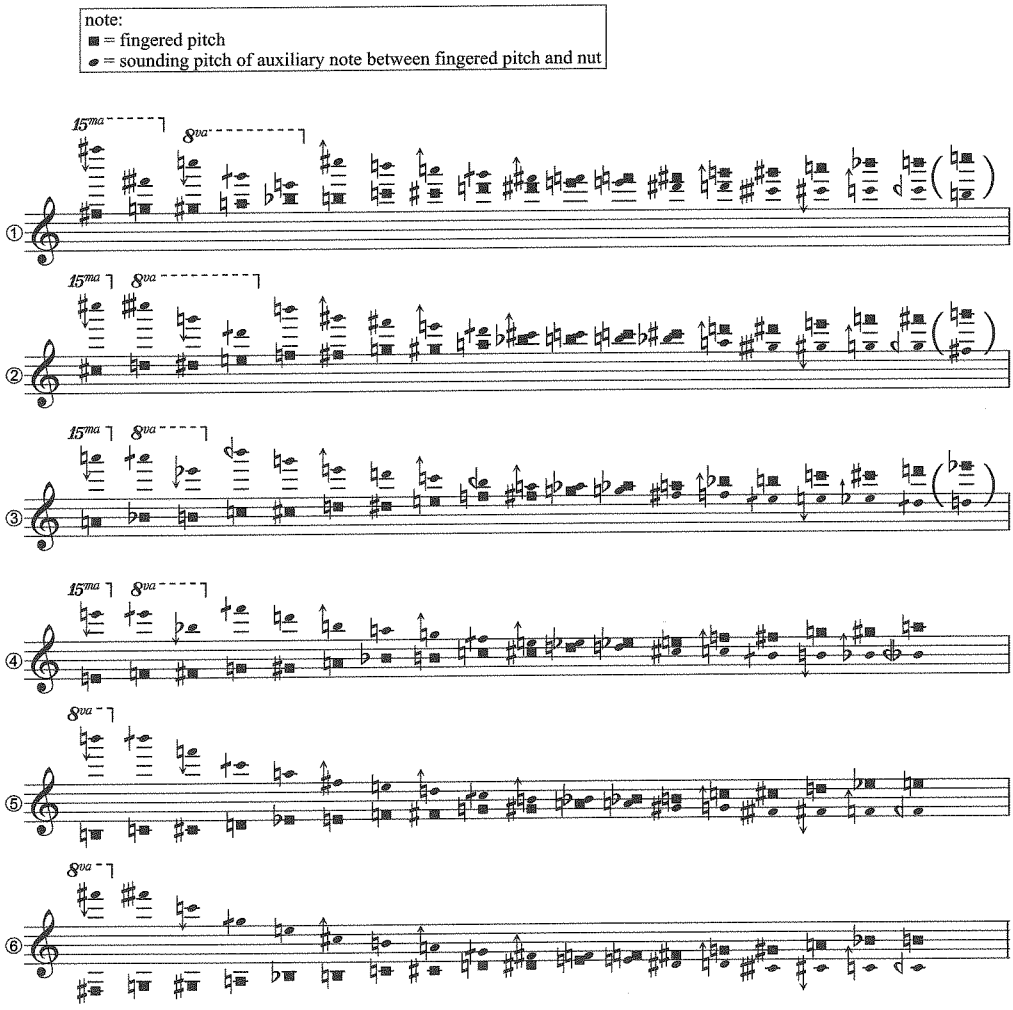


Figure 3.6. Bi-tone chart for each string

105 Sainsbury, "Bi-tone Techniques and Notation," 10–11.

106 Note: 𝄲 𝄳 = one eighth-tone flat, 𝄳 𝄪 = one eighth-tone sharp, 𝄳 = one quarter-tone flat, 𝄲 = one quarter-tone sharp, 𝄪 = three quarter-tone sharp, 𝄫 = three quarter-tone flat.

Below is chart of the cent deviations of bi-tones/auxiliary pitches from the equal tempered pitch:

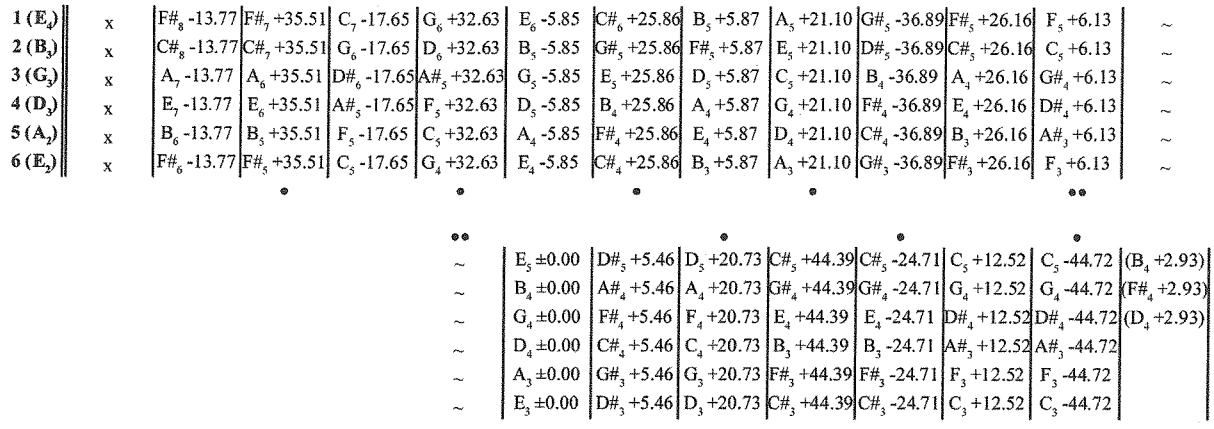


Figure 3.7. Cent deviations of bi-tones from equal tempered pitches. The vertical lines represent the frets and the dots indicate the traditional fret markers (Chart courtesy of Rama Gottfried)[107]

3.3.2 Producing the auxiliary pitch of a bi-tone

The auxiliary pitch to any stopped note (sometimes referred to as a *backtone*) can be produced in isolation by plucking the string behind the note toward the nut, provided some time is allowed to move the RH into position behind the LH. There are essentially three ways of producing the auxiliary tones:

(a) Plucking with the RH behind the LH that is stopping the note (or, if the RH is stopping the note, having the LH pluck in front of it). If more than one string is being stopped, as in the case of a chord, then the RH can arpeggiate the strings behind the LH, either by strumming across them with the thumb or index finger or even by using a *rasgueado* technique.

(b) Plucking behind the LH stopped note with the LH index finger (or, if a RH finger is stopping the note, using the RH index finger to pluck in front of the stopped note). This method produces a more delicate tone than method (a) above, since less force can be applied to the string and no fingernail is involved in producing the pitch.

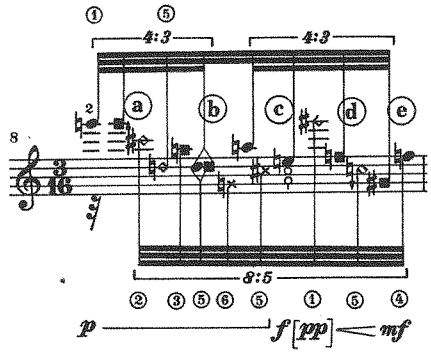
(c) LH tapping while muting the string with the RH in front of the left (in the normal manner of positioning the hands), where the RH essentially acts as a filter by dampening the string from vibrating in the normal manner and allowing only the auxiliary note to sound. It is also possible to filter out the auxiliary notes when using right and LH tapping by loosely placing a capo on the strings toward the nut, which keeps them from vibrating behind the stopped note.

Plucking an auxiliary tone cannot achieve a dynamic greater than *mf* (i.e., moderately loud), assuming it is produced on a standard classical guitar. This ceiling is due in part to the fact that auxiliary tones resonate primarily in the neck rather than the body of the instrument. Still, auxiliary tones can and have been used in a variety of ways: these include auxiliary tone glissandi (keeping in mind that, as the stopped note glides downward chromatically, the auxiliary pitch rises and vice versa), auxiliary tone trills and tremolos, auxiliary tone pull-offs and hammer-ons behind a stopped note, auxiliary tone chords, and auxiliary

107 See 5.1.3 for the equation used to calculate cent deviations. Note that C^4 represents middle *C*.

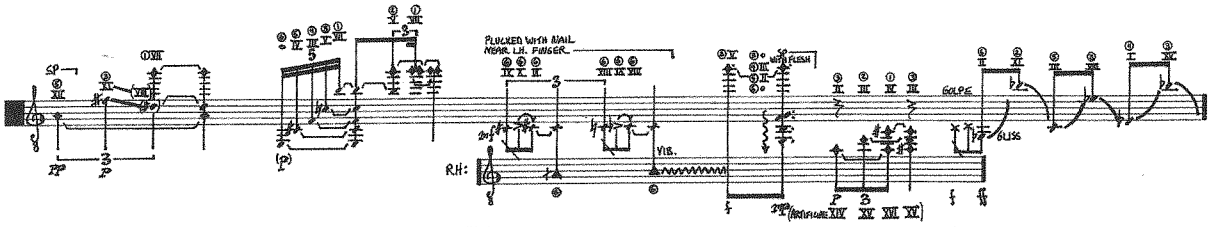
tones combined with harmonics and normal tones.[108] To notate an isolated auxiliary tone, it is sufficient to give the stopped note with an added indication to pluck behind it. We recommend using a square notehead to signal this action.

A passage from Hübler's *Reißwerk* (Example 3.18) intersperses auxiliary tones (square noteheads) with natural harmonics (open diamond noteheads), LH tapping (*x* noteheads), attackless harmonics (incomplete diamond noteheads) and normal plucked tones (ordinary noteheads) in a densely contrapuntal context.



Example 3.18. Klaus K. Hübler, *Reißwerck*, measure 8, Breitkopf & Härtel (Tempo: ♪ = 38 ca.)

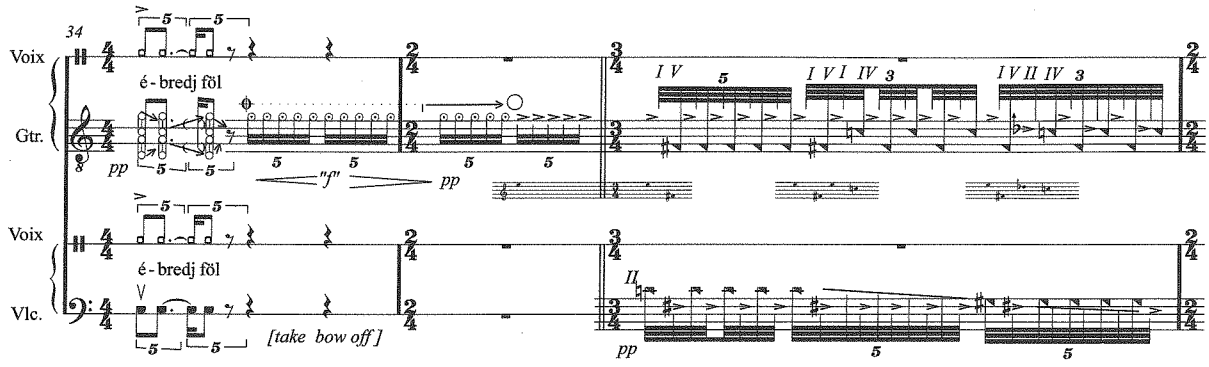
In Example 3.19, the RH plucks behind the LH in the segments where a lower stave is present. The lower stave indicates the approximate sounding results of the auxiliary tones. For the second auxiliary tone, Applebaum has the performer use vibrato in the LH to prolong its sustain.



Example 3.19. Mark Applebaum, *DNA*, page 1, system 3, manuscript (Tempo: ♩ = 60+)

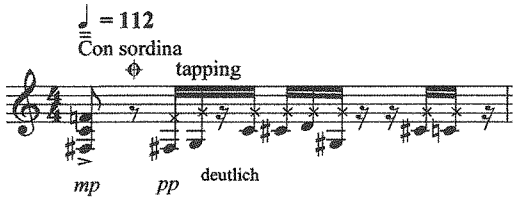
Frédéric Pattar's *tresse-ébresztés* has the guitarist tap lightly with the LH while dampening the string with the RH (Example 3.20). In measure 35 (where the "beak" noteheads appear), the guitarist gradually releases the dampening to allow for the bi-tone to emerge. In the third measure, the RH begins tapping on string 5 and then on string 4, so now the two hands tap in alternation. Throughout this measure, the bi-tone tappings on the guitar are combined with similar actions on the cello to produce a delicate "patter". Notice that the sounding results of the auxiliary tones in the bi-tone phenomenon are notated below in a separate stave.

108 For a complete compendium of auxiliary tone techniques, see Sainsbury "Bi-tone Techniques and Notation."



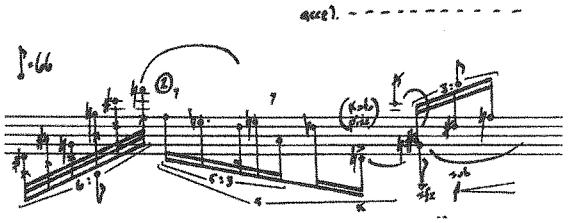
Example 3.20. Frédéric Pattar, tresse-ébresztés, measures 34–36, manuscript (Tempo: ♩ = 52)

Elena Mendoza filters out the auxiliary tones produced by LH tapping through placement of a hairband around the neck just slightly before the nut, as indicated by the *con sordina* notation (Example 3.21). This preparation, because it also dampens the sympathetic resonance of the strings, gives the LH tapping actions additional clarity in sound.



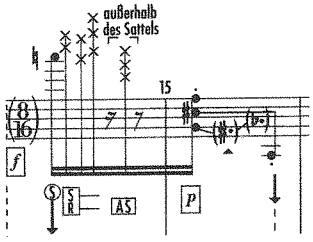
Example 3.21. Elena Mendoza, *Breviario de espejismos*, measure 1, Edition Peters

The piece *Tempo Mental Rap* features what the composer, Michael Edgerton, dubs a "Koto pizzicato." This is essentially a snap pizzicato that is executed behind the LH, which here is stopping the note (Example 3.22). As a result, the action produces the auxiliary tone of a bi-tone. Producing a snap pizzicato behind the LH, however, is markedly difficult because the brevity and tension of the string in this location compromise the pulling action.



Example 3.22. Michael Edward Edgerton, *Tempo Mental Rap*, Variation I (3), system 2, manuscript

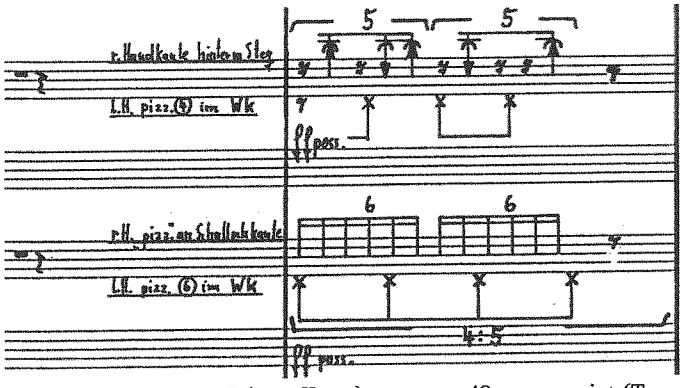
Compared to the sounds of other bi-tones, especially those tones produced directly behind the LH, the sounds of auxiliary tones produced behind the nut are quite unusual. Microtonal deviations and greater resonance imbue these tones with a strange, harp-like quality that some composers have used to great effect. In Example 3.23, from Kagel's *Marquez le jeu (à trois)* any three strings are to be plucked *außerhalb des Sattels* (*AS*)—in other words, behind the nut.



Example 3.23. Mauricio Kagel, *Marquez le jeu (à trois)* from: *Sonant*, system 2, measure 15, Edition Peters (Tempo: left to the performer)

The pitches produced behind the nut are very consistent from one guitar to another, so long as the instrument is in standard tuning. The highest tones emerge from the outer strings, due to the comparative brevity of string from nut to tuning peg. The lowest tones, meanwhile, come from the two middle strings. Occasionally, on guitars that have longer necks and headstocks, the pitches behind the nut may vary slightly from the norm.

In Example 3.24, guitarist 1 rubs the edge of the RH palm against the strings at the bridge while guitarist 2 taps a RH finger against the edge of the soundhole. Next, both guitarists use the LH simultaneously to pluck string 6 behind the nut, producing a strange, almost mechanical counterpoint between the two guitars. Oehring denotes all RH actions in this segment by notes with stems up, and all LH actions, by notes with stems down.



Example 3.24. Helmut Oehring, *Nr. 3* (aus: *Koma*), measure 43, manuscript (Tempo: ♩ = 44 ca.)

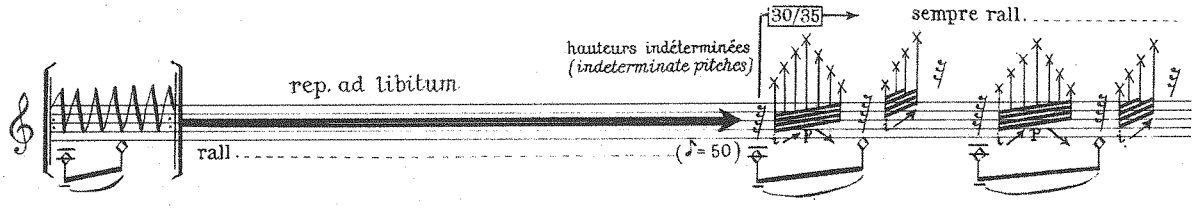
3.4 *Battuto*

Another way to produce bi-tones is by tapping the fingernails or a plectrum on the string. Such bi-tones are audibly much softer than those produced by LH or RH tapping because of the delicacy with which the actions must be executed. Customarily, when calling for *battuto* tapping, composers prefer to have the guitarist tap above the soundhole but dampen the string with the LH as this filters out auxiliary tones. Moreover, they will often notate a general trajectory for these bi-tones, since specific pitches beyond the fretboard are difficult to notate (Figure 3.8. and Example 3.25).

sons obtenus en percutant la corde avec la face externe de l'ongle. Selon l'emplacement où l'on frappe sur la corde, on obtient telle ou telle hauteur de note ,qui est parfois expressément notée : Par ex.:

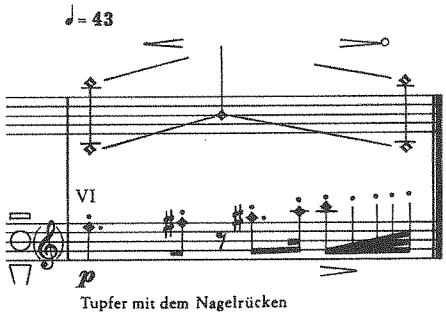
se trouve aux alentours d'une 33ème case hypothétique, soit à environ 9,5 cm du chevalet.

Figure 3.8. Murail's Battuto indication[109]



Example 3.25. Tristan Murail, *Tellur*, page 3, system 5, Éditions musicales transatlantique

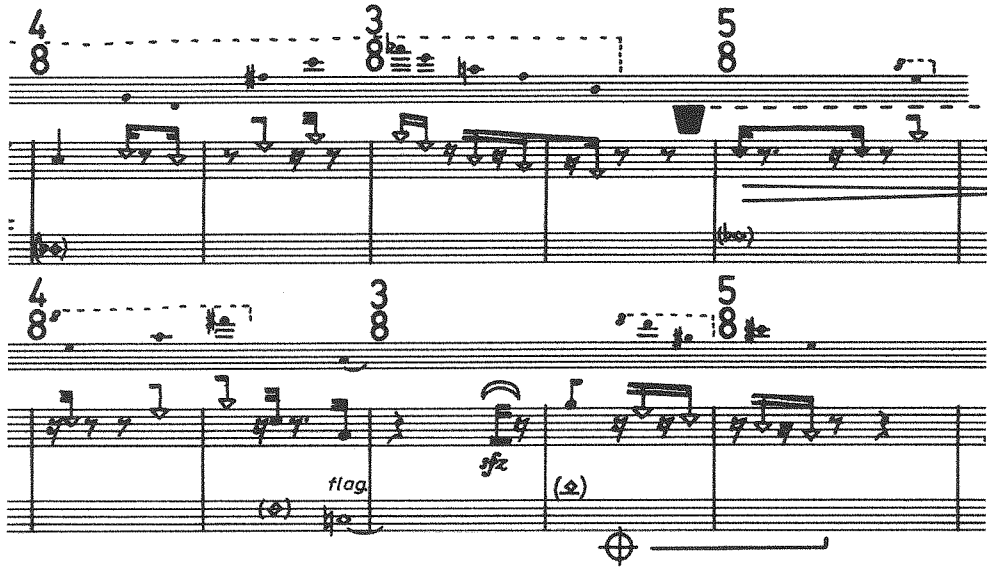
Schwehr calls for *battuto* to be executed with the top of the RH nails on string 6 between the sound hole and the bridge, as indicated by the action clef (Example 3.26). The notated pitches in the lower stave show the sounding result. On string 6, this means that the first notated *E* should sound three octaves above the open string. These pitches may be as difficult to elicit as they are to notate, precisely because they lie well past the fretboard. The LH is free to perform various actions while the RH performs the *battuto*. In this passage, the LH is gliding a glass slide up and down the strings (upper stave).



Example 3.26. Cornelius Schwehr, *sub-version*, measure 69, Breitkopf & Härtel (Tempo: ♩ = 43)

In Example 3.27, Lachenmann has the two guitarists (systems 1 and 2, respectively) bar harmonics across the strings with the LH while producing *battuto* attacks with a plectrum in the RH beginning on string 2 (the five line upper stave indicates string numbers 6 to 1). Lachenmann notates the sounding results in an additional stave above.

109 Legend translates as follows: Percussive sounds obtained by hitting the string with the face of the nail. According to the place where the string is hit, different pitches are heard. These pitches are sometimes explicity notated. (see ex.) This pitch can be found where a hypothetical thirtythird fret would be, i.e. at about 9.5 cm from the bridge). Tristan Murail, legend for *Tellur* (translation Seth Josel).



Example 3.27. Helmut Lachenmann, *Salut für Caudwell*, measures 180–184, Breitkopf & Härtel (Tempo: ♪= 100)

As mentioned, a *battuto* pitch is most audible when the LH dampens the strings, effectively filtering out the auxiliary tone of the bi-tone. In this case, the LH suppresses the auxiliary pitch produced by the string between the nut and the position of the *battuto* attack.

3.5 Guitar as percussion instrument

Music for the classical guitar has started to incorporate a plethora of percussive techniques, some but not all of them similar to approaches used on other string instruments. Tapping—in all its forms—is perhaps the most common of these percussive string methods. As the preceding examples suggest, some tapping may be vigorous enough to exert a strong percussive effect. There are, however, other techniques whose impact is literally more forceful and explicitly percussive in nature: these are *tambour*, which involves striking the strings, and *golpé*, which involves striking the wood. Although both methods have a fairly long history, they have begun to acquire new stature in the guitar music of the last several decades, at times to the point where they alter the function of the instrument.

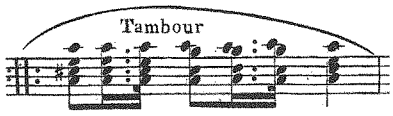
3.6 Tambour

Traditionally used in both flamenco and classical guitar, the tambour technique (also called *tambor* or *tambora* and abbreviated as *tamb.*), derives its name from the Spanish *tambor* for drum, whose sound it was intended to emulate.[110] Indeed, one *tambour* action is meant to mimic the sound of the timpani.[111] One of the earliest instances of the tambour indication can be found in the *Menuet du Tambour*, a short work included as one of the *Plusieurs Petites Pieces* published by Castro de Gistau in Paris in the first decade of the nineteenth century (Example 3.28).[112]

110 In modern usage, *tambora* actually denotes a two-headed hand drum from Venezuela with a low range that makes a low, deep sound like that of a bass drum.

111 Company refers to a type of tambour called *timpano* where one strikes the string with the fingertip of either *i* or *m* in front of the bridge. Company, *Las Seis Cuerdas*, legend, 4.

112 The composition is attributed to Antonio Abreu (1715–1820).



Example 3.28. Antonio Abreu, *Menuet du Tambour*, Andante movement, measure 20, Castro ed. (18--?) (Tempo: Andante)

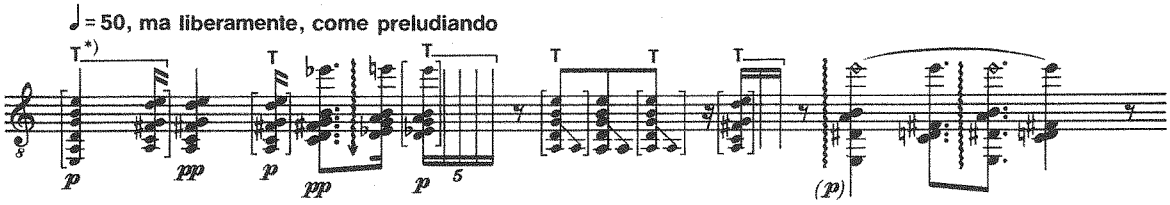
The earliest known discussion of the technique can be found in Aguado's *Escuela de Guitarra*, where it appears under the name *tambora*:

> The *tambora* consists in striking the strings while holding a chord (with the LH) near the bridge with the (RH) middle finger extended or even better, with the thumb (of the RH), giving in this instance a movement of a half turn (to the RH) in order that it fall flatly upon the strings.[113]

Modern implementation of the technique remains essentially consistent with Aguado's description. The guitarist most often extends the RH thumb and rotates the hand at the wrist causing the side of the thumb to strike the strings close to the bridge. On occasion, however, the guitarist may use the flat part of the open RH or the edge of the RH palm instead of the thumb. Typically, all six strings are struck, but it is possible to achieve variations in pitch by striking one or more strings selectively, for example, string 6 alone, strings 5 and 6, or sequential combinations of 3 or more strings. One can achieve variation in tone by striking different distances from the bridge and using different parts of the thumb, i.e., flesh versus bone.

3.6.1 Examples of tambour

Conjuring the mood of flamenco music, Berio's *Sequenza XI* opens with several instances of tambour, which are indicated by the *T* above the chords. In Example 3.29, the guitarist is to finger various chords with the LH, alternately using tambour or normal arpeggiation.

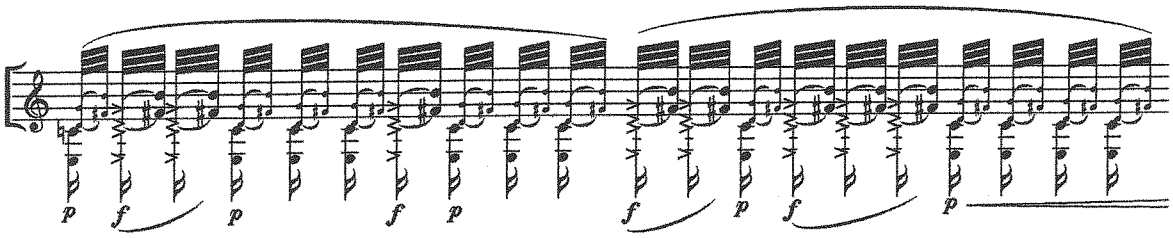


Example 3.29. Luciano Berio, *Sequenza XI*, system 1, Universal Edition

Berio's notation for the tambour is both very succinct and very effective. He uses a simple line to denote the duration of each tambour action. The line extends from the initial point of attack at the *T* to the point where the action ceases, providing a clear signal that proves particularly helpful when attacks are to be made in succession.

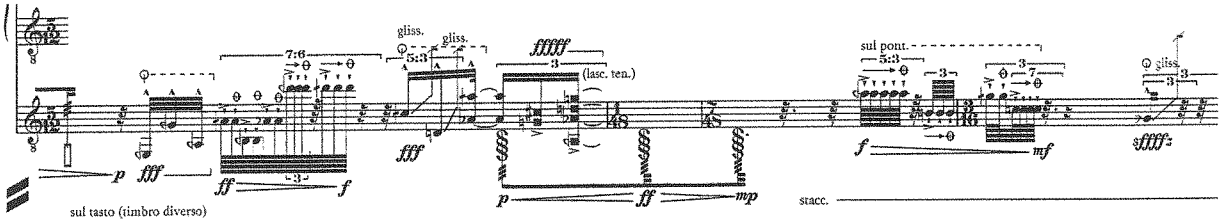
Pisati has the guitarist strike strings 4–6 with the RH thumb in tambour fashion, an action he designates with the open "beak" noteheads (Example 3.30). This gesture is followed immediately by a LH hammer-on on the indicated pitches (denoted by the upward stems), which gives the tambour a dark and distant timbre.

113 "La tambora consiste en herir las cuerdas de un acorde cerca del puente con el dedo largo estendido, y aun mejor con el pulgar, dando en este caso un movimiento de media vuelta á la mano, para que caiga de plano sobre las cuerda." Aguado, *Escuela de la Guitarre*, 48 (translation Eliot Fisk). Percussive effects are also described by Gil (*Principios de Musica*, 18) and Molino (*Méthode Complette pour la Guitare*, 123) who were roughly contemporaries of Aguado. See also Pujol, *Escuela Razonada de la Guitarra*, vol. 4, 141–144.



Example 3.30. Maurizio Pisati, *Caprichos de simios y burros*, 4. Asta su abuelo, page 8, system 4, manuscript (Tempo: ♩ = 72–76)

With a "double *S*" notation, Mahnkopf signals a tremolo "tambour" that is to be executed by rapidly patting the RH thumb or fingers directly on the bridge (Example 3.31). This action produces a pulsating, wooden, percussive sound that is accompanied by the sound of resonating strings, first from a normally plucked dyad and then from a tetrachord tapped by the LH (indicated by the square noteheads).



Example 3.31. Claus-Steffen Mahnkopf, *Kurtág-Duo*, measures 35–38, CSM (Tempo: ♪ = 30)

Composed specifically for an archtop guitar fitted with a tailpiece, Giancinto Scelsi's *Ko-Tha* (Example 3.32) treats the guitar primarily as a percussive instrument.[114] Toward this end, the performer is to lay the instrument flat across their knees, thus freeing both hands to execute a variety of percussive actions on its body and strings. The piece includes frequent tambour actions on the open strings, which are either left to resonate freely or occasionally damped to curtail the sound. These effects are denoted, respectively, by a half-circle and an inverted *v* above the chord (Figure 3.9).

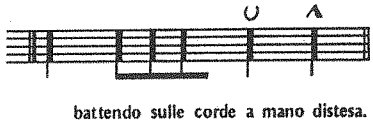
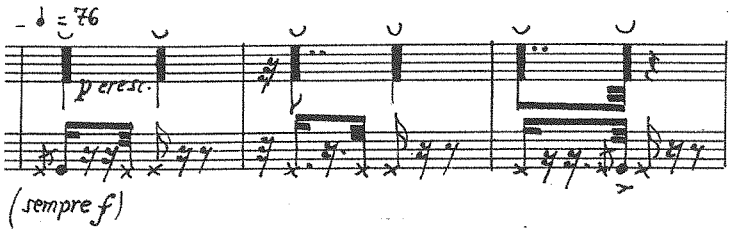


Figure 3.9. Excerpt from the legend for *Ko-Tha*[115]

In Example 3.32, from *Ko-Tha*, the top stave indicates actions on the open strings and the bottom stave indicates percussive actions on the body of the guitar. The guitarist performs the tambour actions notated in the upper stave. The *x* notations in the lower stave prompt percussive *golpé* actions that are executed with the joints of the LH fingers.

114 An archtop guitar is a steel-string acoustic or semi-acoustic guitar whose top and back are curved as on a violin.

115 Legend translates as follows: Strike the strings with the flat part of the hand. Scelsi, legend for *Ko-Tha* (translation Seth Josel).



Example 3.32. Giancinto Scelsi, *Ko-Tha*, Movement 3, measures 25–27, Editions Salabert

Muting a tambour action can create a truly percussive sound, as Figure 3.10, from a work by Gadenstätter, suggests. Here the composer asks the guitarist to strike the strings with the RH while muting the strings with the LH near the nut. The performer then essentially reverses the action by striking the strings with the LH against the fretboard while muting the strings with the RH near the bridge.

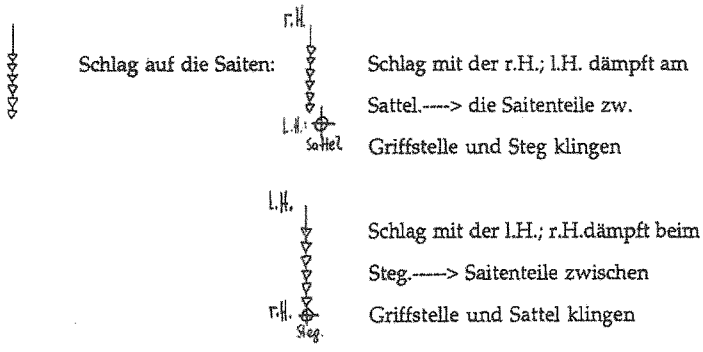
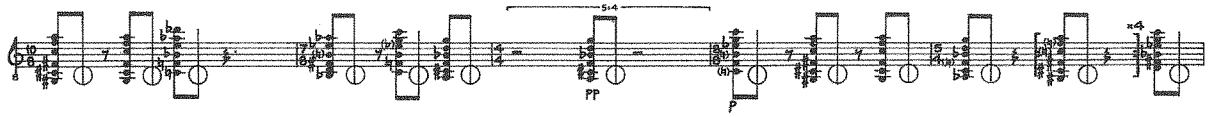


Figure 3.10. Clemens Gadenstätter, *variationen und alte themen*, legend, Ariadne Verlag[116]

3.6.2 RH muting as a percussive effect

The RH can also mute the strings more vigorously for percussive effect by striking them sharply in a tambour-like manner once they are sounding.
For a passage from his work *Chile* (Example 3.33), Christopher Fox has the guitarist first pluck a chord and then, at the circle prompt, thwack the strings over the soundhole with the RH fist. These strikes effectively—and abruptly—mute the sound of the chords. The sound of the RH fingernails hitting the strings should be part of the effect.



Example 3.33. Christopher Fox, *Chile*, page 5, system 3, Fox Edition (Tempo: ♩ = 112)

Shifting the location of forceful, percussive RH muting actions can induce timbral variation: performing such actions by the bridge (sul pont.), over the soundhole, or over the fretboard (sul tasto) will noticeably change the sounding results. Murail exploits these alternatives in his piece *Tellur* (Figure 3.11), in one instance including the proviso that the percussive sound of the RH action itself should be pronounced.

116 Legend translates as follows: Strike the strings; Strike strings with the RH while LH mutes at nut / → the portion of the string between the stopped position and the bridge should sound; Strike strings with the LH while RH mutes at the bridge / → the portion of the string between the stopped position and the nut should sound. Gadenstätter, legend for *variationen und alte themen* (translation Seth Josel).

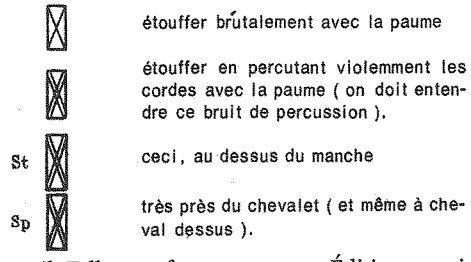
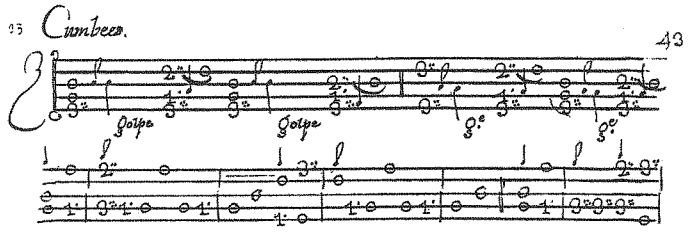


Figure 3.11. Tristan Murail, Tellur, performance notes, Éditions musicales transatlantique[117]

3.7 Golpé

Probably the earliest percussive action to emerge for use on the guitar was the *golpé*. This technique involves tapping the RH nails against the soundboard or, in the case of flamenco guitar, against the *golpeador* (tap plate), an early version of the pick guard built especially for this effect. Mention of *golpé* can be found as early as 1732, in Santiago de Murcia's *Cumbees* from the Saldivar Codex (Example 3.34).



Example 3.34. Santiago de Murcia, *Cumbees*, systems 1–2 (ca. 1732), Reprint. M. Lorimer

The *golpé* is traditionally performed with the ring finger or the little finger of the RH. It can be used independently for percussive effect, specifically to accentuate rhythmic syncopations. It can also be executed simultaneously with a down stroke on the strings by another RH finger (e.g., plucking with the index finger and *golpé* with the ring finger) so as to combine the sounds of plucked strings with those of percussive taps. Simultaneous *golpé* and arpeggiation of the strings, which requires two independent actions by the same hand, can pose some coordination issues and normally demands diligent practice and time to master.

3.7.1 Possible areas on the guitar to execute a golpé

The guitar lends itself well to *golpé* because the technique can elicit the different pitches and timbres associated with different regions of the soundboard.[118] However, many composers have extended the use of *golpé* to other, less acutely resonant parts of the instrument.

Possible areas on the guitar to execute a *golpé*	
1. Mid-soundboard or pick guard	Specifically between the soundhole and the bridge (this is the traditional locus)
2. Face	Anywhere on the soundboard apart from the traditional locus
3. Side	Generally on the upper side of the guitar facing the performer
4. Other areas	On the back of body, on the head stock, or on the back of the neck

Table 3.1.

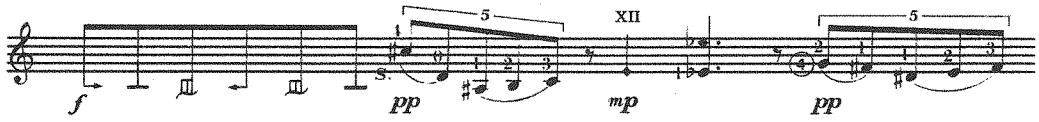
117 Legend translates as follows: Mute suddenly with the palm / Mute by slamming the palm on the strings (the percussive noise should be heard) / This effect is to be performed on the fingerboard / This effect is to be performed near the bridge (even *on* the bridge). Murail, performance notes for *Tellur* (translation Seth Josel).

118 *Golpé* will wear down—or even damage—the lacquer on the soundboard. Many practitioners therefore have a second instrument designed for more "abusive" playing techniques; some even have thin tap-plates affixed to their instruments as a protective device.

It is especially important to remember that the sounds *golpé* produces will differ not just from one area to another but also from one guitar to another, sometimes quite dramatically, as a consequence of the different woods and construction used in making the instruments.

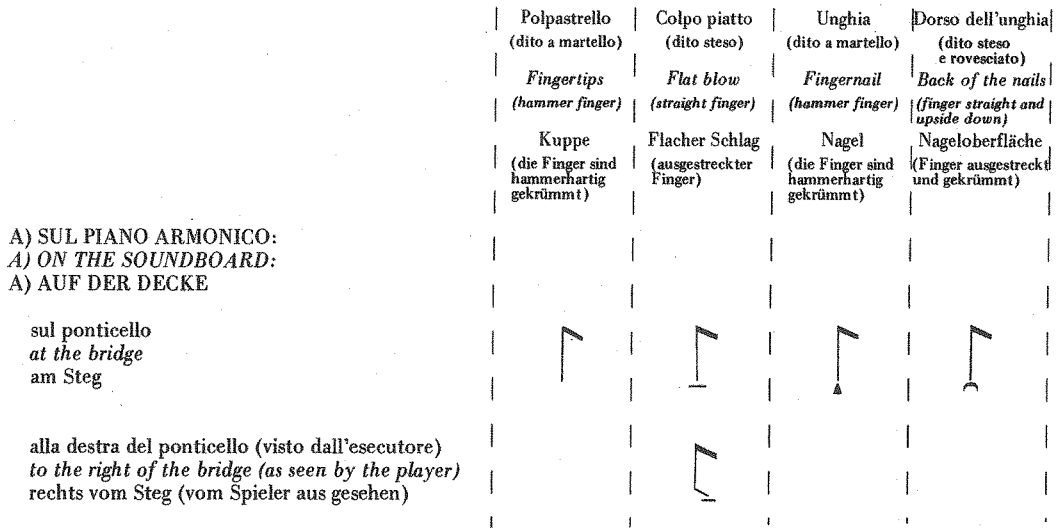
3.7.2 Diversified golpé

In *Algo*, Donatoni intersperses a florid passage of plucked and slurred notes with diverse *golpé* effects as part of a gradual integration of percussive noise into the music (Example 3.35). He distinguishes four modes and areas in which to strike the guitar: (a) striking the RH palm to the right of the bridge on the soundboard in a quasi-tambour fashion (arrow to the right); (b) striking the flesh of the RH fingertip on the bridge (inverted "T"); (c) rapid, successive striking of three or four RH fingernails on the upper side of the guitar where the specific area on the upper side is not specified (gracenote iteration); and (d) striking the flesh of an extended RH finger on the upper region of the soundboard to the left of the bridge (arrow to the left).



Example 3.35. Franco Donatoni, *Algo: Due pezzi per chitarra*, page 8, system 5, Edizione Suvini Zerboni (Tempo: ♩ = 49)

Bruno Maderna's *Aulodia per Lothar*, a duet for guitar and oboe d'amore, incorporates multiple *golpé* actions whose distinct effects are based on specific spatial parameters and hand articulations. Maderna borrows Company's notation for these various percussive actions (Figure 3.12):



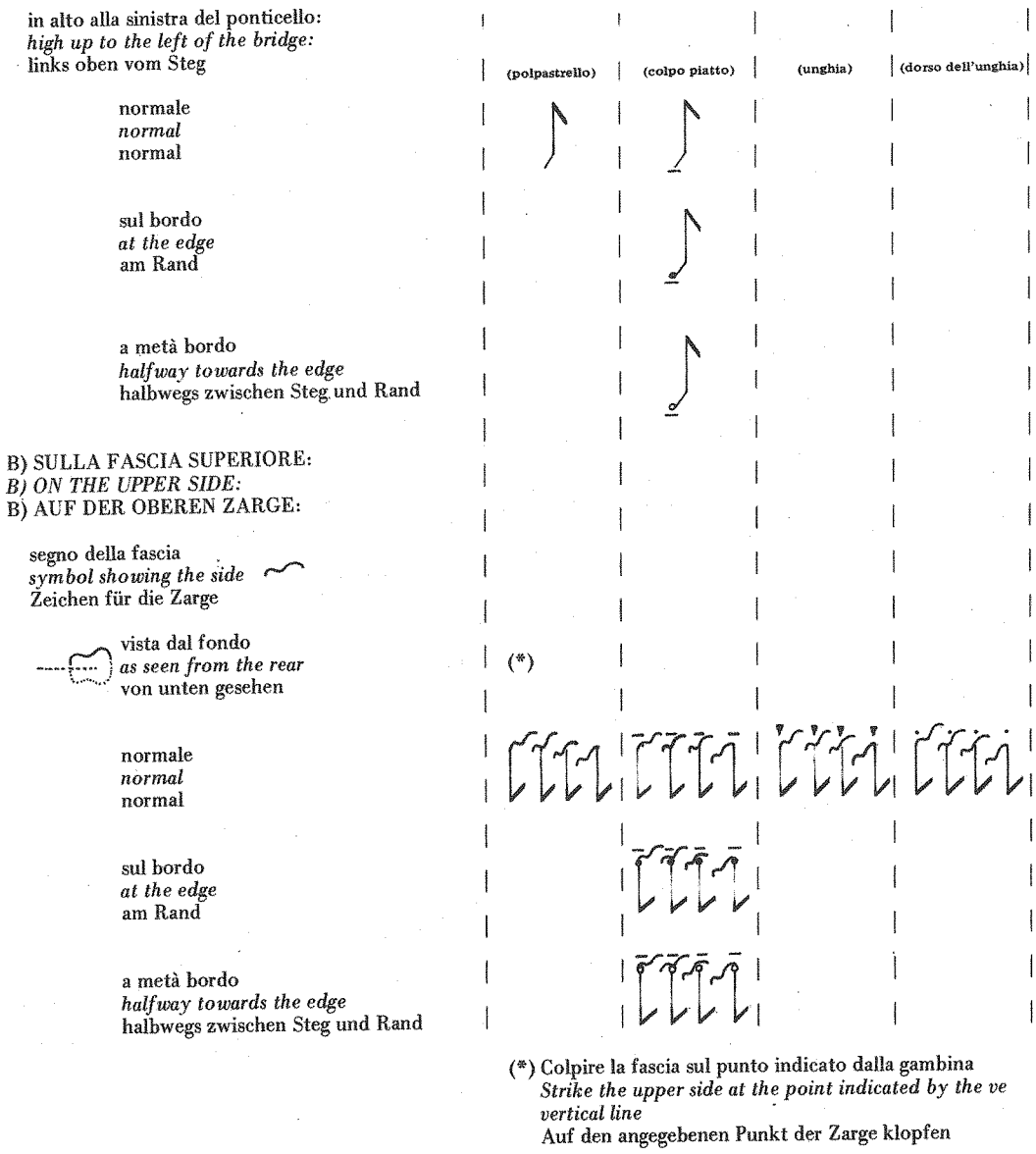


Figure 3.12. Maderna's percussive indications

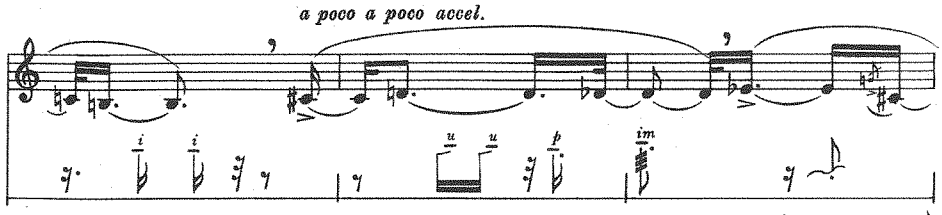
In *Aulodia per Lothar*, the RH articulations for striking the guitar include the fingertips, the outstretched finger, the fingernail, and the back of the fingernail with the finger(s) curled inward. The areas of the guitar to strike are stipulated as follows:

A. *On The Soundboard*: (a) on the bridge, (b) to the right of the bridge (behind the bridge), (c) on the upper side of the soundboard close to the soundhole ("normal"), (d) on the edge by the upper side, (e) halfway between the edge of the upper side and the soundhole.

B. *On The Upper Side* (front to back from the guitarist's perspective): (a) toward the outer edge away from the performer (no notehead), (b) halfway between the two edges (open notehead, 'normal' position), (c) toward the outer edge nearest the performer (closed notehead).

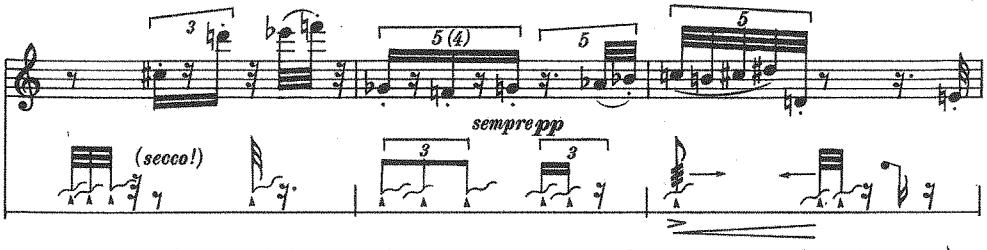
Positions along the upper side of the guitar: (a) closest to the fretboard, (b) at the top of upper bout, (c) at the trough, (d) at the top of the lower bout. The wavy line represents the upper side of the guitar and the downward stems point to the attack positions (a)–(d).

Maderna combines the articulations and locations above to create a rich percussive world with a bounty of timbral variation. In Example 3.36, the guitarist strikes on the bridge and to the right of the bridge with RH fingers outstretched (using the index, little finger, and thumb), and also executes a percussive tremolo on the bridge, alternating between the index and middle fingers. The passage concludes with a strike of the back of the nail on the upper side. These sounds lend a drum-like punctuation to a lyrical oboe d'amore line notated in the upper stave.



Example 3.36. Bruno Maderna, *Aulodia per Lothar*, page 6, system 2, Edizione Suvini Zerboni (Tempo: ♪= 100 ca.)

In Example 3.37, Maderna juxtaposes delicate fingernail strikes on various areas of the guitar's upper side against a generally staccato line in the oboe, generating a fine percussive counterpoint.



Example 3.37. Bruno Maderna, *Aulodia per Lothar*, page 7, system 4, Edizione Suvini Zerboni (Tempo: ♪= 120 ca.)

3.8 Percussive map

Below is a series of schematic diagrams showing the areas on the guitar for executing percussive RH strikes, as well as the relative differences in timbre of specific articulations in these areas. The diagrams are confined specifically to those combinations that are sufficiently differentiated in sounding result for the differences to be audible (Figure 3.13). (There are no doubt further, subtler gradations in timbre, but it would be impractical to illustrate them here.) Each diagram is specific to a region on the guitar, since each region possesses a different overall timbre. These regional "maps" are ordered from brightest to dullest in timbre as follows: front (with edge of face), side, back, and neck. Corresponding to the map of each region is a scale of the timbral qualities of each strike/location, from dark and "low" to bright and "high". Four strike articulations are also ordered from brightest to dullest in timbre: nail, back of nail, outstretched finger, and knuckle. The scale assumes that the strings are dampened with the LH and that the guitar is struck with the same force.[119]

119 Our analysis was conducted with two different guitars: Imai "special" classic and Southwell A-series classic. The Southwell A-series classic guitar has a German spruce soundboard, Indian Rosewood back and sides, a maple neck, and an ebony head and fretboard. The Imai classic guitar has a cedar wood soundboard, Brazilian Rosewood back and sides, a mahogany neck, and an ebony head and fretboard.

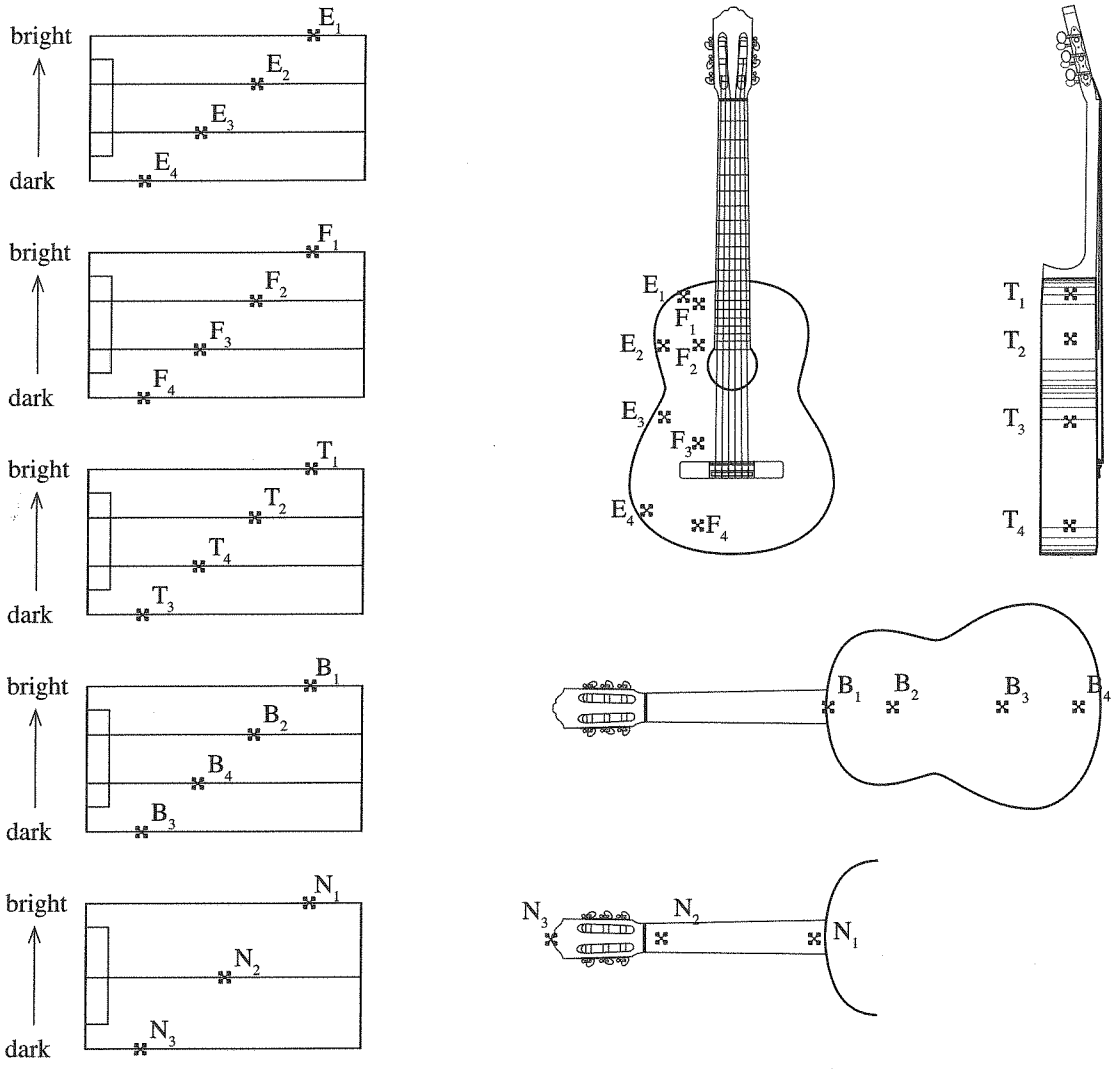
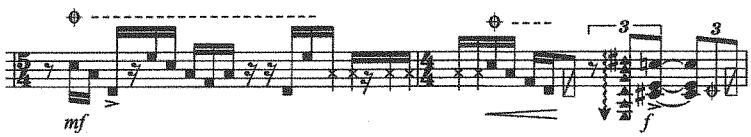


Figure 3.13. Percussive map. The letters show the timbral gradations that correspond to positions on the guitar.

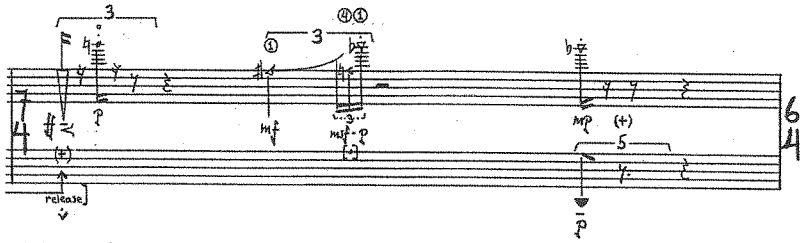
3.8.1 Further extensions of golpé

In Example 3.38, the strings of the guitar are dampened with the flat part of the RH. Five positions on the soundboard are assigned to the four fingers and thumb of the RH used to strike it. The percussive attacks are notated with square noteheads. The passage also features LH tapping (*x*-noteheads) with dampened strings, a LH tambour strike on the fretboard (open box with diagonal), and a *güiro*-like arpeggiation of the strings on the bridge. At the very end of the passage, a RH tambour on the strings (the circle with a '+') is immediately followed by a LH tambour on the fretboard.



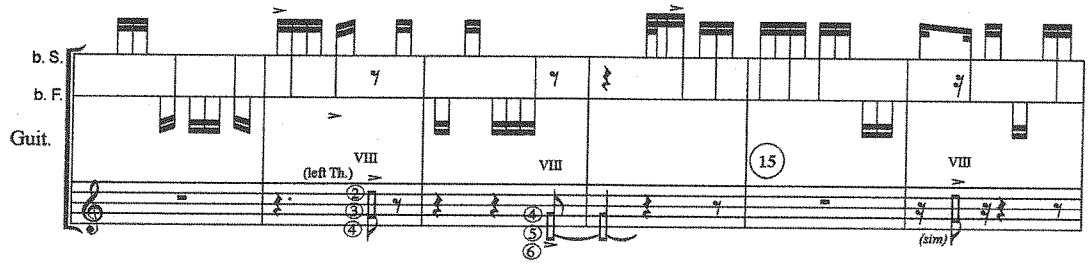
Example 3.38. Elena Mendoza, *Breviario de espejismos*, measures 45–46, Edition Peters (Tempo: ♩ = 112)

For a passage in *Downstream* (Example 3.39 at the end of the measure), Levine has the guitarist strike the heel of the LH against the backside of the guitar's neck opposite the tenth fret, an action not unlike a tambour. (The action is indicated by the shaded arrowhead in the lower stave.) This gesture produces a gentle boom, akin to the sound of a tam-tam. At the same time, the RH is lightly touching string 1 with half harmonic pressure (denoted by the open triangle in the upper stave) and simultaneously plucking it, producing an effect that accentuates the subdued resonance of the LH action.



Example 3.39. Josh Levine, *Downstream*, Movement 1, measure 65, manuscript (Tempo: ♩ = 60)

The performer in Pisati's *Caprichos...* must hold the guitar rotated on their knees so that the strings face them. This position frees the two hands to perform a variety of percussive actions on the back of the instrument. These actions are notated in the two lines above the stave (Example 3.40): the upper line shows areas for RH strikes on the back of the soundbox, and the lower line shows locations for LH strikes on the back of the neck. Barré chords fingered occasionally by the LH thumb punctuate this series of events. The reversal in fretboard orientation leads here to an elegantly simple inversion of the customary roles of the LH fingers and thumb: while the fingers tap the back of neck as if playing on the strings, the thumb assumes the usual part of the fingers by barring the notes of a chord.



Example 3.40. Maurizio Pisati, *Caprichos de simios y burros—Brabisimo!*, measures 11–16, manuscript (Tempo: left to the performer)

For *Ko-Tha*, which was introduced in the section on tambour, Scelsi specifies four ways of striking the body of the instrument (Figure 3.14), but distinguishes only between the soundbox and the tailpiece, which for this work has been added behind the bridge. (Recall that *Ko-Tha must* be played on an archtop guitar that includes a tailpiece similar to a cello's.) In the score, notations on the lower staff (see Example 3.32) signal the manner of RH percussive attack.

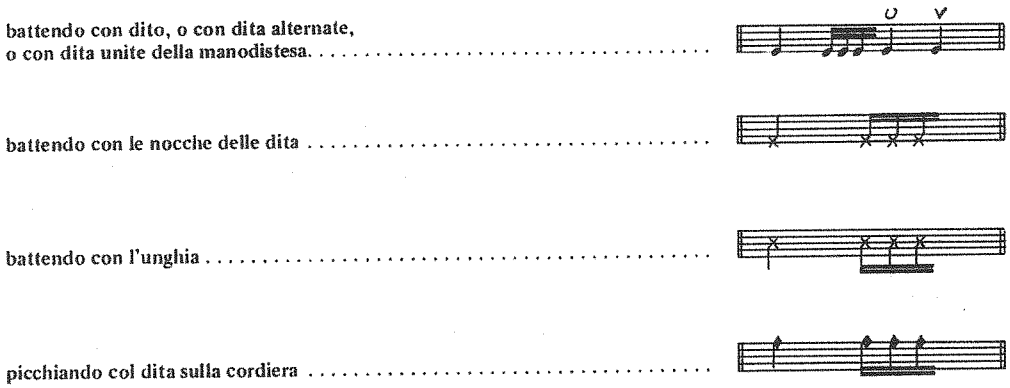
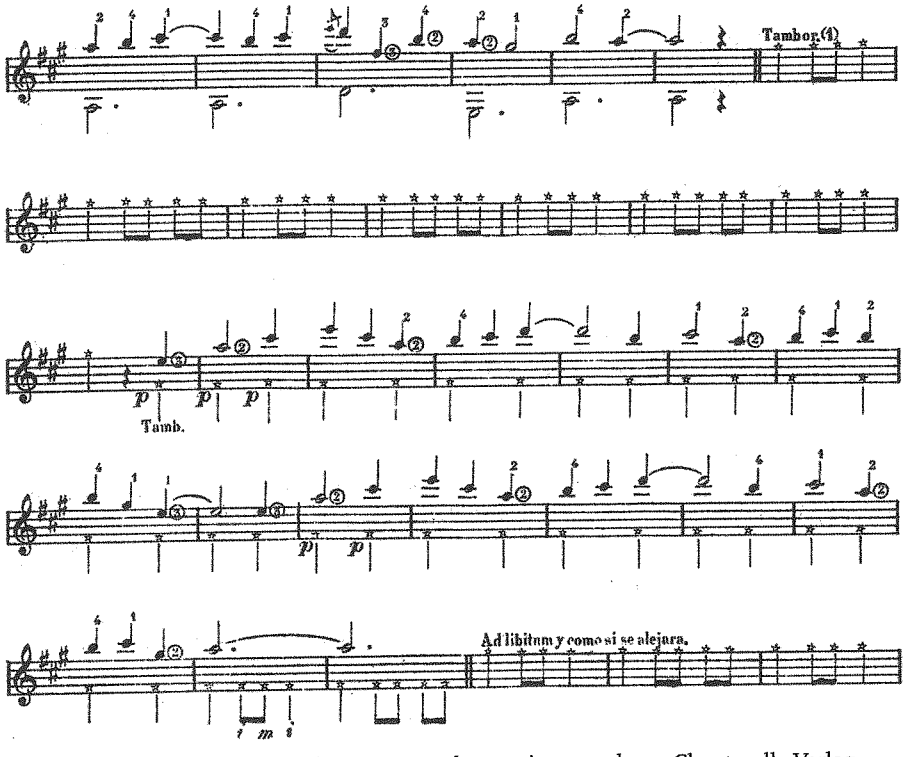


Figure 3.14. Giancinto Scelsi, *Ko-Tha pour guitare traitée comme un instrument de percussion*, legend, Éditions Salabert[120]

3.9 Tamburo

Another percussive approach used by guitarists is the *tamburo* or "snare-drum effect," which is wrought by twisting or crossing two strings together with any LH finger so that they "rattle". This technique has been employed at least since the latter half of the nineteenth century when guitarist–composers such as Tárrega began experimenting with it in pieces like the *Gran Jota* (1872) (Example 3.41).[121]



Example 3.41. Franciso Tárrega, *Jota sobre motives populares,* Chanterelle Verlag
(Tempo: "Jota," a fast dance in triple meter)

120 Legend translates as follows: Strike with the flesh of one RH finger, or with alternate fingers, or with the fingers bunched together while keeping the hand supple (solid notehead) / Strike with the knuckles of the RH fingers (*x-noteheads*, stems up) / Strike with the nail of any RH finger on the body (*x*-noteheads, stems down) / Strike with the flat of any RH finger on the tail-piece (shaded diamond note heads) Scelsi, legend for *Ko-Tha* (translation Seth Josel).

121 The definitive authorship of this work has yet to be determined. Indeed, it is probably a combination of various arrangements by individual artists in Tárrega's circle, possibly including Fortea and Alier.

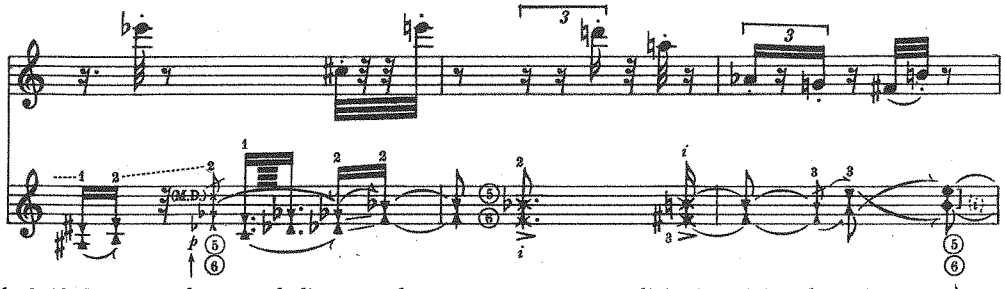
Tamburo is easiest to achieve by crossing the strings near the twelfth fret since they are most flexible at this point, but it can be implemented wherever the strings can be bent. Although nylon strings can work, wound strings produce a more pronounced effect because of their greater resonance. Typically, tamburo will produce shadow pitches, which are affected by the choice of juncture along the strings. Where the strings are crossed, which strings are used and, of course, the musical context will all influence how much time the guitarist needs to prepare the technique.

Figure 3.15 shows an instance of tamburo where strings 5 and 6 are crossed at the 6th position, and also denotes the audible result. Generally, the audible pitches sound a semitone above the stopped position where the strings are crossed.

Figure 3.15. A tamburo implementation (left) and its sounding result (right)

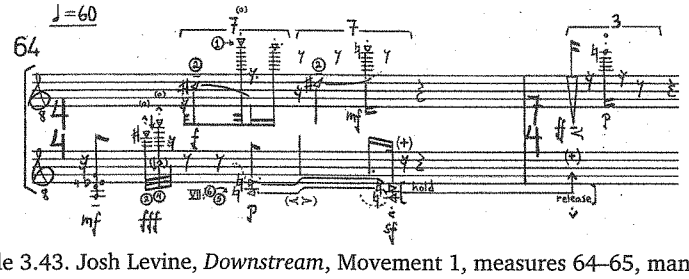
3.9.1 Examples of tamburo

In Example 3.42, Maderna combines normally plucked tamburo with tambour. The guitarist is to cross the fifth and sixth strings and then strike them percussively with side of the thumb. Maderna uses shaded triangular noteheads to indicate the tamburo and *x*-noteheads for the tambour.



Example 3.42. Bruno Maderna, *Aulodia per Lothar*, page 8, system 2, Edizioni Suvini Zerboni (Tempo: ♪= 120 ca.)

Releasing strings from a tamburo generates a noise of its own, a sound which may well be unwanted, and which the guitarist must work to suppress; however, a few composers have chosen to emphasize this reverberation for its own effect, as Levine has done in Example 3.43. Here, the guitarist crosses the fifth and sixth strings at the 7th position and then glides up to the 8th position while keeping the strings crossed. That position is held until the next measure when the crossed strings are audibly released, with no attempt to damp the sound. The release is accompanied by a whisk of the flattened RH fingers up the fretboard. Levine designates the tamburo strings using sideways triangular noteheads, and their release with an upward arrow, both on the lower stave. The RH gesture is shown in the upper stave with large triangular notehead.



Example 3.43. Josh Levine, *Downstream*, Movement 1, measures 64–65, manuscript

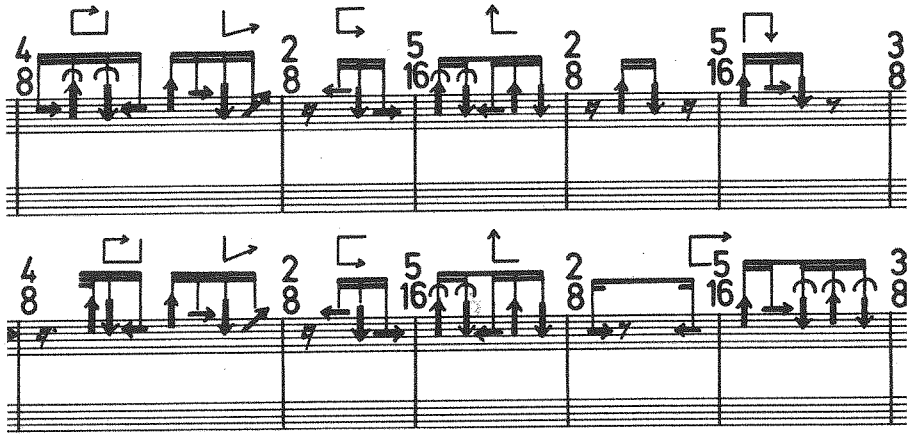
3.10 Brushing/Rubbing/Scraping

A few percussive techniques actually send vibrations in a different, "abnormal" direction through the string. Most techniques induce vibrations across the string with the sound waves moving perpendicular to the direction of propagation, but certain actions—namely, scraping, brushing, rubbing and whisking—can activate vibrations along the string, either in addition or instead.

Scraping is usually done with a fingernail or a plectrum. The actions can be either continuous or discrete, in which case they produce iterative clicks along the string(s) that can even be rendered rhythmically. With scraping, the string still vibrates to some extent in the normal mode, and any pitches that result change depending on where the scrape/scraping occurs. Thus, one can scrape either up or down the string and create a pitch glissando despite the fact that the vibrations *along* the string remain constant.

Brushing or whisking (a faster brushing action) can be performed with either or both the right and left hands. In contrast to scraping, these techniques attenuate a string's normal vibrations to the degree that only the vibrations along the string are heard. Thus, when brushing or whisking the most significant factor for the timbre of a string's longitudinal vibrations is its mass: the thicker the string, the lower the pitch of vibration.

The strings can also be rubbed, brushed, or whisked with the RH held in a flattened but upright (i.e., knife-like) position. As the side of the palm moves across and against the strings, each individual string acts as a point of resistance, which creates a distinctive percussive effect. This technique works particularly well when the hand continuously and/or rhythmically whisks over the strings in alternating directions, across and along them. In Lachenmann's *Salut für Caudwell*, for instance, players are to move the RH up across the strings from lowest to highest, along the strings toward the nut, back down across the strings from highest to lowest, and then finally along the strings again but in the direction of the bridge, thus creating a continuous square.

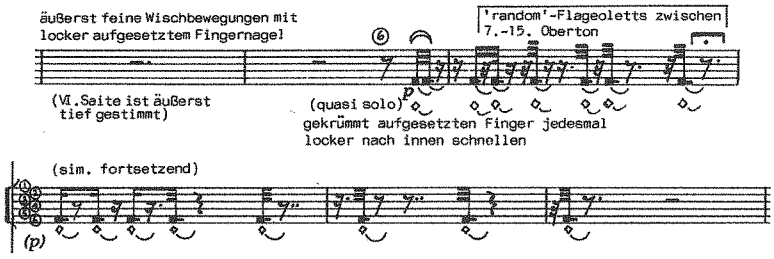


Example 3.44. Helmut Lachenmann, *Salut für Caudwell*, measures 483–487, Breitkopf & Härtel (Tempo: ♩ = 54)

At another point (Example 3.44), two guitarists, both adopting the same knife-like hand position, are to run the RH first along, and then across the strings on the saddle of the bridge, in the directions indicated by the arrows. Lachenmann denotes the saddle locus by a semi-circle on the stem. (Both composers and performers should be advised that extensive rubbing on the saddle with the side of the palm can easily irritate the skin.) These successive actions in different locations

produce noticeably different timbres. As the passage continues, the hands are supposed to move up, down, across, and diagonally over the strings, although not necessarily in that order.

In another piece by Lachenmann (Example 3.45), the guitarist is to hold the thumb of the RH at a right angle to the open sixth string and scrape the string with the nail in short, jerking motions. Different harmonics emerge, with the scraping sound followed by a harmonic resonance.



Example 3.45. Helmut Lachenmann, *"...Zwei Gefühle...,"* Musik mit Leonardo, measures 330–334, Breitkopf & Härtel (Tempo: ♩ = 50)

In Figure 3.16, an excerpt from the legend for Ambrosini's *RAP*, the LH, imposing only half harmonic pressure, is to rapidly "scratch" back and forth along the strings. These events are denoted by half-shaded diamond noteheads and zigzagging lines. The intent is to obtain a sound resembling the "squish-squish" of a disk jockey spinning a 33-rpm record to and fro on a turntable.

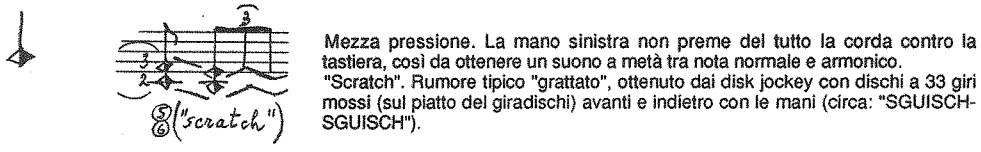
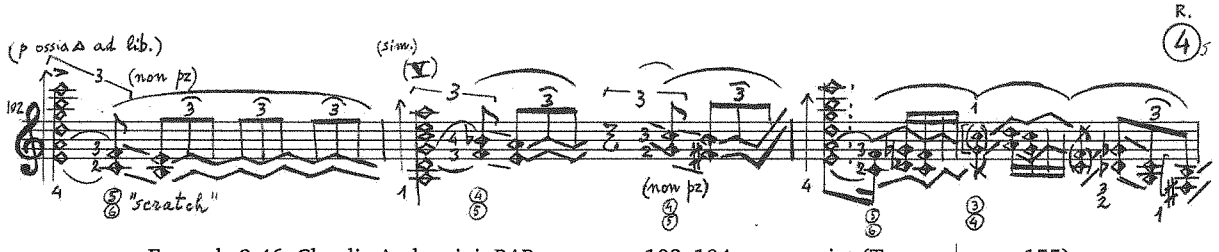


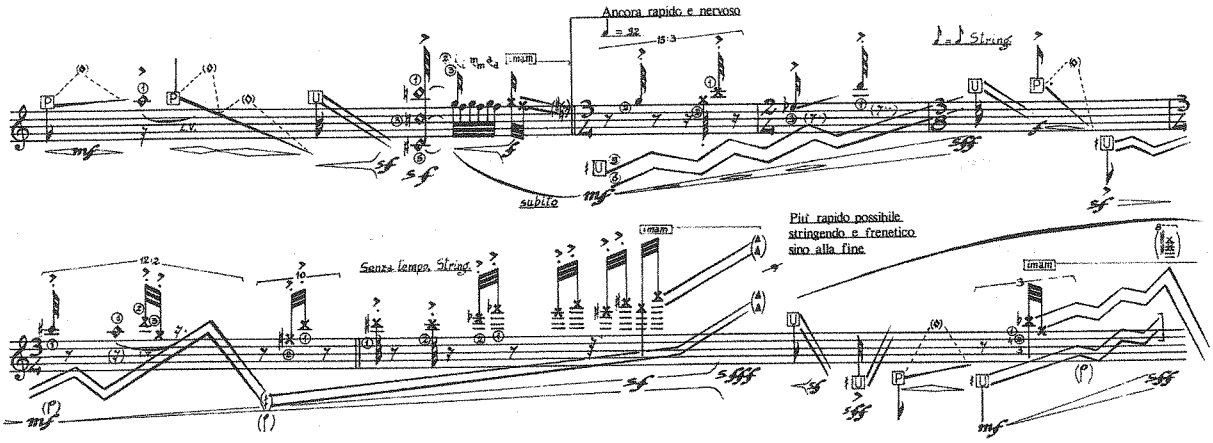
Figure 3.16. Claudio Ambrosini, *RAP*, legend, manuscript

In Example 3.46, one can see the half harmonic "scratch" in its musical and gestural context.



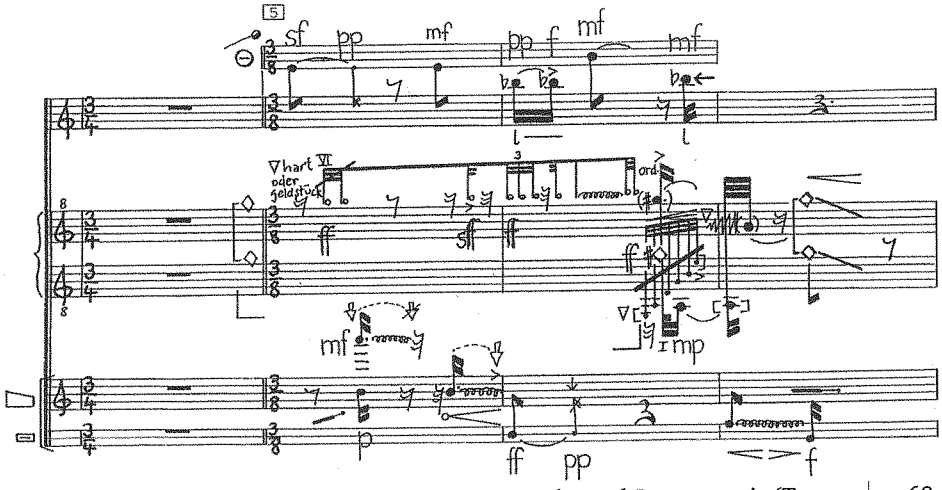
Example 3.46. Claudio Ambrosini, *RAP*, measures 102–104, manuscript (Tempo: ♩ = ca. 155)

In Example 3.47, Pisati has the performer place the LH thumbnail between the fifth and sixth strings and scrape along them in a glissando action.



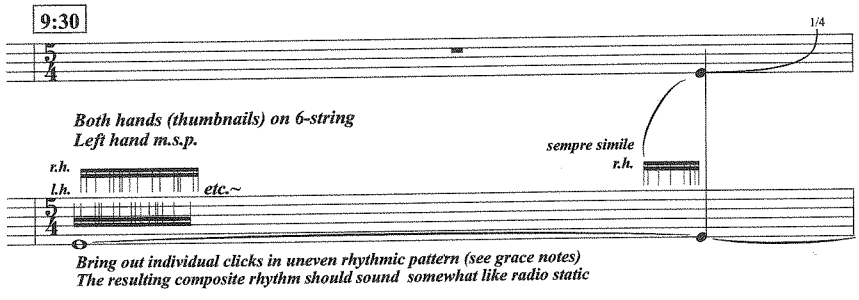
Example 3.47 Maurizio Pisati, *Sette Studi*, Studio 6, page 22, systems 2–3, Ricordi

The guitarist in Spahlinger's *música impura* (Example 3.48, middle two staves) is to scrape string 6 with either a plectrum or metal coin in order to elicit discrete "clicks" along the winding of the string. Spahlinger does not specify the locus of the scraping action on the string but does notate each click with a small circle, a few of which he follows with a curlicue to indicate the scraping noise succeeding them.



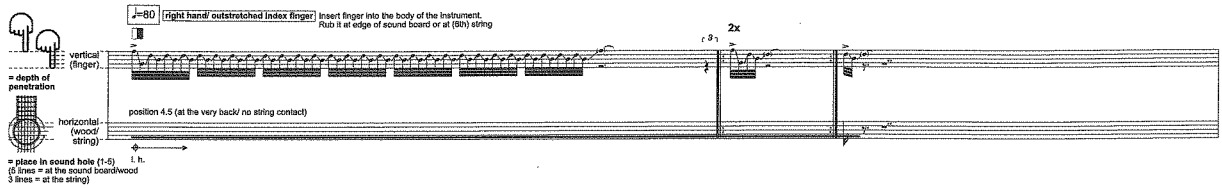
Example 3.48 Mathias Spahlinger, *música impura*, page 5, rehearsal 5, peer music (Tempo: ♩. = 68 –72)

Chris Mercer has the performer slowly scrape both thumbnails along the sixth string (Example 3.49). Because of its slowness, this action produces a noise similar to radio static.



Example 3.49 Chris Mercer, *A Snowball's Chance*, measure 212, manuscript (Tempo: ♩ = 48)

Rubbing or whisking actions by the RH can also be produced on the body of the guitar, as shown in Example 3.50. Here the performer rubs the RH index finger in a tremolo-like manner across the wooden edge of the soundhole, creating a dry and airy chafing sound.



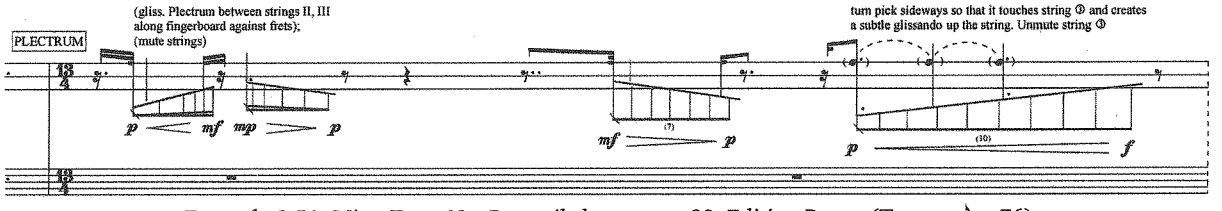
Example 3.50. Stefan Beyer, *Schabefleisch*, page 5, system 1, manuscript

3.10.1 Güiro/"Guero" actions

The frets on the guitar can serve as points of resistance, much like the corrugation on the side of the *güiro*, a traditional Latin American percussion instrument. A plectrum drawn along the fretboard will catch on the frets, producing *güiro*-like sounds that grow progressively "brighter" as the device moves toward the nut, and "darker" as it moves toward the soundhole, according to the varying reverberative qualities of the instrument.[122] The composition and thickness of the plectrum (or fingernail) will also influence the timbral results.

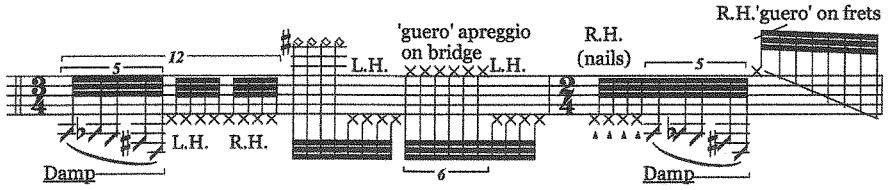
In addition to these iterative sounds, it is possible to produce glissandi, simply by turning the adjacent strings as it moves along the fretboard. In the saddle area behind the bridge, the strings are sufficiently stiff to substitute for frets and will "click" as the plectrum or fingernail draws across them. This action can be executed over all six strings, or selectively on specific strings. The different densities of the strings affect the timbre of the "*güiro*" only minimally.

Tsao achieves a *güiro* effect by having the guitarist run a plectrum between strings 2 and 3 along the fretboard against the frets (Example 3.51). The plectrum is later turned to touch string 2, producing a pitch glissando as it is drawn along the string.



Example 3.51. Ming Tsao, *Not Reconciled*, measure 80, Edition Peters (Tempo: ♪= 76)

In Example 3.52, the *güiro* effect along the fretboard contrasts with the *güiro* effect across the strings behind the bridge.

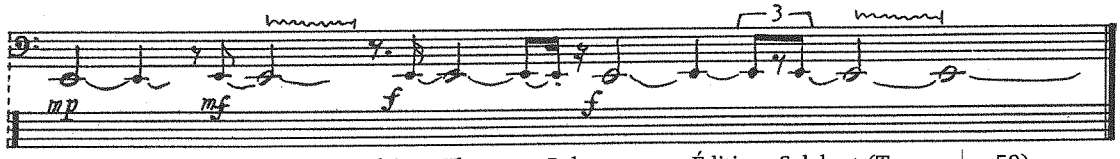


Example 3.52. Simon Steen-Andersen, *in-side-out-side-in...*, measures 176–177, manuscript (Tempo: ♩ = 80 ca.)

122 The *güiro* effect has also been referred to in the literature as the "guero" technique, based on earlier (mis)spellings of the instrument's name.

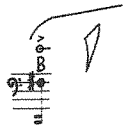
3.11 String Buzz

Once a string is vibrating, a buzzing noise can be produced by gently touching the string with a fingernail or a plectrum. In Example 3.53, the performer is to pluck the string and let it vibrate against the nail. The wavy line above the note indicates the action.



Example 3.53. Giancinto Scelsi, *Ko-Tha*, page 5, last system, Éditions Salabert (Tempo: ♩ = 50)

A similar effect can be achieved with the LH after a string has been attacked by slowly releasing pressure on the string so it "rattles" slightly against the fret. Alternatively, the vibrating string can be left to "rattle" against a fingernail, a technique Hans-Joachim Hespos invokes in Example 3.54. Here, the sideways Bartók pizzicato sign denotes the "rattling" sound and the "B" tells the performer to place the LH finger squarely on the fret. The positioning of the LH finger is important since, as it lightly touches the string, it will tend to induce harmonics in addition to the desired buzz.



Example 3.54. Hans-Joachim Hespos, *KITARA*, page 5, system 1, Hespos Verlag

Ambrosini indicates a "buzz note" with a wavy line around the note's stem (Figure 3.17). In this instance, the LH finger is stopping the $C^{\sharp}$ on string 5. The idea is to tilt the finger forward just enough to cause the open string 4 (*D*) to buzz slightly against it. This process is then repeated on strings 4 and 3 with the $F^{\sharp}$ and *G* respectively.

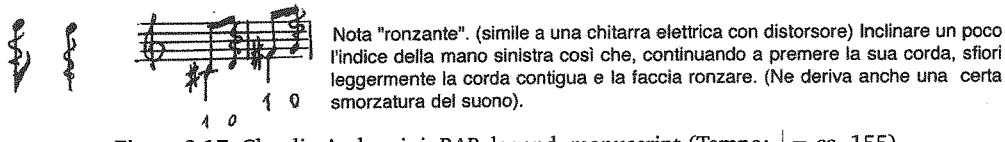
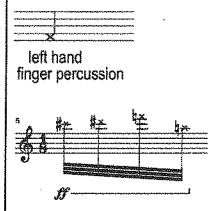
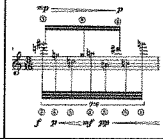
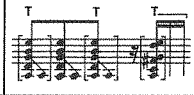
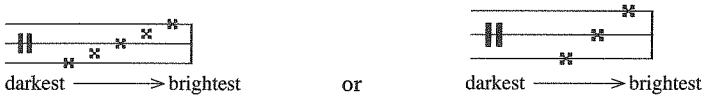


Figure 3.17. Claudio Ambrosini, *RAP*, legend, manuscript (Tempo: ♩ = ca. 155)

3.12 Notational conventions

Below is a table of select, recommended notation for specific guitar percussive techniques.

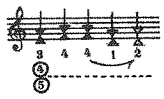
Recommended notation for percussive techniques on the guitar[123]	
LH Tapping	× = Tonerzeugung durch Fingerkuppenschlag 
Auxiliary tone (plucking a string between the nut and the stopped note).	The square notehead indicates the LH stopped position and not the sounding result. The sounding result occurs upon plucking the string between the stopped position and the nut. ■ = Saite zwischen gegriffenem Ton und Sattel anzı 
RH Tapping	= RH Tapping If the composer wishes to elicit certain bi-tones from RH and LH tapping, notating the auxiliary tones in an upper stave can prompt the guitarist to draw them out as much as possible. If bi-tones are unwanted, then a dampening sign can be indicated for the LH.
Battuto (with plectrum or nails)	Indicate the string number and relative position in which to execute the *battuto*: if the *battuto* is to be executed past the fretboard, it is advisable to indicate the locus with an action clef representing the instrument from the edge of the fretboard to the bridge; if the *battuto* is to be executed on the fretboard, it is best to specify the position with notated pitches. A smaller stave indicating the precise sounding pitches resulting from the *battuto* action may also be helpful.
Tambour	"T" with chord in brackets [ ] 
Golpé	Notate the rhythm with *x*-noteheads on a percussion stave below the guitar staff.
Extended percussive actions 1	a) Notate the rhythm of the action with *x*-noteheads on a percussion stave below the guitar staff.  b) Either include general areas for executing the action (e.g., on the bridge, soundboard, side, etc.) or draw more specific positional notations (e.g., precise locations on the front, back, etc.) under the corresponding noteheads. Also indicate if one is to strike with the fingertips, flat of the finger, fingernail, back of the nails, or knuckle. (See Figure 3.13)
Extended percussive actions 2	a) Indicate a scale of brightness on a stave below the guitar stave, but with no locational notations. The number of lines on the stave will depend on the extent of the scale—i.e., use a three-line stave if only three degrees of brightness are needed. Map the degrees of brightness from darkest to brightest, starting on the lowest line. The guitarist is then free to choose the area(s) on their specific instrument to accommodate the given scale 

123 Sources for the notational exemplars in Table 3.2 are as follows: LH tapping and auxiliary tones, Hübler's *Reißwerck*, measure 5; auxiliary tone, Hübler's *Reißwerck*, measure 3; Tambour, Berio's *Sequenza XI*, system 1; Tamburo, Maderna's *Aulodia per Lothar*, legend,

Tamburo

Indicate the fret position (i.e., at the notated pitches) for the action, and the string numbers for the strings to be crossed. The pitch result for the tamburo depends on where along the strings the LH crosses them.

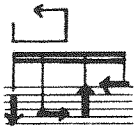
"Tamburo" – incrociare (con un dito M.S.) le due corde indicate, sovrapponendo la più bassa, quindi premerle ambedue (collo stesso dito) sul tasto corrispondente alle note (i suoni risultano circa un semitono sopra).
"Tamburo" – cross the two strings shown with the l.h., the lowest string on top, then press both at the fret shown with the same finger (the sounds are about a semitone above the pitch shown).
"Tamburo" – (mit einem Finger der M.S.) werden die beiden bezeichneten Saiten überkreuzt, indem man die tiefere über die höhere legt; dann drückt derselbe Finger sie am Bund, der den geschriebenen Noten entspricht, nieder. (Die Töne fallen um ungefähr einen halben Ton höher aus).



Esempio di "tamburo" con cambiamento di note sulle stesse corde incrociate – si ottiene sulla tastiera con una diteggiatura uguale a quella usata per variare l'intonazione di una sola corda.
"Tamburo" with crossed strings but altering the pitch of sounds: this is done by fingering on the frets in the usual manner.
Beispiel "Tamburo": die Noten auf den verschränkten Saiten wechseln – ausführbar mit derselben Griffbretttechnik, mit der man die Stimmung einer Saite wechselt.

Brushing/Rubbing[124]

Wischbewegungen mit der Handfläche über alle Saiten jeweils in Pfeilrichtung;



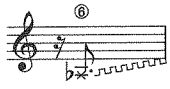
die Zeichnung über einer Notengruppe deutet die resultierende geometrische Figur der Wischbewegung an, die auf der Saitenoberfläche auszuführen ist

Wischbewegungen (wie oben) mit der Handkante über den Steg

For an accelerated (i.e., whisking) motion, use an arrow curving up; for a decelerated motion (i.e., brushing), use an arrow curving down. The radius of the curve can indicate the duration of the action: the steeper the curve, the shorter the duration and vice versa.

Scraping

Notate the rhythm precisely, preferably with a corrugated line. The line should extend diagonally up or down in the direction of the scrape. If the scraping occurs over the fretboard, then indicate the position where the scraping begins along with the string number(s).



If the scraping occurs beyond the fretboard, indicate the general area where the scraping occurs along with the string number(s) (the latter can be placed on an action stave below the main guitar stave).

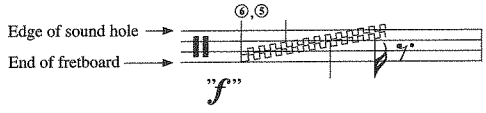


Table 3.2. Suggested notations for percussive techniques on the guitar

124 Legend translates as follows: Brushing movements of the hand across the strings in the arrow's direction / The figures depicted above the groups of notes suggest the resulting geometrical shape of the brushing movement that is to be executed on the surface of the strings / Brushing movements as above with the side of the hand above the bridge. Lachenmann, legend for *Salut für Caudwell* (translation Seth Josel).

3.13 Foreign objects

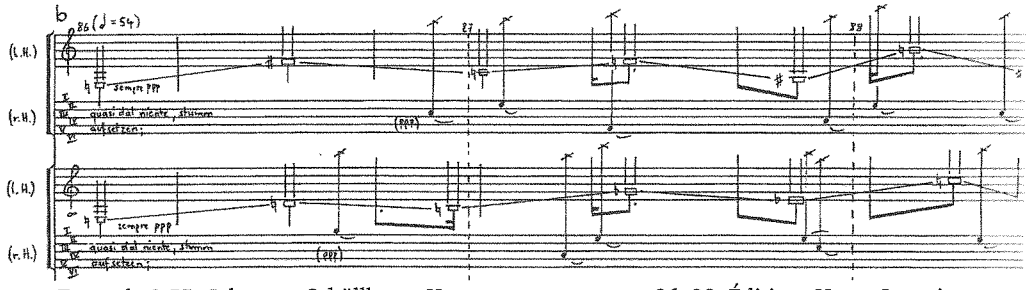
The utilization of "foreign" objects as means of either plucking or stopping the strings, or of striking the rest of the instrument, has further extended the percussive uses of the guitar. Indeed, just as the quest for new timbres has brought an array of novel devices into percussion music, so too has it greatly expanded the variety of implements and preparations in the guitar repertoire.

3.13.1 Slide

One of the first foreign objects to have found its way into contemporary music for the classical guitar was the *slide*—often referred to as the "bottleneck" slide—which was borrowed from early American blues music. This tubular device generally fits over the LH little finger or ring finger and is used to stop the strings lightly as they are plucked. The slide can move up and down the fretboard so smoothly that it effectively negates the frets, allowing for microtonal shadings and seamless glissandi, and ultimately produces a shimmering effect. Bottleneck slides can be made from any one of a number of materials including glass, metal, and ceramic. They also come in varying thicknesses. The different weights and compositions produce differences in timbre. Moreover, some slides are quite short and cannot extend over all six strings. Thus, to determine the type of slide necessary for a particular sound may require some experimentation. The variety of slides available and the variety of sounds they can produce also make it advisable to specify for every passage which sort of slide the guitarist is to use.

A relative of the bottleneck slide is the bar slide, usually an oblong, *solid* bar of metal that is gripped by the LH (or RH) rather than placed over a LH finger. Bar slides come in many different forms, some more suitable than others for eliciting particular effects on particular types of guitars. One variant is the *Gleitstahl*, a fairly thin, rectangular steel plate with an indented grip along the top. The advantage of the *Gleitstahl*—or any bar slide—over the bottleneck slide is that it can be subtly twisted and turned along the strings in order to create various diagonal barrés. Its solidity also enables it to produce distinctly different timbres than its tubular counterpart. The disadvantage of the bar slide is that it requires the entire hand to hold it, unlike the bottleneck slide that leaves the index and middle fingers of the LH free to finger the frets.

The bottleneck slide and the bar slide can be used in different ways to produce a variety of effects. However, the guitarist will need some time to prepare these devices in the midst of a performance, although usually more time for placing a slide over a finger than for seizing a device like the *Gleitstahl*.[125] Juggling foreign objects with and on the guitar can demand choreography of a sort, and therefore needs to be integrated into the temporal unfolding of the music.

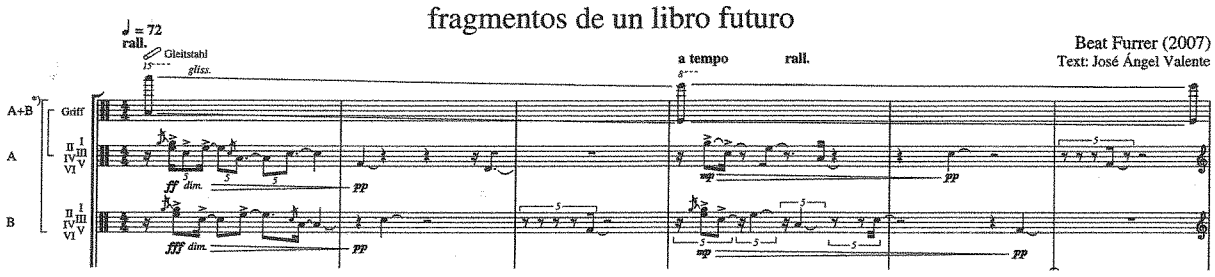


Example 3.55. Johannes Schöllhorn, *Hexagramm*, measures 86–88, Éditions Henry Lemoine

125 It is best to use a proper stand covered with soft material, such as heavy felt, so as to avoid unwanted noises when setting the *Gleitstahl* down after use.

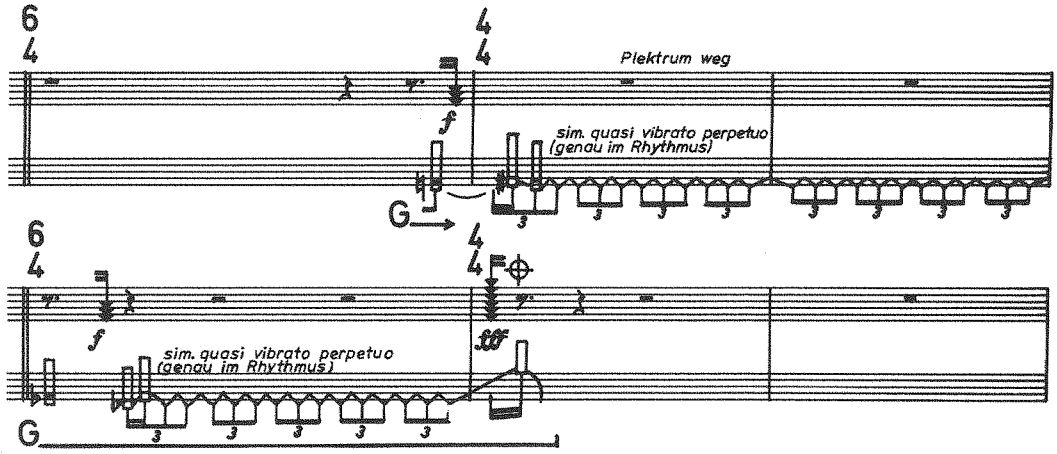
In Example 3.55, the *Gleitstahl* is to be applied very gently across all strings and moved up and down them, producing a simple glissando effect in both directions. The actual pitches are indeterminate because of the continuous movement of the slide. Indicated on the lower stave, notes to be plucked by the RH on strings 6–1 occasionally punctuate these glissandi. In the upper stave, Johannes Schöllhorn notates the bottom pitch on string 6 with a square notehead, and adds two vertical beams (visually suggestive of the slide) indicating where the slide is to be placed across the strings.

Example 3.56 shows the first two of four guitar parts, A and B, for a guitar quartet with soprano singer by Beat Furrer. The uppermost stave illustrates the direction in which both guitarists move the slide. The lower staves show the strings to be plucked by the RH, which Furrer notates in a manner similar to that used by Schöllhorn.



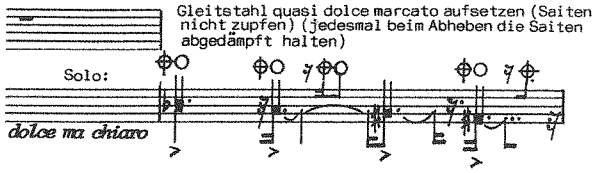
Example 3.56. Beat Furrer, *Fragmentos de un libro futuro*, measures 1–6 (Guitars A and B), Bärenreiter

In a passage from *Salut für Caudwell* (Example 3.57) the two guitarists use the *Gleitstahl* to create a tremolo effect through a rapid, rhythmical movement of the LH, often eliciting the noise of the steel rubbing against the strings. Unlike Schöllhorn and Furrer, Lachenmann notates this LH action in the lower staves and reserves the upper staves for the RH, which infrequently plucks the strings. Here, the triangular noteheads in the spaces between the lines represent strings 6–1, in ascending order:



Example 3.57. Helmut Lachenmann, *Salut für Caudwell*, measures 363–365, Breitkopf & Härtel (Tempo: ♪= 100)

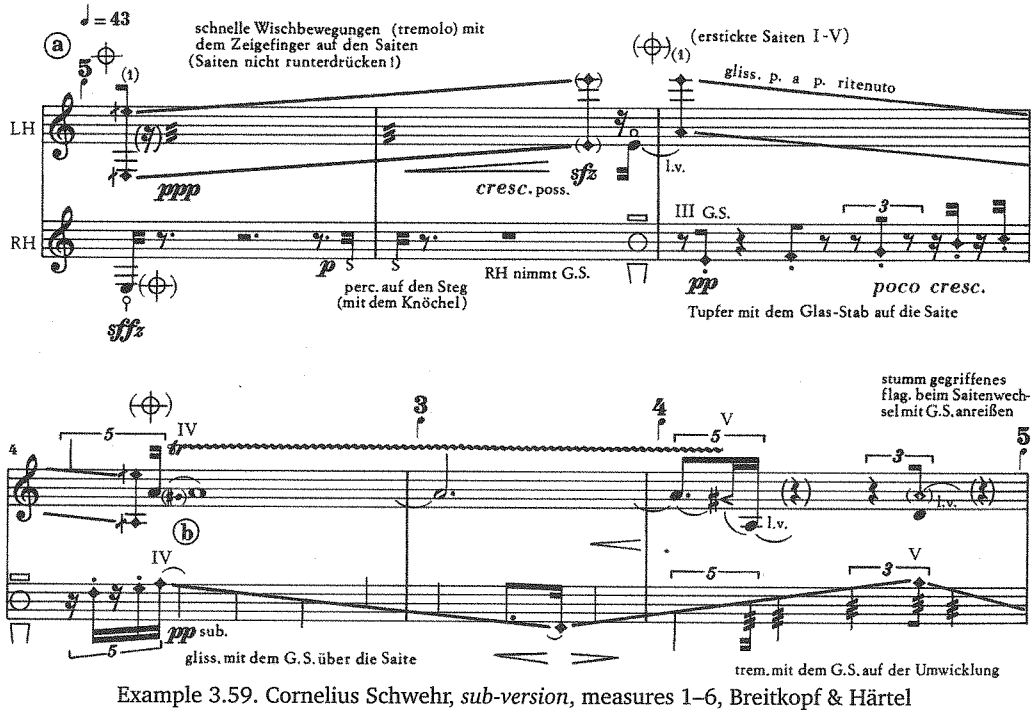
In "...*Zwei Gefühle...*," the performer alternately and repeatedly touches the *Gleitstahl* lightly against the strings with the LH and then dampen them with the RH (Example 3.58). The dampening not only helps articulate the slide effect but also prevents the open strings from sounding when the slide is removed. In the same passage, the guitarist is to wave the RH up and down over the soundhole without touching the strings, so as to create a "wah-wah" effect in the resonating *Gleitstahl* sound.



Example 3.58. Helmut Lachenmann, *"...Zwei Gefühle...,"* Musik mit Leonardo, measures 174–178, Breitkopf & Härtel (Tempo: ♩ = 63)

The passage in Example 3.58 concludes with a light RH strum behind the LH holding the *Gleitstahl*. This action is followed by a short LH glissando downwards. As a rule, when plucking behind the *Gleitstahl* (or any slide), moving the device up the strings will produce a descending glissando, whereas moving it down toward the nut will do the opposite—i.e., create a glissando ascending in pitch.

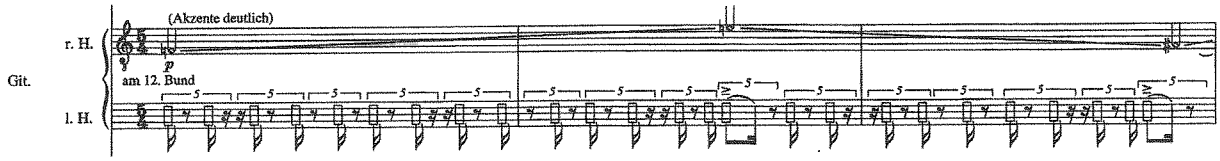
A less conventional approach to bar slide use is for the guitarist to grip the slide with the RH and either run it along the strings in the usual manner or tap the strings gently with it at different points in *battuto*-like fashion.



Example 3.59. Cornelius Schwehr, *sub-version*, measures 1–6, Breitkopf & Härtel

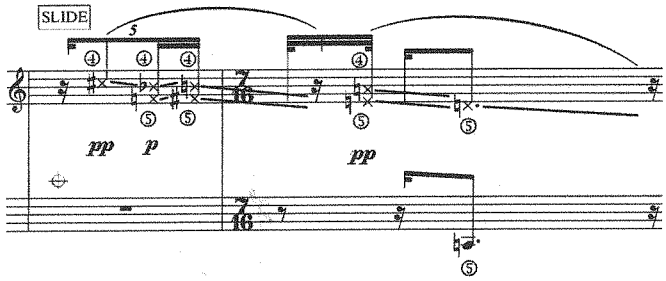
In Example 3.59 (third measure, upper stave), after attacking an *E* harmonic as an upbeat to the measure, the LH dampens strings 1–5 at the 12th position while slowly gliding downward toward the nut, producing a very slight "wiping" sound. The RH (lower stave), holding a glass rod that acts as an ersatz slide, gently taps along the third string, moving from the end of the fretboard toward the bridge. (The bottom stave has an action clef indicating positions between the edge of the fretboard and the bridge.) Because the LH is moving downward, effectively elongating the extent of open string between the original damping position and where the RH is tapping, the bi-tones from the tapping gradually become lower and more pronounced.

The guitarist in Schöllhorn's *Tiento* (Example 3.60), holds a Gleistahl in the LH and articulates percussive taps against the strings at the 12th position. At the same time, the RH, applying light harmonic pressure across all strings in barré form, glides up the strings.



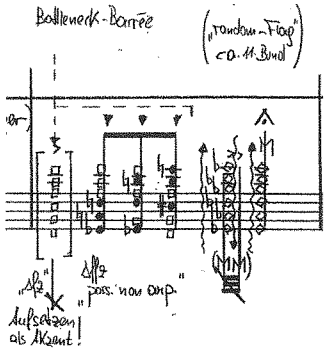
Example 3.60. Johannes Schöllhorn, *Tiento*, measures 30–32, Éditions Henry Lemoine (Tempo: ♩ = 60)

Any slide can be used to articulate *battuto*-like pitches against a string as a means of obtaining subtly varying timbres. In a passage from Tsao's *Not Reconciled*, a glass bottleneck slide is employed for this purpose (Example 3.61). The sound of the last *battuto* is accompanied by the sound of the open fifth string (the written *A*), which produces a clear auxiliary tone underneath the *battuto* pitch. Tsao notates each *battuto* pitch by the string number and position where it is to be executed.



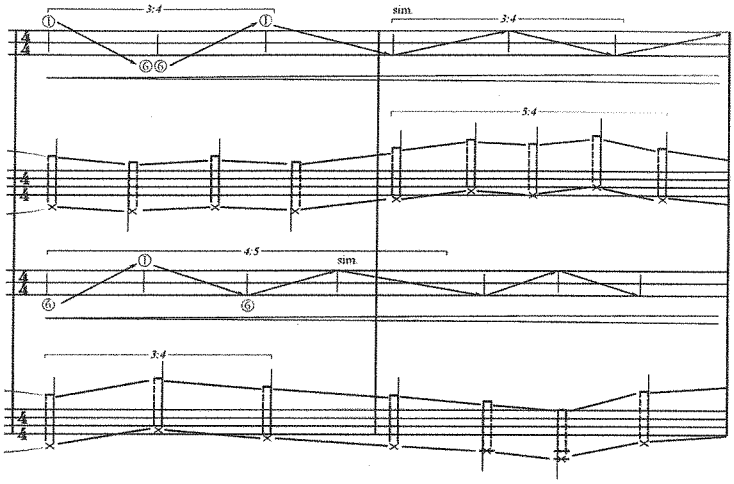
Example 3.61. Ming Tsao, *Not Reconciled*, measures 28–29, Edition Peters (Tempo: ♪ = 63)

Distinctly percussive sounds can be produced by striking a bar slide against the strings. In Example 3.62, the guitarist generates "clacking" noises as they hit several strings at once with a bar slide. The pitches produced by the slide in this way are indicated by the bracketed square noteheads. Next, the performer is to use a plectrum (represented by an inverted triangle above the notes) to strum chords that combine the pitches of notes stopped normally in front of the slide and those produced by the slide barré itself.



Example 3.62. Clemens Gadenstätter, *Tal Para Qual*, measure 2, manuscript (Tempo: ♪ = 240)

In a scene from Tsao's *Die Geisterinsel*, two *percussionists* perform on two guitars that are placed supine on a table. In Example 3.63, the performers employ glass bottleneck slides in the LH to bar all six strings in various positions, moving to and fro between the end of the fretboard and the soundhole, as shown in the lower staves as an action clef. Simultaneously, they use the RH to strum across all six strings with a plectrum. Note how using two staves for each performer makes it possible to illustrate the rhythmic movement of the left and right hands independently.

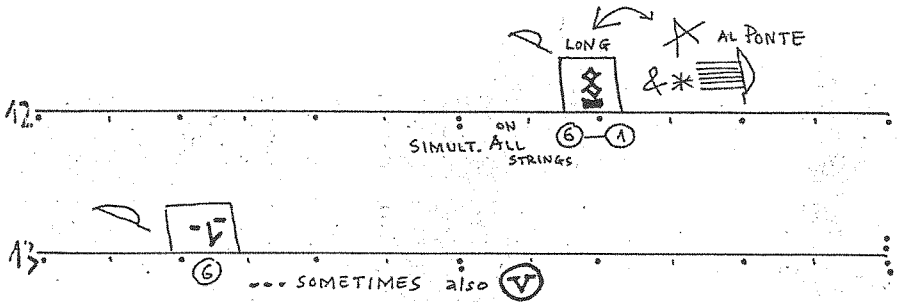


Example 3.63. Ming Tsao, *Die Geisterinsel*, measures 586–587, Edition Peters (Tempo: ♩ = 100)

3.13.2 Other foreign objects: bows, beaters, thimbles, etc.

Bar and bottleneck slides are just a few of the many external devices that have come to be used on the guitar. Some composers have ventured to introduce beaters, thimbles, or even string bows into the repertoire of guitar techniques. While no more "foreign" than the other implements, the bow is a peculiar case in that the guitar's flat soundboard and fretboard would seem to restrict its use. However, despite the fact that the guitar's basic structure does inhibit bowing, a bow can still elicit some marvelous sounds when applied to the strings, whether it be to one of the two outer strings or all six. Moreover, bows of different weights and curvatures will generate different timbres, a fact that opens yet further acoustic possibilities but also necessitates careful selection and clear specification of the bow(s) of choice.

Bowing the guitar may be called for as an isolated special effect, as it is in the first movement of Henze's *El Cimarrón*, or it may be more thoroughly integrated into the general sound of the composition, as it is in Radulescu's *Subconcious Wave*.[126]



Example 3.64. Horatio Radulescu, *Subconscious Wave*, systems 12–13, Lucero Print (Tempo: dots = 10 seconds, dashes = 5 seconds)

126 Note: Rosin is an issue. When too much rosin is applied to the bow, it tends to have a dampening effect, especially on the steel wound strings. Furthermore, normal RH playing techniques following heavy use of the bow can be impeded: the residual dust, being somewhat heavy and sticky, transfers to the plucking fingers, which inhibits their agility. If extended use of a bow is required, therefore, having a second instrument on hand—as well as ample time for the guitarist to change instruments—is advisable.

In system 12 of Radulescu's piece (Example 3.64), the indication "6–1" coupled with the *al ponte*, tells the guitarist to bow across all six strings simultaneously close to the bridge. Subsequently, as indicated in system 13, the performer is to bow only on the sixth string using fast down-bow/up-bow strokes with very light *flautando* pressure to build a rapid tremolo, but always changing bowing points along the string. These shifts, from sul ponticello to sul tasto, produce a soft "balayage d'harmoniques" (harmonic sweep), which when coupled with the tremolo motions create an effect that Radulescu calls "phase-shifting" (Figure 3.18).

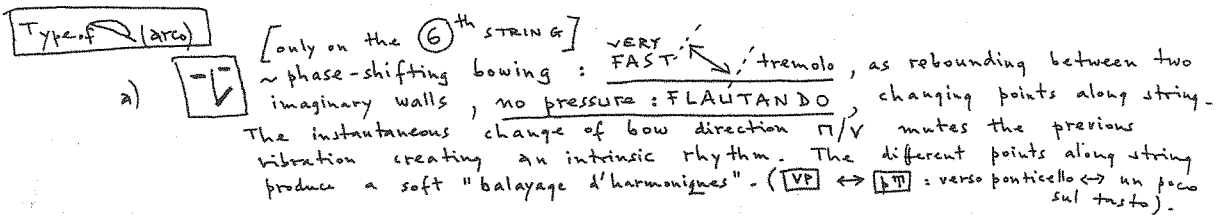
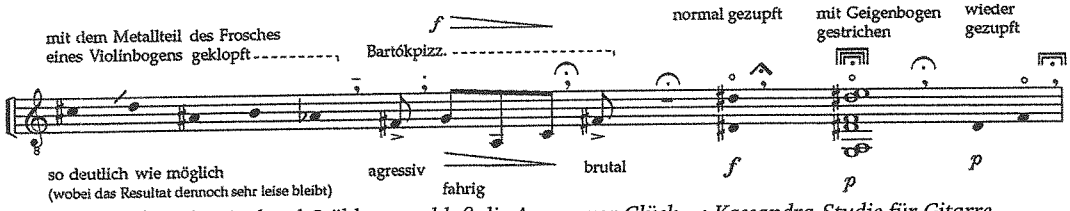


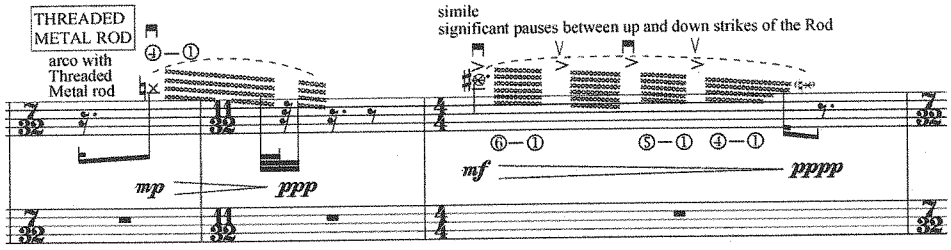
Figure 3.18. Horatio Radulescu, *Subconscious Wave*, legend, Lucero Print

A passage from Gerhard Stäbler's *...schloß die Augen...* calls for the guitarist to use both the strings and frog of a violin bow (Example 3.65). They are to begin the passage by tapping the strings clearly yet gently with the metal portion of the frog in the RH, as the LH stops the first five notes. (The *battuto* tones produced by the tapping are not notated.) The guitarist then proceeds to bow across all six strings, which are tuned to the notated pitches.



Example 3.65. Gerhard Stäbler, *...schloß die Augen, vor Glück...: Kassandra-Studie für Gitarre*, measure 1, G. Ricordi & Co. (Tempo: "sehr langsam")

Sometimes a composer writing for the guitar may choose to employ an object as an ersatz bow. In Example 3.66, a long, finely threaded metal rod is drawn over the strings, at first across all six and then, as the rod gradually descends in a glissando, the number declines incrementally to only four. During this action, the LH mutes the strings in first position. The *notated* pitches designate the sounding pitches made by the threaded rod against string 1. The result is a delicate, perforated glissando.



Example 3.66. Ming Tsao, *Not Reconciled*, measure 177–179, Edition Peters
(Tempo: ♪ = 76 rallentando to ♪ = 63 in measure 179)

3.13.3 More notational conventions

The table below shows our suggested notations for select implements and their uses on the guitar.

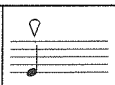
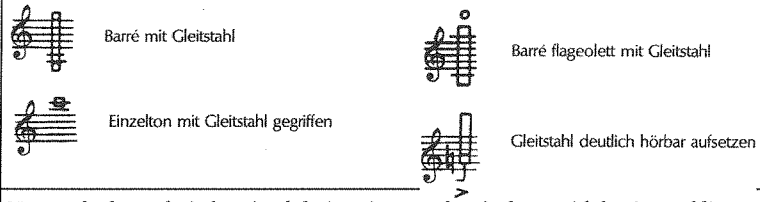
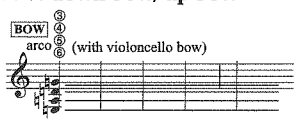
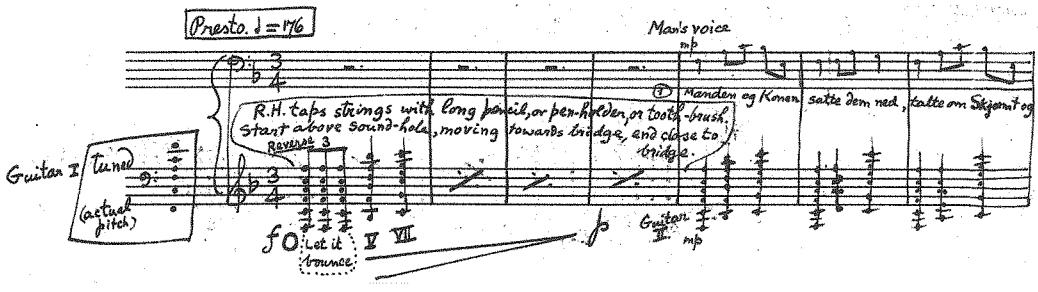
Plectrum	
Slide[127] (bottleneck or *Gleistahl*)	For barré actions, indicate the slide position by the fingered note on either string 6 or the lowest string that the slide is to bar. For the fingered note use a square notehead with a rectangle above it. When the guitar is in scordatura, it is best to notate the position of the slide as if the tuning were transposed to normal. Always indicate the string numbers for any strings barred. 
Bow	Notate the bowed pitches (and their string numbers) along with horizontal lines to indicate the duration of the bowing. Indicate *up-bow* for drawing from the tip of the bow to the frog and *down-bow* for the reverse. If the bow direction is not indicated then the performer will find suitable areas to change the direction of bowing. ⊓ ∨: **down bow/up bow** 

Table 3.3. Suggested notations for implements

3.13.4 Beaters and mallets

The notion of the guitar as a percussion instrument approaches its apogee when the strings—or body of the guitar—are actually struck with an implement like a percussion mallet. A handful of composers have extended the guitar in this way, coopting a range of tools from mallets to beaters that have traditionally been used on instruments in the percussion family.

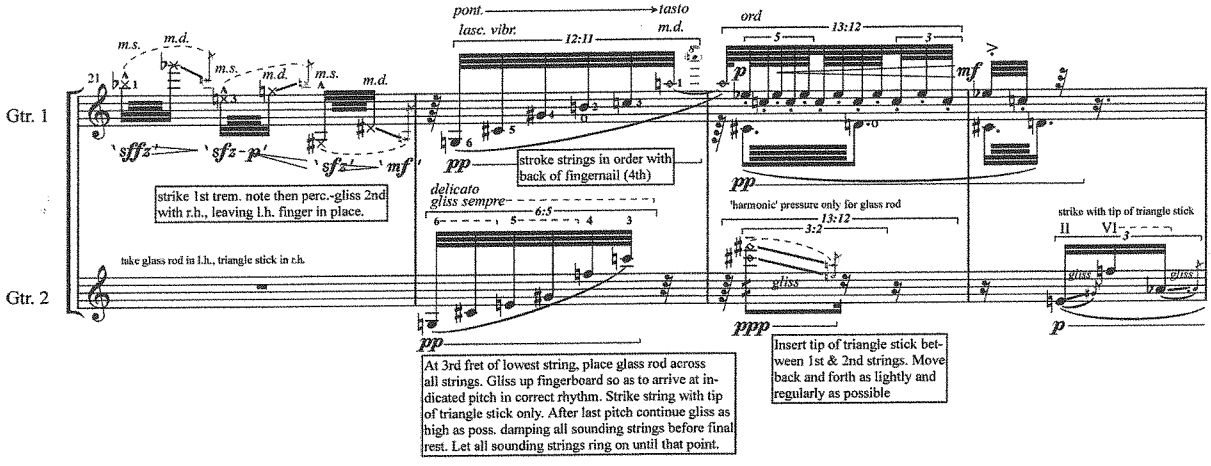
In a striking example from 1923 by Grainger (Example 3.67), the first guitarist is to use one of three stick-like implements to tap the strings in a tambour fashion. The gradual movement of the object from sul ponticello to sul tasto subtly modulates the timbre of the percussive result.



Example 3.67. Percy Grainger, *Hubby & Wifey*, measures 1–7, Courtesy of the Grainger Museum collection, University of Melbourne

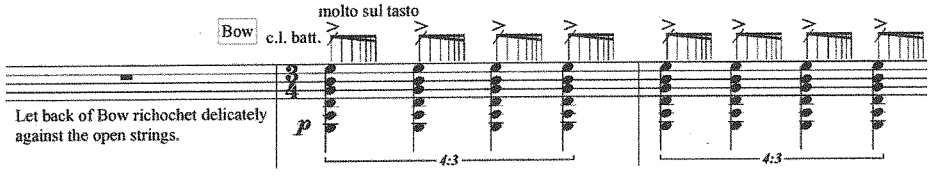
127 The notations for the slide are taken from Lachenmann, *Salut für Caudwell*. The legend translates as follows: Barré with the *Gleitstahl* / A single pitch is stopped with the *Gleitstahl* / barré harmonic stopped with the *Gleitstahl* / *Gleitstahl* attack should be clearly audible (translation Seth Josel).

In the first measure of Example 3.68 the second guitarist (whose part is denoted in the bottom stave) is to hold a glass rod with the LH in a barré manner against strings 6–3 and execute a glissando beginning at the 3rd position on string 6, eventually ascending to the 17th position on string 3 and beyond. Simultaneously, the RH is to strike the indicated strings (6–3) with the tip of triangle beater in the notated rhythm (6:5). In the next measure, the triangle beater is inserted between two strings and shaken lightly between them in order to create a tremolo effect, as the LH executes a descending glissando.



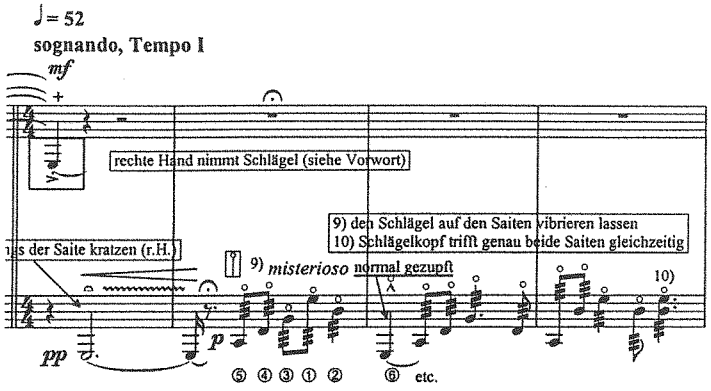
Example 3.68. Brian Ferneyhough, *no time (at all)*, Movement III, measures 22–24, Edition Peters (Tempo: ♪= 80)

The performer in Tsao's *Serenade* (Example 3.69) is to gently bounce a violin or cello bow *col legno battuto* against the open strings of the guitar. The sonic result should emulate the effect that Schönberg achieves with the *col legno battuto* in the strings in the first movement of his *Serenade* (op. 24).



Example 3.69. Ming Tsao, *Serenade*, measures 139–40, Edition Peters (Tempo: ♩ = 100)

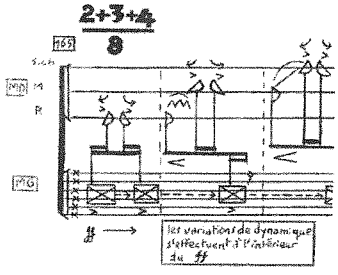
Moritz Eggert's *Vermillion Sands* calls for a steel string guitar to be set flat on a table and struck with a crotales (aka antique cymbals) beater with either a porcelain or plastic head (Example 3.70). The stick is to be held lightly between two fingers of the RH so that it ricochets against the strings, a technique similar to the *balzando* used on string instruments. As the beater bounces on and off the various open strings of the guitar, it produces a gentle, vibrating sound.



Example 3.70. Moritz Eggert, *Vermillion Sands*, measures 44–47, manuscript

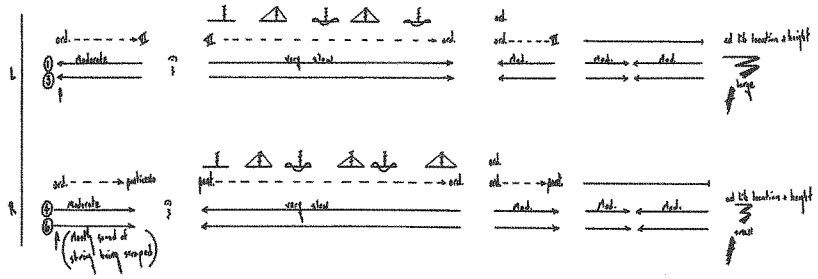
3.13.5 Miscellaneous objects

Objects not necessarily associated with percussion instruments—nor with any musical instruments, for that matter—have also been adapted for percussive uses on the guitar, often with interesting results. Many of these implements are common household objects, some drawn from the kitchen, others from the garage, and yet others from the playroom.



Example 3.71. Clara Maïda, *Gitter für Gitarre*, measures 165–166, manuscript (Tempo: left to the performer)

For Clara Maïda's *Gitter für Gitarre* (Example 3.71), the guitarist takes a metal soup spoon in the RH and uses it to beat and scrape the sixth string in various ways, occasionally adding glissandi as well as changing the direction in which the bowl of the spoon is facing. The shifting orientation of the spoon, which is notated in the upper stave as front, back, and side views of the spoon head from the perspective of the player, in and of itself affects the character of sound quite markedly. The upper stave also indicates the three positions at which to strike or rub the spoon against the sixth string, namely, the edge of the soundhole (i.e., the rosette [*R*]), the midpoint between the soundhole and bridge (*M*), and at the bridge (*sur chevalet*). LH action is notated in the bottom stave, and involves slapping the flattened hand against the strings and muting them.



Example 3.72. Michael Edward Edgerton, *Tempo Mental Rap*, Variation 5 (5), system 1, manuscript (Tempo: left to the performer)

In Example 3.72, Edgerton has the guitarist swipe household cleaning pads and a sponge over the strings at various velocities and pressures, which are indicated in the performance notes. These gestures produce sustained sounds with pitches ranging from very low to very high and with timbres ranging from nearly pure, sine-like tones to "extra-complex" sonorities featuring more than one perceptible pitch at a given time. Figure 3.19 shows the required actions with the cleaning pads and sponge and the notations for them.

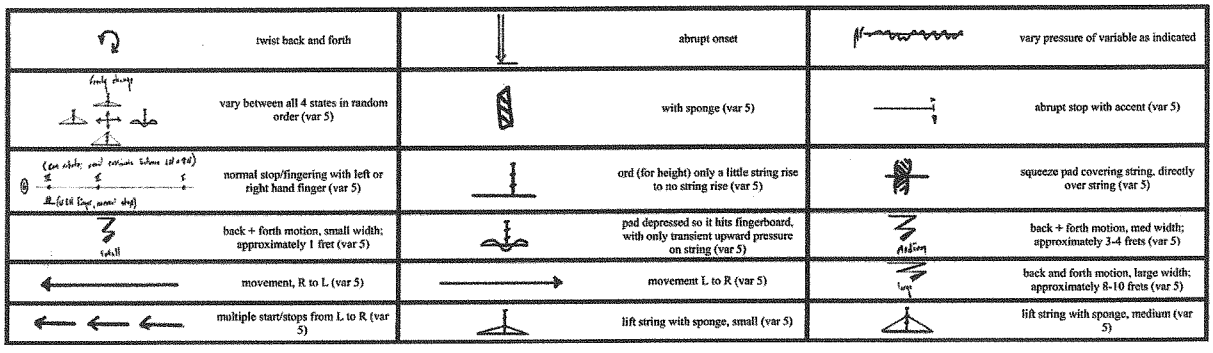


Figure 3.19. Michael Edward Edgerton, *Tempo Mental Rap*, performance notes, p. 2, manuscript

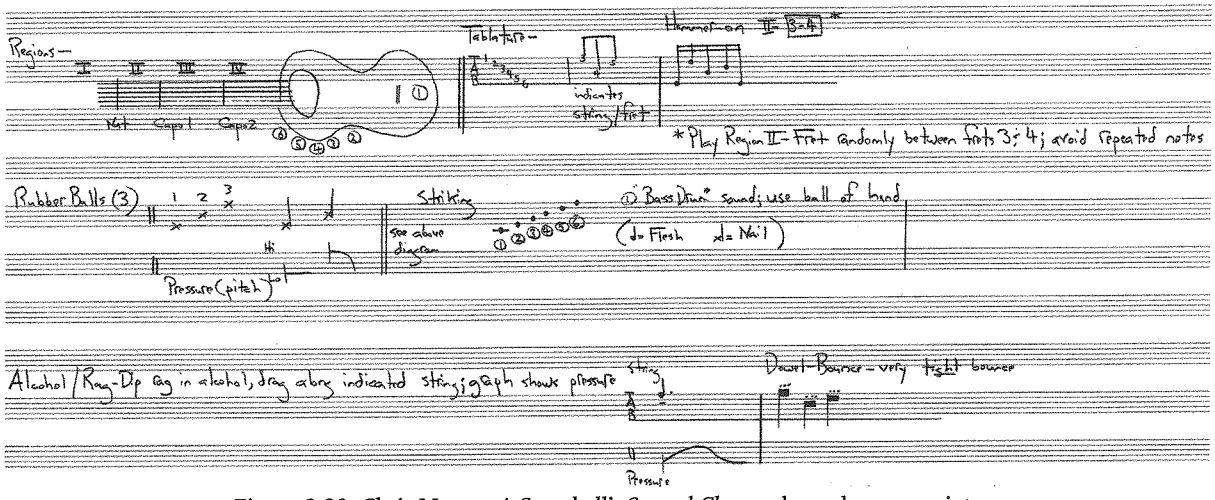


Figure 3.20. Chris Mercer, *A Snowball's Second Chance*, legend, manuscript

Mercer's *A Snowball's Second Chance* for four table-top guitars (Figure 3.20) requires a compact yet diverse collection of implements, each of which yields an arresting timbre and texture when it is applied to the guitar. Some of these objects and their applications appear below:

(a) A rag or cloth dipped in alcohol is dragged along indicated strings at various pressures (the lower stave indicates degrees of pressure) to produce varied squeals.

(b) Mallets with rubber Super Ball heads are rubbed against the open strings to produce sustained sounds

(c) A short wooden dowel is bounced in a ricochet manner against the open strings to produce a *balzando* effect as in bowed string instruments.

(d) Metal coins are scratched along the wire binding of the lower three strings to create a *güiro* effect

(e) An eggbeater is ground against the edge of the guitar as well as the strings to create an irregular tremolo

3.14 Prepared Guitar

The quest for novel timbres has urged several composers in the last few decades to modify the guitar itself rather than simply induce new sounds from the outside through performance techniques and/or objects. This form of experimentation, not to mention many of the approaches previously discussed here, have been influenced by the pioneering practices of musicians like Derek Bailey, Keith Rowe, Fred Frith and Marc Ribot, all of whom improvise (or improvised) heavily on the electric guitar.

3.14.1 Capo tasto

The *capo tasto* (*capo d'astro*, *capodastro*, or *capo* for short) is a mechanical device that shortens the vibrating length of the string, thereby raising the pitch. More commonly used in vernacular types of music, it fastens to the guitar neck and ostensibly shifts the nut upwards to coincide with a fret position. Indeed, when scoring for the guitar with capo, it is advisable to transpose the notation to standard tuning, with the capo standing in for the nut. The history of the capo spans roughly four centuries, beginning with one of the first known references in a treatise by G. Battista Doni dating to 1640.[128] Traditionally, the capo is used to stop the entire width of the fretboard, i.e., all six strings; recently, however, there have been experiments with partial capos, such as a "Spider Capo," that allow a select number of strings to remain in the open tuning.[129] For practical reasons, it is best not to use the capo beyond the 8th position since some guitar necks are so broad past this point that the device can be difficult to firmly affix. The composer should also be aware that a capo can affect a guitar's resonance to the degree that the instrument's overall amplitude diminishes somewhat. Finally, attaching a capo tends to disturb a guitar's intonation, so once it is on the guitarist should expect to have to re-tune their instrument, if only slightly.

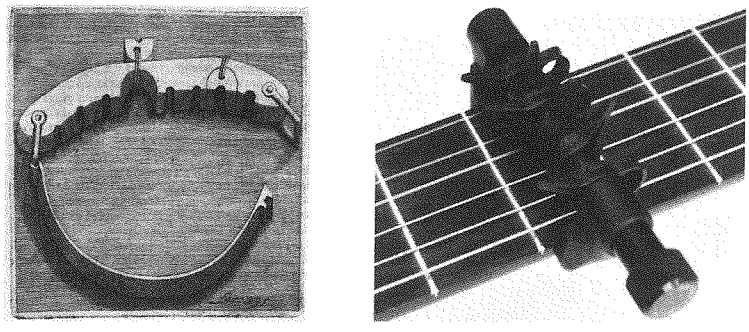


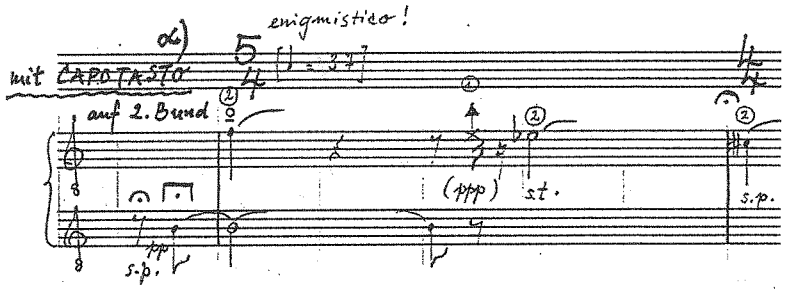
Figure 3.21. An early capo (Courtesy of the Biblioteca Nazionale Centrale di Firenze) and a Spider Capo™[130]

128 Doni, *Annotazioni Sopra il Compendio,* 335. This work is an annotation of a previous treatise by the same author (*Compendio del trattato de' generi et de' modi della musica*) which was published in 1630. An even earlier tome (1555) by the vihuelist Juan Bermudo also refers—albeit somewhat obscurely—to the use of a capo-like device. Bermudo calls the object a "*panezuelo*," which only tentatively translates as "handkerchief." The handkerchief (*pañuela* in contemporary Spanish) is wrapped around a stick (*palito*) and tied around the fret board, hence acting as a capo. Bermudo, "Libro Segundo," fol. 30.

129 Coined a "Spider Capo" because of its appearance, this capo is designed to stop any combination of the guitar strings. Other partial capos cover the top five strings leaving the bass *E* string free. There are other partial capos available, such as the "Kyser" which covers any three consectutive strings.

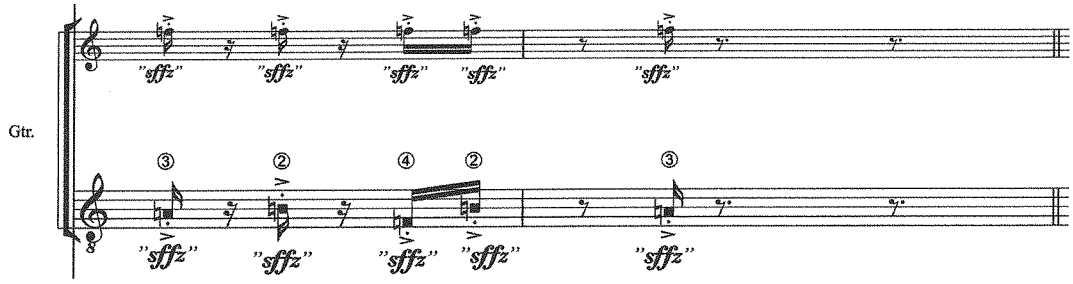
130 The early capo is from Doni, *Annotazioni Sopra il Compendio*, 335.

3.14.2 Repertoire



Example 3.73. Klaus Huber, *Lumineszcena*, measures 1–2, G. Ricordi & Co (Tempo: ♩ = 37)

In Example 3.73, the guitarist is to place a capo on the second fret. (Notice that the guitar part is transposed to standard tuning.) Huber uses a triangular notehead to stipulate that the guitarist play at the highest position possible on the indicated string. This action yields a fine, percussive sound in which more noise than pitch is present.



Example 3.74. Olav Lervik, *Vortex II*, measures 97– 98, manuscript (Tempo: ♪ = 70)

Throughout Olav Lervik's *Vortex II*, a capo remains on the ninth fret. In Example 3.74, the square noteheads in the lower stave signify where the guitarist is to pluck behind the capo (i.e., from the first to eighth fret), producing auxiliary tones. Approximate sounding pitches for the auxiliary tones appear in the upper stave.

Figure 3.22 shows the preparation of the guitar for a piece by Klich. A capo is placed on the ninth fret and two spoons—which function in part as quasi capos—are placed roughly at the edge of the rosette and midway between the rosette and the bridge. The capo and spoons essentially divide the strings into five discrete playing areas, including the area behind the nut (denoted A–E). The guitar is held in the normal fashion and plucked with the RH in these five areas. The areas on the neck, both above and below the capo, are sometimes fingered by the LH. Four microphones (and eight loudspeakers) are used to amplify the sounds produced in these five areas. In Example 3.75, each of the five areas is notated on a separate stave with the very top stave indicating approximate sounding result.

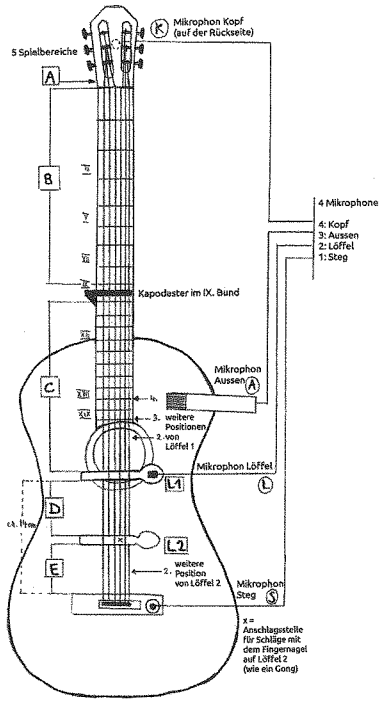
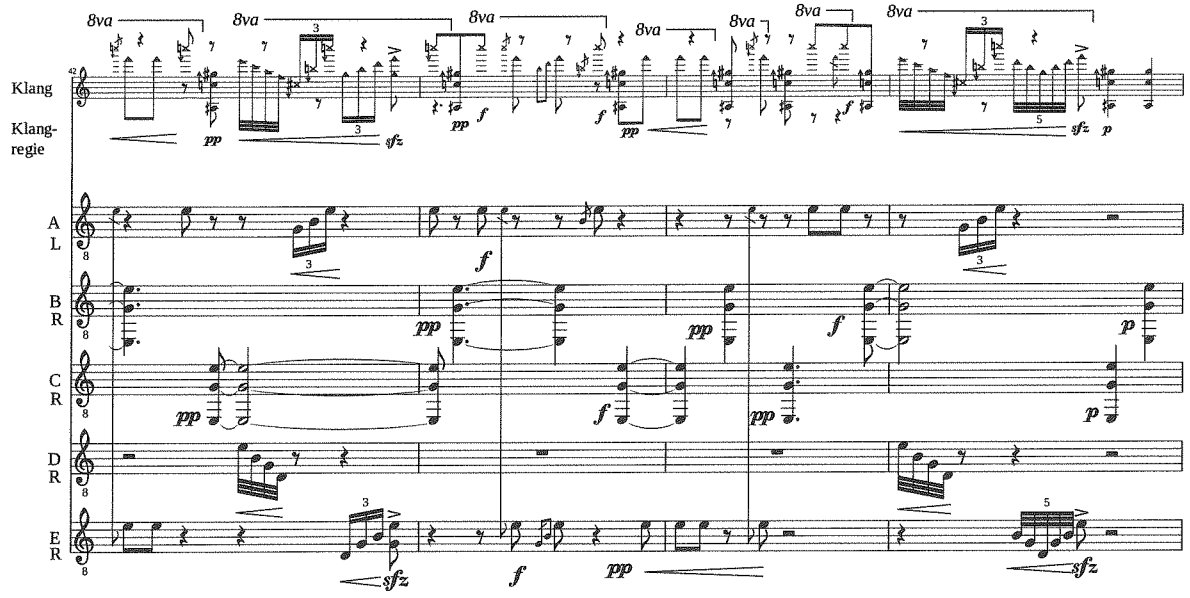


Figure 3.22. Tobias Klich, *grüntrübe Ritornelle beim Verlassen des Territoriums*, legend, manuscript



Example 3.75. Tobias Klich, *grüntrübe Ritornelle beim Verlassen des Territoriums*, measures 42-45, manuscript (Tempo: determined by time brackets)

3.14.3 Other preparations

Inspired by Cage's *Sonatas and Interludes* for prepared piano, several guitarists in the 1960s began experimenting with different guitar preparations, moving well beyond the use of the capo tasto. Most notable among this group were the improvisers Bjørn Fongaard, Keith Rowe and, somewhat later, Fred Frith. Like Cage, they were determined to alter the instrument's fundamental timbre, an objective achieved primarily by placing objects under—or by attaching objects to—the

ANADOLU ÜNİVERSİTESİ
Merkez Kütüphanesi

strings. Their work has influenced generations of improvisers and composers since. From the standpoint of sound, these alterations produce diverse results that, depending on the type of object used, can be quite arresting to the ear. Some devices, like those made of metal, will contribute their own tonal character, owing to their material composition. Others, with less resonance of their own, may create strange buzzing effects. Many of the sounds that emerge from a prepared guitar resemble gongs, bells, or non-Western musical instruments.

3.14.4 Guidelines for guitar preparation

In their compact pamphlet on the subject, Peter Yates and Matthew Elgart present some general guidelines for guitar preparation:[131]

1. Fastening the object directly to a string
2. Weaving the object among three or more strings
3. Attaching the object to some part of the guitar and letting it rest against a string by the force of gravity
4. Pinning the object between a string and the nut, fretboard, soundboard, or saddle of the guitar

A prepared string is principally affected by the mass of an object, its location along the string, and the kind of attack employed. Materials such as metal or wood tend to produce brighter timbres; softer materials such as rubber or cloth tend to produce darker timbres. The myriad objects suitable for use in preparation fall into several categories according to their basic material, either metal, wood, cloth, plastic, or rubber. Within the first category—metal—a very large array of objects can help create interesting sounds. These include nuts and bolts, nails, hairpins, paper clips and screws, alligator clips, bottle caps, metal wire, safety pins, "split shot" (fishing sinkers), aluminum foil, and sheet metal. Among wooden (or wood-like) devices, bamboo chips and chopsticks both work well. Useful cloth materials include felt, cloth tape, and string. A number of rubber and plastic items are also efficacious, among them rubber erasers, rubber tubing and washers, sheet plastic, foam rubber, and polyurethane foam, as well as wire insulation. Several other devices/materials are harder to classify but still produce intriguing acoustic effects. These range from masking tape, paper strips, and pipe cleaners to cork, wax, and putty (including the window insulation material mortite).[132]

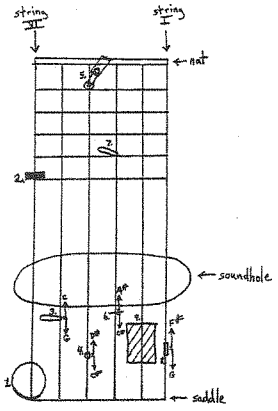
There are several factors to which the composer and performer should be alert when considering performance on a prepared guitar. The placement of an object is critical: for instance, an object placed near the middle of the string allows the player to pluck freely on both sides of it; an object placed near the bridge colors all stopped notes on the prepared strings; as for an object placed near the nut, any sound produced by it is cancelled out by all fingered pitches above it on the prepared strings. When prepared, moreover, the three metal-wound strings respond differently than the nylon strings. Sometimes a guitar's action will impinge on a preparation's desired outcome: too low an action, for instance, can impede a prepared string's vibration. In addition, fretboards of different lengths will require adjustments in an object's position, since the precise placement strongly influences the sounds that are produced. Last but not least, and regardless of performance context, the composer needs to consider the time it will take to comfortably prepare a string or set of strings, especially if the preparation is to be implemented during the course of a performance.

Finding an acceptable notation for music on prepared guitar can be extremely challenging. We recommend using a tablature system indicating the string number to be plucked by the RH and the fret position to be fingered by the LH. As for

131 Yates and Elgart, *Prepared Guitar Techniques,* 4.

132 For an array of preparation examples and how they sound, see Appendix B.

the preparation itself, the composer should specify where to place the device(s), preferably in terms of its distance from either the nut or bridge. It is also crucial to stipulate which string(s) is to be affected.



1. Bottle cap ("sitar")
2. Rubber washer ("drums")
3. Alligator clip ("gong")
4. Split-shot ("gong")
5. Safety pin ("buzzer")
6. Guitar pick ("bell")
7. Alligator clip ("rattlesnake")
8. Wire insulation ("bell")
9. Polyurethane ("wood block")

Figure 3.23. Diagram of an extensive preparation, illustrated by Peter Yates. Yates and Elgart, Vortex (1990), 16.

Figure 3.23 shows the positions of guitar preparations for a piece by Yates and Elgart. A key listing the materials for the preparations accompanies the diagram. For each device, the composers supply an acoustic analogue for the desired sound. With works involving such extensive preparations, we suggest incorporating a diagram similar to the one above into the score's performance notes.

3.14.5 Repertoire

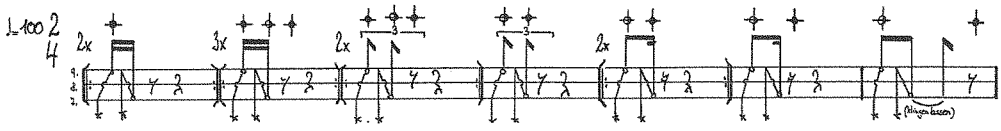
For her *Brevario*...(Figure 3.24), Mendoza calls for an elastic hairband (*sordina*) to be placed at the first fret to slightly dampen the strings, but specifies that it be situated leaving adequate space for the guitarist to stop a note there. This preparation eliminates unnecessary sympathetic resonances and provides for a cleaner, more focused realization of the LH pizzicato and hammer-on gestures required for the piece.

- Scordatura: I cuerda un semitono abajo (re #)/ I Saite ein Halbton runter (d #)
- Sordina: Banda textil elástica (p.ej. coletero) sobre el primer traste/ Elastisches Textilband (z.B. Haarband) über den ersten Bund
- Flageoletts/Armónicos: Suenan una 8va por debajo de lo escrito, como todo el resto/ Klingen eine 8ve tiefer als notiert, wie alles Andere

Figure 3.24. Elena Mendoza, *Breviario de espejismos*, performance notes, Edition Peters

The preparation for Christian Billian's *Inbezugnahme* involves weaving a plastic wand resembling a children's xylophone mallet through all six strings between the 7th and 9th positions (Example 3.76). Once in place, the mallet is moved back and forth between these positions by the LH for the entire duration of the piece. The three lines of the stave refer to positions 7, 8, and 9, while the curved lines attached to the note stems signify the temporal extent of each movement of the mallet. The RH interacts with these LH glissando gestures by striking the hand against the mallet, motions denoted by the open circles at the ends of note stems, and by muting the strings at three different positions: between the nut and the plastic wand, between the wand and the bridge, or both.[133]

133 These three dampening positions are signified above the notes by partly or fully shaded circles with crosses: a circle shaded on the left half indicates dampening between the nut and wand; a circle shaded on the right half indicates dampening between the wand and the bridge; and a fully shaded circle indicates dampening in both areas. An open circle indicates no dampening.



Example 3.76. Christian Billian, *Inbezugnahme*, page 1, system 1, manuscript

The performer prepares the guitar for Pisati's *Poema...* (Figure 3.25) by weaving a pencil underneath string 5 and slightly below the fourth partial above the soundhole on top of string 6, which produces a "flatted" *E*. With the LH, the guitarist repeatedly plucks the top end of the pencil near string 1, causing it to vibrate against the strings, and occasionally combines this action with other techniques such as *golpé* or normal plucking, the latter of which is colored by the continuous reverberative bouncing of the pencil. This wild vibrato, which is indicted with noteheads accompanied by wavy lines (Example 3.77), shifts the pencil's position sufficiently to create changes in intonation. Other actions in this passage include plucking the bottom end of the pencil near string 6 so as to produce a gong-like sound and, at the close, a flattened-hand tambour against all strings in front of the pencil (i.e., toward the bridge). These events are denoted, respectively, by the rectangles and small "hand" noteheads.

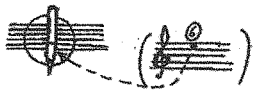
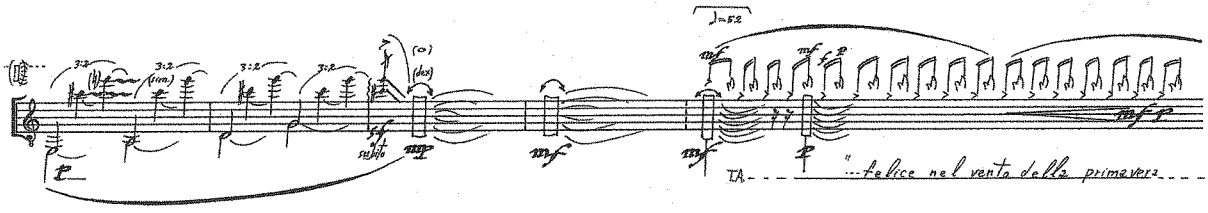
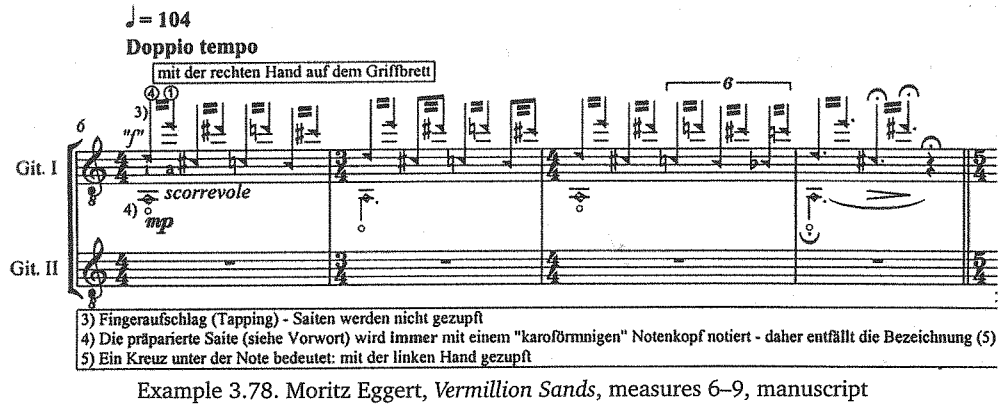


Figure 3.25. Pisati's preparation indication for the guitar in Poema della Luce



Example 3.77. Maurizio Pisati, *Poema della Luce*, page 10, system 1, manuscript (Tempo: ♩ = 72 until tempo change)

Preparing the guitar for Eggert's piece *Vermilion Sands* (Example 3.78) requires affixing Blu tack (a sticky putty for hanging wall posters) to the fifth string near the bridge. Whenever the guitarist plucks the open prepared string, which is signified by the diamond notehead, it produces a gong-like sound. Eggert combines this plucking with RH tapping on the fretboard, as indicated by the triangular noteheads.



Example 3.78. Moritz Eggert, *Vermillion Sands*, measures 6–9, manuscript

For Kent Olofssons' *Wheel within a Wheel* (Example 3.79), a work for flute, tenor saxophone, guitar and vibraphone, a plastic ruler of about 20 cm. in length should be interlaced between the strings of the guitar so as to give the guitar a glassy, impressionistic sound (Figure 3.26).

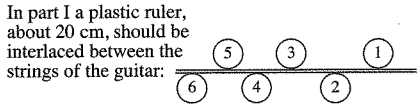
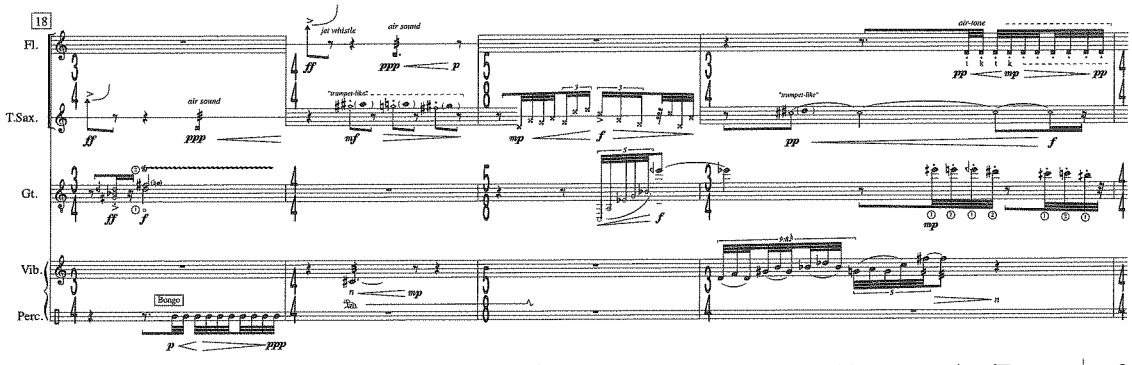


Figure 3.26. Preparation indication for the guitar in Olofsson's *Wheel within a Wheel*

In Example 3.79, a jet whistle, breath sounds in the flute (square noteheads in the top stave), key-clicks in the tenor saxophone *(x-noteheads* in the second stave from the top) and, ultimately, the vibraphone (bottom stave), all contribute to a medley of sounds from which the glassy guitar timbres emerge quite convincingly.

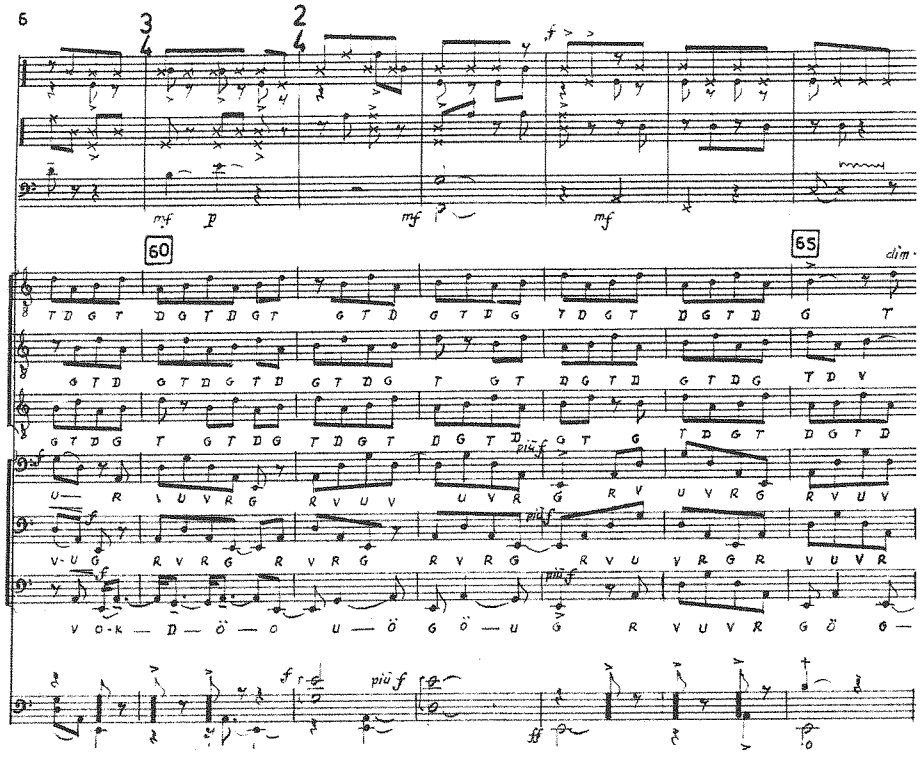


Example 3.79. Kent Olofsson, *Wheel within a Wheel*, performance notes, measures 17–19, manuscript (Tempo: ♩ = 80)

3.15 The guitar as percussion in context

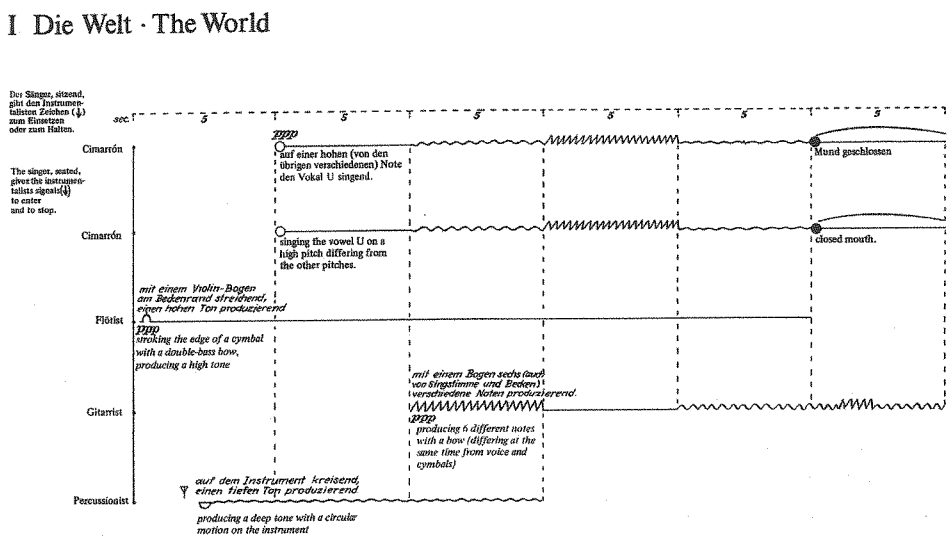
This chapter has explored various avenues through which composers have promoted the percussive potential of the guitar, from pitched LH and RH tapping and bi-tones to unpitched percussive effects. It has also touched upon the use of "foreign objects," ranging from the not so foreign slide to more unusual preparations and objects with which to strike the instrument. By examining these types of effects in chamber and ensemble contexts, one can more fully appreciate the inventive ways that composers have utilized these extended techniques as they transform the traditional role of the guitar.

In Example 3.80, Scelsi combines the guitar in a percussive guise with bongos, tumbas, wood blocks, and *güiro*, as well as the voices of a male tenor and bass choir. Specifically, tambour strikes by the flattened RH, denoted by the shaded, vertical beam on the bottom stave, mix with percussive strikes on the other instruments and the sung articulation of consonants, as indicated in the upper three and middle six staves, respectively. The piece presents a unique context in which the guitar becomes an integrated member of the percussion family of instruments, a status further supported by its placement on stage among them.



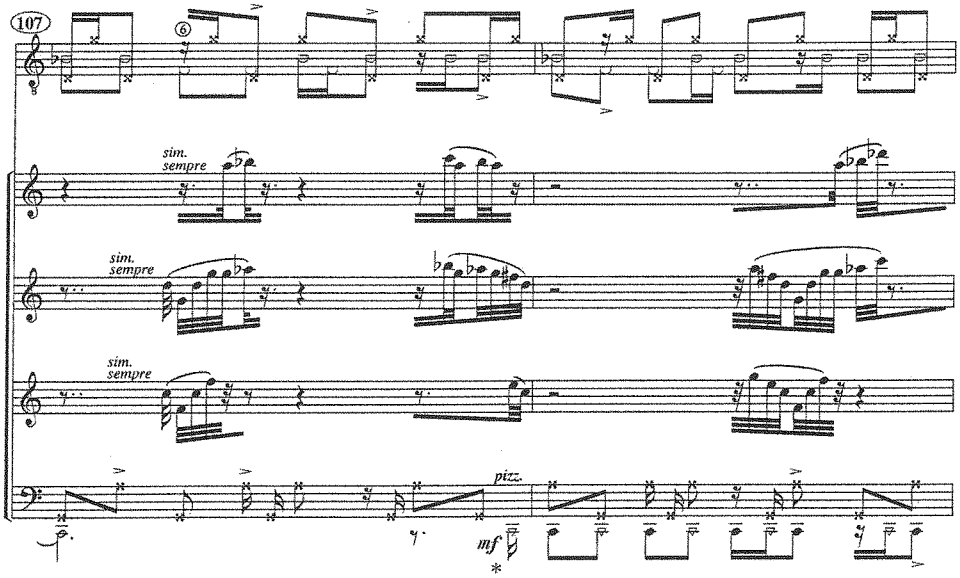
Example 3.80. Giancinto Scelsi, *TKRDG*, Movement 1, measures 59–65, Éditions Salabert (Tempo: ♩ = 84)

For Henze's piece *El Cimarrón*, the guitarist is to hold the guitar between their legs like a violoncello and to then draw a cello bow across all six strings close to the bridge, thus producing high partials from the open strings (Example 3.81). At the same time, the flautist bows a cymbal, the percussionist runs their fingernails in continuous circular motions on a temple bell, and the vocalist sings the vowel *U*. These distinctive sounds combine to create a rich sonic tapestry.



Example 3.81. Hans Werner Henze, *El Cimarrón*, 1. Die Welt, system 1, B. Schott's Söhne (Tempo: according to time brackets)

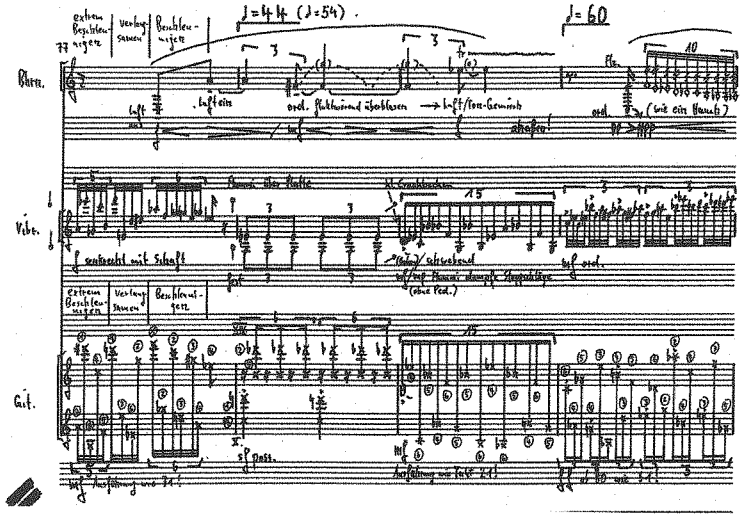
Ruben Seroussi has the guitarist alternately beat their RH knuckle and thumb against the soundboard of their instrument (Example 3.82, top stave). These gestures are denoted respectively by the upper and lower *x*-noteheads. The square noteheads indicate LH finger tapping. The guitar actions accompany similar percussive gestures in the cello, also involving beating by the RH knuckle and thumb, and that are likewise signified by upper and lower *x*-noteheads, although on the bottom stave. The occasional triangular notehead in the cello prompts the RH thumb to beat against the open C string.



* Beat on "C" string with r. h. thumb. The sound of the percussion on string and fingerboard is obtained.

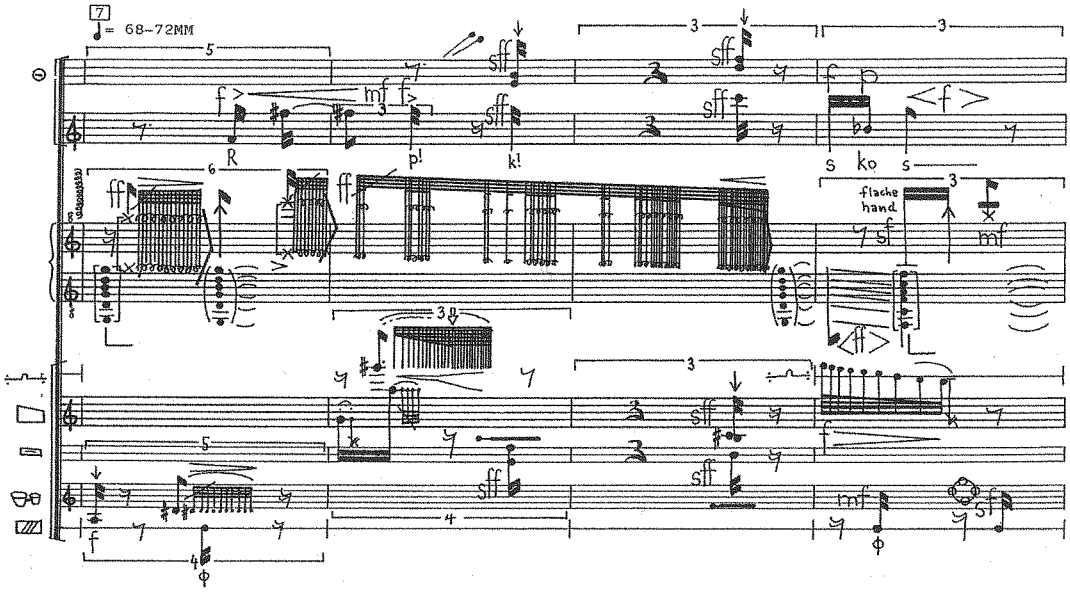
Example 3.82. Ruben Seroussi, *Vueltas Y Revueltas*, Movement 2, measures 107–08, Israel Music institute (Tempo: ♩ = 72)

Oehring blends alternating RH and LH tapping on the guitar with delicate sounds on the vibraphone and basset horn (Example 3.83). The vibraphone is played mutedly but without the pedal, using the head or shaft of Super Ball mallets. The horn player produces air sounds (square noteheads), soft overblowing (noteheads in parentheses), and an air/pitch combination (diamond noteheads).



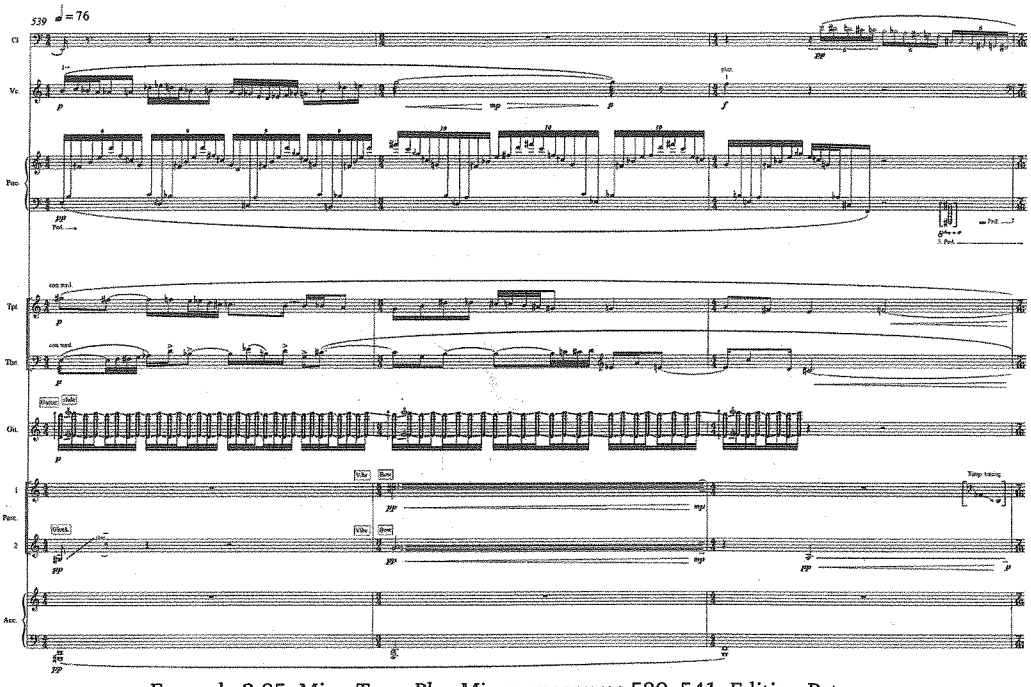
Example 3.83. Helmut Oehring, *CAYABYAB*, measures 77–80, Bote & Bock

A complex passage from Spahlinger's *música impura* (Example 3.84), orchestrated for soprano, guitar (middle two staves), and percussion (bottom three staves), calls for the guitarist to rub a fine, silver-wound screw against the lower strings so as to produce a raspy, grating noise. This effect complements similar tremolos produced by drumsticks as they ricochet on and off the percussion instruments, which include cymbal, marimba, woodblock, bongo, and snare drum.



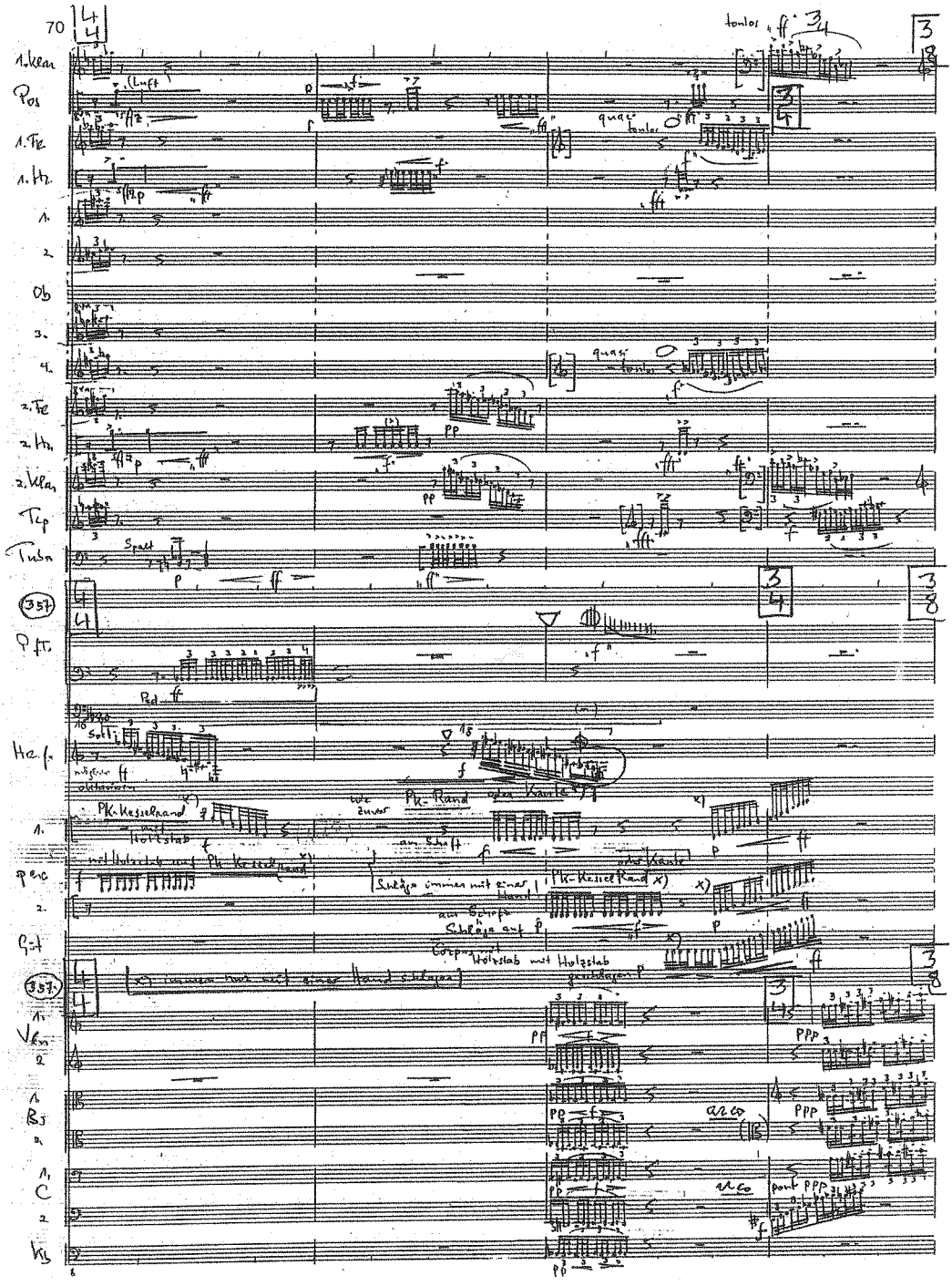
Example 3.84. Mathias Spahlinger, *música impura*, page 15, rehearsal D7, peer music

The passage in Example 3.85, from a work by Tsao, combines a series of rapid tremoli on the guitar, created through the use of a bar slide, with arpeggiation in the piano. The more linear materials in the cello and brass provide textural counterpoint.



Example 3.85. Ming Tsao, *Plus Minus*, measures 539–541, Edition Peters

In Example 3.86, the guitarist joins the two percussionists in an ascending timbral flourish in measures 359-360. By striking the body of the guitar with a rattan mallet, they produce percussive sounds that progress from dark to bright.



Example 3.86. Helmut Lachenmann, *Concertini*, measures 357–360, Breitkopf & Härtel (Tempo: ♩ = 56)

4

"All in the Family"—The Acoustic Guitar's Relatives

Throughout the history of the guitar, luthiers and performers have collaboratively developed various extensions of the instrument. One recurrent motive for experimentation has been the desire to expand the bass register. Such extension was of particular interest prior to the twentieth century and was attained either by adding strings to the standard six-string guitar or by adding a second neck with floating (i.e., unfretted) bass strings. In other cases, the intent was to build transposed versions of the instrument that would preserve its basic conformation and tuning but move its range into a higher or lower register. The comparatively diminutive *octavine* and *terz* guitars were both results of such adjustment. Ultimately, the more lasting relatives of the guitar have been precisely those that, while often smaller, have nevertheless retained the original shape and the six strings with their standard interval pattern of tuning.

The advent of manufactured materials and the expanding influence of North American vernacular music since the outset of the twentieth century have spurred yet further experimentation. Most of these ventures have been aimed primarily (though by no means exclusively) at increasing the volume of the guitar sound. Some experiments have led to obvious structural modifications, such as the built-in conical resonators that distinguish the Dobro and other slide guitars. Other innovations have altered the instrument's capacities through less overt changes to the classical structure. Carbon fiber has been introduced into bracing systems that in certain configurations significantly augment the power and projection of the instrument.[134] A "bigger" sound has also been achieved by sandwiching the synthetic material Nomex within the soundboard. The development with perhaps the most profound impact, however, has been the steel string. Substituting steel for gut or nylon has not only necessitated structural modifications to the guitar but more importantly has greatly amplified its sound. In turn, the greater volume has radically changed the contexts in which the guitar has been—and can be—used.

Although there are numerous string instruments that share characteristics with the guitar and have influenced its development, this chapter focuses exclusively on the modern guitar's closest relatives and immediate precursors. It therefore treats neither the vihuela nor the Baroque guitar, as both instruments are strongly associated with particular eras, positioned well in the past. Other plucked string instruments, while roughly contemporaneous with the modern guitar and belonging to the same extended family, have different lineages. Among these distant cousins are the mandolin, a descendant of the mandore, a small variant of the lute, as well as the banjo, whose predecessors were instruments indigenous to Africa.

134 The Australian luthier, Greg Smallman, has gained prominence through the introduction of a lattice bracing system composed of balsa and carbon fiber, a design innovation that has resulted in an instrument with uncanny volume.

As for the electric guitar, its technological complexities warrant a separate volume. Innovations such as exclusively amplified sound and the effects processing that accompanies it require detailed, in-depth analyses that exceed the bounds of the current publication.

4.1 Nineteenth century instruments

Luthiers in the nineteenth century introduced a range of guitars that differed in size and thus in pitch from the ordinary guitar but retained the standard interval pattern of tuning. None of these instruments is especially common today, but some are still available and a few even figure in contemporary compositions. The previously mentioned octavine and terz guitars both belong to this category. The small *quarte* guitar, also known as a *requinto* guitar, has also endured. It is tuned a fourth higher than standard tuning and is particularly prominent today in Central- and South American ensembles dedicated to vernacular styles of the region.

4.1.1 Octavine guitar

The octavine (also soprano, piccolo, or octave) guitar is tuned an octave higher than standard tuning (Figure 4.1). Because of its high register, this guitar has limited sustain. The scale length of 400–430 mm. is approximately two thirds that of the standard guitar. The strings are by necessity thinner, so it is difficult to maintain accurate tuning for extended periods of time.

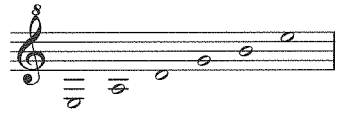


Figure 4.1. Tuning of the octavine guitar

4.1.2 Terz guitar

The terz guitar is tuned a minor third higher than the standard tuning, the same tuning that results when a capo is placed at the third fret of a normal guitar (Figure 4.2). Of the instruments in this group, the terz guitar has the most considerable musical repertoire. The terz guitar was particularly popular in Vienna in the early part of the nineteenth century and was used widely in ensemble situations, where its pronounced upper-register tessitura and powerful tone resulted in superior projection. During that time, it often featured in guitar duos, or in duos for guitar and piano, as well as in ensembles with other instruments. The terz guitar was even combined with full orchestra, as in the case of Giuliani's third concerto for guitar and orchestra.[135]

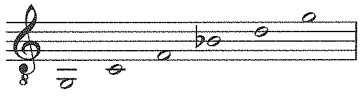


Figure 4.2. Tuning of the terz guitar

135 The term *terz* guitar first appeared in Giuliani's *III Rondo per due Chitarre*, op. 66: "Col capo tasto alla terza positione, o barra Meglio con una *Terz Chitarra*" (as advertised in Wiener Zeitung Dec. 1815). For a while afterwards, this "capo–terz" guitar was used with some regularity (e.g., by Diabelli et al.). Ferranti's *Fantaisie Variée sur la Romance d'Otello*, MVdC 111, 1828 is another well-known terz guitar work. It is marked "Guitare Tierce."

4.2 Deviation from the six strings: the seven-string guitar and the ten-string guitar/décacorde

Several guitars have been designed to include more than six strings. The nineteenth century Lacôte Heptacorde Model seven-string guitar developed from the work of Napoléon Coste, a student of Fernando Sor. The seven-string guitar has an extra "floating" bass string above the fretboard. It is tuned either to D or C below the low E of the sixth string.[136]

The early Romantic period saw the emergence of the ten-string guitar, but in two slightly variant constructs with different numbers of fretted and unfretted strings. Each version also had its own tuning, although both tunings sounded an octave lower than written. In the early nineteenth century, Fernando Carulli and René Lacôte developed a guitar that Carulli patented under the name *décacorde* (ten-string).[137] As originally conceived, the upper five strings were to be fretted and the lower bass strings were left floating above the fretboard, although other configurations may have existed. It was tuned as follows:

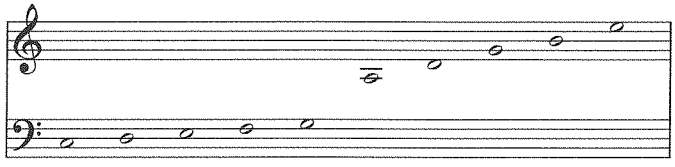


Figure 4.3. Fernando Carulli's *décacorde* tuning

The other major Romantic prototype of ten-string guitar had six fretted strings and the bottom four bass strings left unfretted. It was tuned in a step-wise manner:

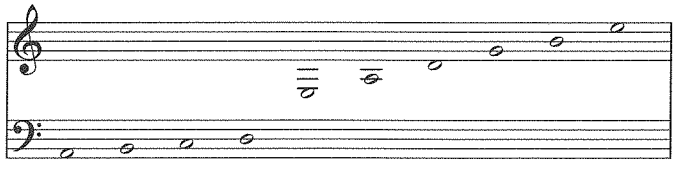


Figure 4.4. Step-wise tuning

Unlike its predecessors, the modern ten-string guitar has frets beneath all ten strings. This modification, as well as the instrument's broader fretboard and larger tuning apparatus, emerged through the collaborative efforts of the guitarist Narciso Yepes and the luthier José Ramirez in the early 1960s. Despite the complete fretting on this instrument, the additional four lower strings are still used primarily for sympathetic resonance. In other words, these strings are not customarily fingered with the left hand but instead are left to resonate when other strings are played, similar in principle to the viola d'amore.

136 An instrument with a rich history and a substantial body of high quality literature is the "Russian" seven-string guitar of the early nineteenth century, which had an open G-major tuning (*D–G–B–D–g–b–d*). Widely played in Russia, particularly by the Romani, it never achieved much popularity outside the country and remains something of an anomaly.

137 Carulli later wrote an instruction book for the *décacorde* entitled *Méthode Complète pour le Décacorde* (ca. 1826). This instrument should not be confused with the earlier, identically named ten-string lute-guitar hybrid invented by Gabriel-Louis Besson at Versailles in the late 1700s.

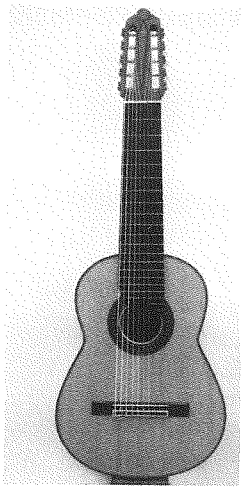


Figure 4.5. Ten-string guitar

The guitar is tuned to the so-called Yepes tuning, which appears below:

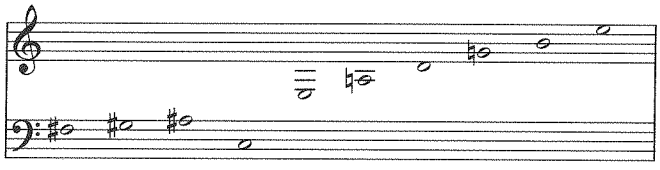
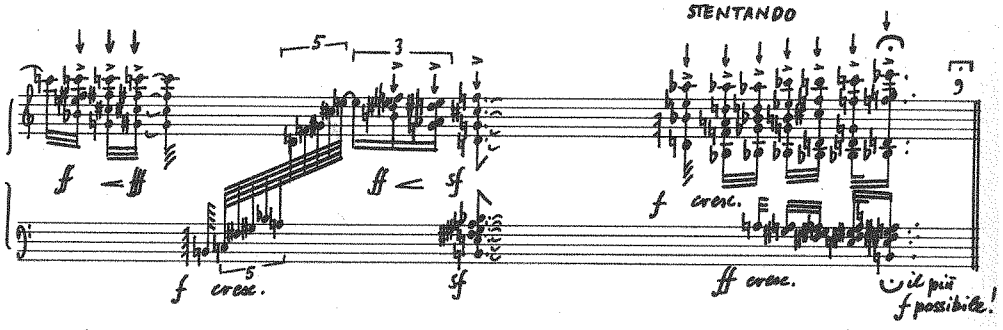


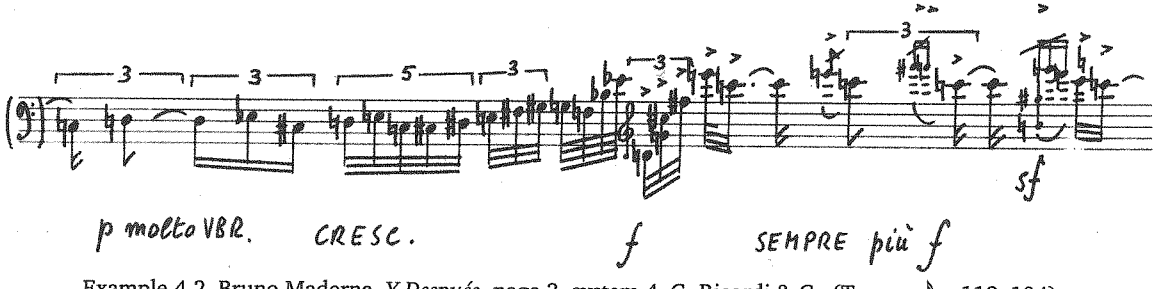
Figure 4.6. "Yepes" tuning

The extended bass range of the modern ten-string guitar affords a more luxuriant, harp-like sound than can be attained with the standard six-string guitar. Owing to this expanded range, the ten-string guitar is sometimes conveniently scored on two staves, using bass and treble clefs, and sounding an octave lower than written. This approach to notation can be seen in Example 4.1, an excerpt from Bruno Maderna's *Y Después*, where the composer exploits the instrument's extended range capabilities.



Example 4.1. Bruno Maderna, *Y Después*, page 4, system 1, G. Ricordi & C (Tempo: ♪= 112–104)

In Example 4.2 from the same composition, Maderna incorporates fairly rapid figuration on the low strings of the guitar, which gives the music a deep, murmuring quality.



Example 4.2. Bruno Maderna, *Y Después*, page 3, system 4, G. Ricordi & Co (Tempo: ♪= 112–104)

The body of literature written for the modern ten-string guitar is relatively small. Along with Maderna's *Y Después* and certain works by Ohana, Richard Barrett's *Colloid* ranks among the more

distinctive compositions specifically for the instrument. Barrett demands a wide array of playing techniques that are detailed in the legend (Figure 4.7).

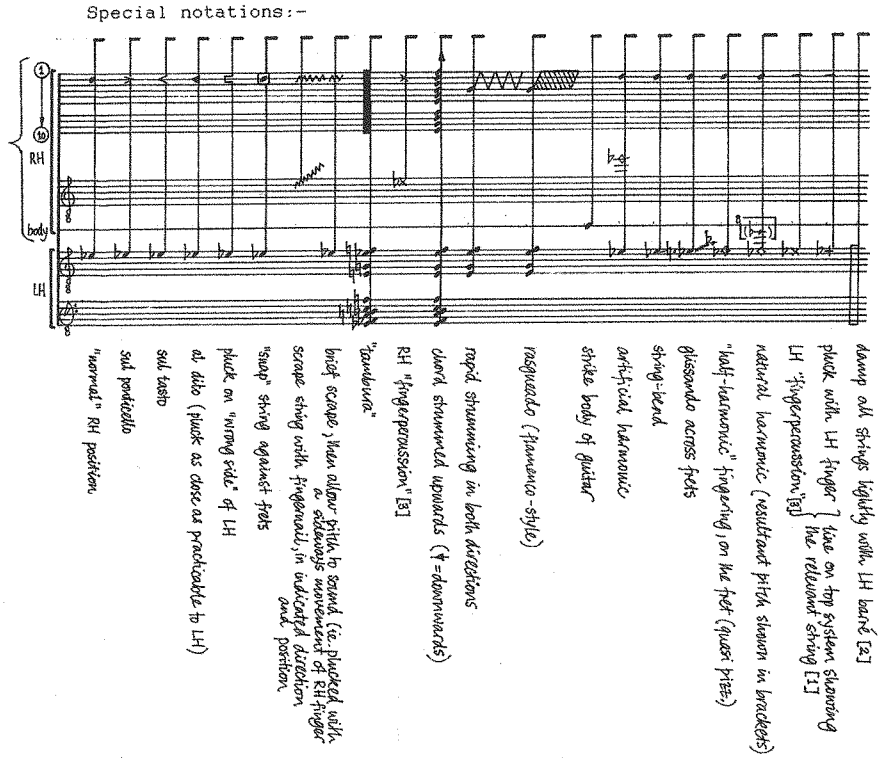
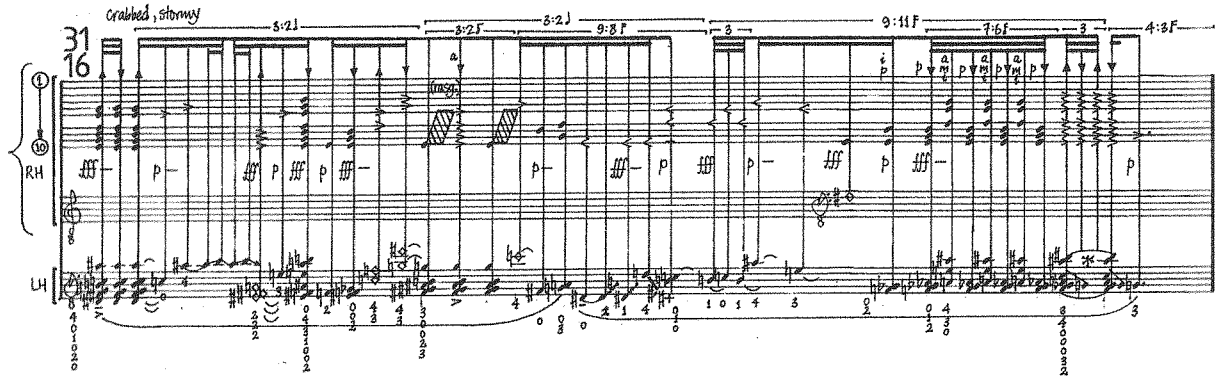


Figure 4.7. Richard Barrett, *Colloid*, legend, United Music Publishers

Colloid integrates RH and LH tapping with a combination of other playing techniques such as harmonics, half harmonics, and plucking sul tasto, generating a rich but fluid texture whose internal differentiation is ever changing.



Example 4.3. Richard Barrett, Colloid, page 9, system 1, United Music Publishers (Tempo: ♪= 104)

4.3 Double-neck guitars

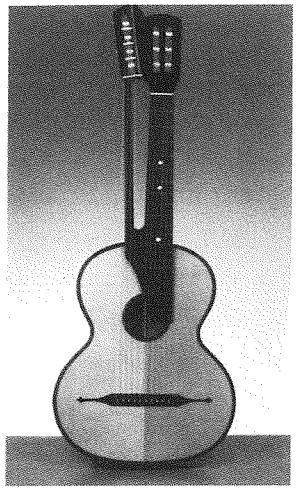


Figure 4.8. Contra-guitar

Like the ten-string guitar, the contra-guitar was developed in the early nineteenth century,[138] although the term is much more recent. Many nineteenth century guitar virtuosos—including Napoléon Coste and Johann Kaspar Mertz—favored these instruments. Nonetheless, by the early 1900s, this instrument had mostly vanished from the classical scene and was largely relegated to use in vernacular music, particularly in Austria. Indeed, for many years, the contra-guitar was widely known as the *Schrammelgitarre* because of its use by the popular Schrammel Quartet (*Specialitäten Quartett Gebrüder Schrammel*), an Austrian group formed in 1884 that performed mostly folk songs, dances, and marches.[139]

The defining characteristic of the contra-guitar is its two necks: one replicates the neck on the normal concert guitar; the other carries additional bass strings, which descend in a chromatic scale from low $E^{\flat}$ to *C*. These supplemental bass strings are sometimes called "theorboed basses," after the theorbo with its second set of strings and pegbox. The contra-guitar has a wider body than the usual concert guitar but is generally shallower in depth. Since a wider soundboard provides for greater resonance in the lower registers, the shallow body compensates by assisting in greater projection of sounds in the higher register.

Contra-guitars fit into two categories, both originating in Western Europe. The traditional Viennese contra-guitar has 13 to 15 strings with push-in tuning pegs to lock the strings into place, as well as a metal rod through the body of the guitar to support the extra tension induced by the additional strings. The other contra-guitar is the German type, which, despite being similar in appearance to its Viennese counterpart, differs in constructional details. The body of the instrument is more like the ordinary six-string concert guitar but larger. It is usually fitted with machine heads and may have 13, 15, or even 18 strings—the latter construct having a complete chromatic scale of twelve strings on the bass neck. Tunings for specific contra-guitar variants appear in Figures 4.9 and 4.10:

138 There was a double-neck instrument in use during the seventeenth century called the *chitarra atiorbata,* which had a body shaped like that of a guitar. Surviving period music for this instrument includes works by Giovanni Battista Granata and Ennemond Gaultier, also known as Gaultier le Vieux.

139 In German the contra-guitar is less colloquially—and often interchangeably—called a *Kontragitarre* or *Baßgitarre,* although the choice of name sometimes depends on the number of additional (i.e., theorbo-like) bass strings. There are period catalogues showing *Baßgitarren* with four, seven, and nine so-called theorboed basses. In France the instrument is referred to as the *guitarre theorbée.* In the U.S.A. contra-guitars are also collectively known as harp guitars.

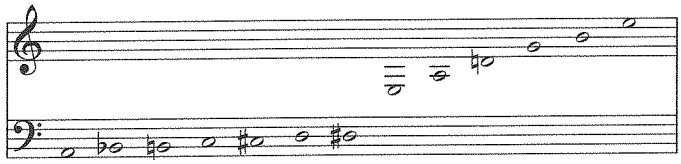


Figure 4.9. Tuning of a thirteen-string contra-guitar (with seven bass strings)

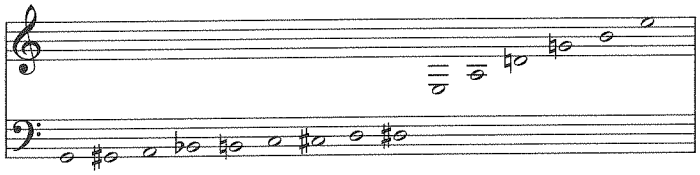


Figure 4.10. Tuning of a fifteen-string contra-guitar (with nine bass strings)

As on the ten-string guitar, the auxiliary, unfretted bass strings are normally not fingered by the LH. Instead, they vibrate sympathetically with the other strings, even following an attack when no bass strings are actively engaged. For example, if the guitarist plays a D chord using only the four treble strings and then immediately dampens the strings on the upper (i.e., standard) neck, the low D bass string continues to vibrate at about 20 percent of the initial plucked volume. These sympathetic vibrations increase the resonance and overtones of the guitar, thus generating an interesting shadow harmony.

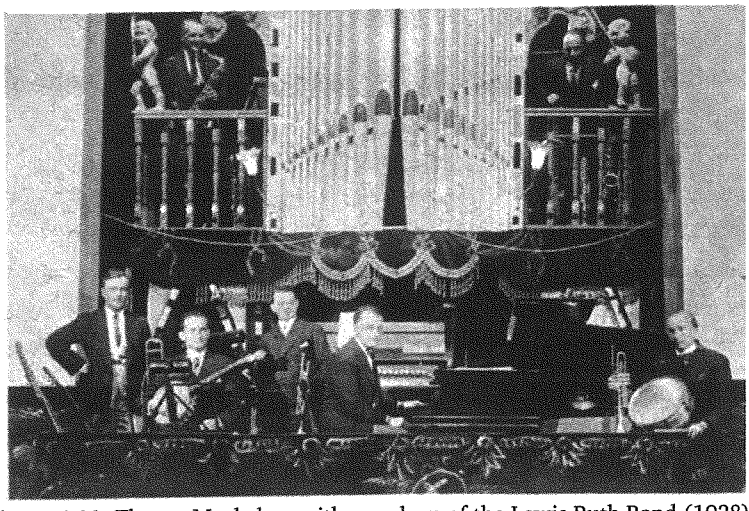
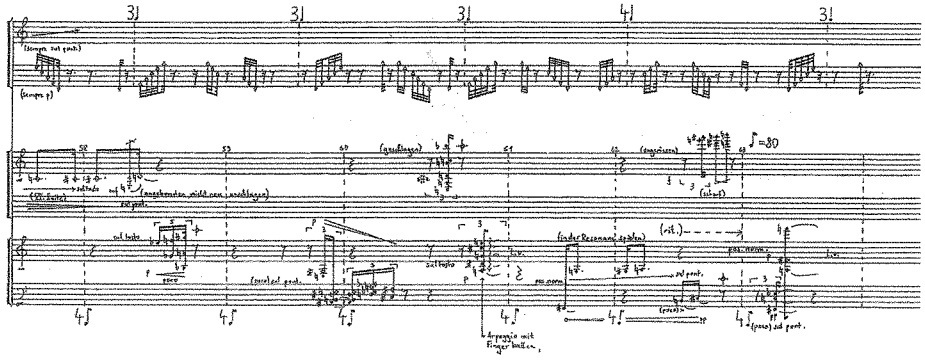


Figure 4.11. Theo v. Mackeben with members of the Lewis Ruth Band (1928).
Photo courtesy of the Kurt Weill Foundation, New York

The use of the contra-guitar in twentieth century music was at most sporadic, at least in formal contexts. The scores for several of Kurt Weill's operas, *Die Dreigroschenoper* (1928) and *Aufstieg und Fall der Stadt Mahagonny* (1930) among them, include a part for the "Baßgitarre." Evidence suggests that guitars with theorboed basses were in fact used in performance, although it is impossible to ascertain anything further about the instruments' constructs or the composer's intent. Recently recovered photographs of the Lewis Ruth Band, which, under Theo Mackeben premiered *Die Dreigroschenoper*, show the pegboxes of a guitar with theorboed basses, but reveal nothing more.[140]

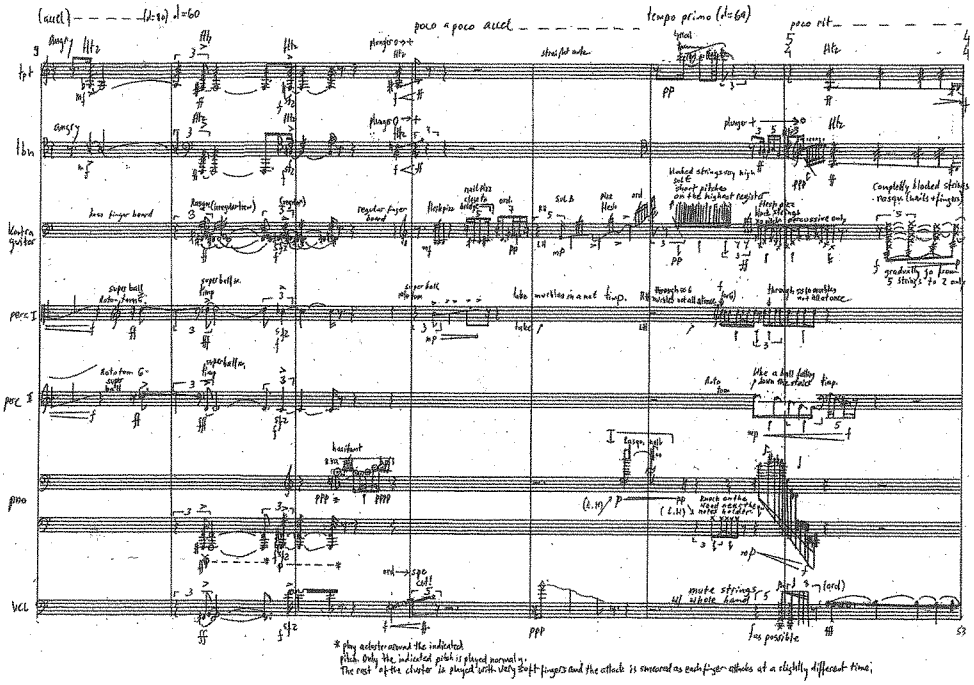
140 The information regarding original instrumentation comes from the Kurt Weill Foundation in New York. In the photograph of the premiere of *Die Dreigroschenoper* (Figure 4.11) the double headstock of a fifteen-string guitar with theorboed basses is just visible to the left of the tenor banjo player (although the smaller headstock is camouflaged by the larger one in front of it).

Despite its sonorous qualities, very few composers since Weill have utilized the contra-guitar in any of its several forms. Schöllhorn's *Hexagramm* is a work for three types of guitar, including the contra-guitar.[141] In Example 4.4, the contra-guitar part is denoted on the lower two staves, with actions on the special bass strings shown on the bottom stave and actions on the standard strings on the stave above it. The contra-guitar part features harmonics on both sets of strings as well as soft arpeggiations with the flesh of the RH fingers. At the same time, the octave-guitar part (top stave) involves barred harmonics and arpeggiations back and forth across the strings with a plectrum. This blend of shimmering harmonics with low resonances creates an effective plucked-string texture.



Example 4.4. Johannes Schöllhorn, *Hexagramm*, page 6, lower system, Editions Henry Lemoine (Tempo: ♩ = 60)

Chaya Czernowin calls for a contra-guitar in her work *Sheva* (third stave from the top), and often employs it to great effect. In measures 10-11 of Example 4.5, she uses RH *rasgueado* on the low bass strings to emphasize bass note clusters. These deep timbres combine well with the low notes struck on the piano and the bowed low cluster on the cello.



Example 4.5. Chaya Czernowin, *Sheva*, measures 9–15, Schott Music

141 The score indicates "Baß-Gitarre"; however it further specifies (in parentheses) a double-necked instrument with the auxiliary neck featuring nine floating bass strings.

4.4 Ukulele

Figure 4.12. Ukulele

The ukulele originates in Hawaii, first appearing in the 1880s. Its design and construction are likely based on the *machete da braça*, an instrument that was brought to the islands by Portuguese immigrants in the late nineteenth century.[142] With its flat front and back and contoured sides, the body of a ukulele resembles that of a small acoustic guitar. Ukuleles commonly come in four sizes: soprano, concert, tenor, and baritone. The soprano or "standard" ukulele is the smallest, and the original size for the instrument. Although ukuleles are generally made of wood, with the finer instruments built of spruce, more recent models have been made either partially or entirely of plastic. The tone and volume vary with the instrument's size and material composition. The ukulele has either three or four strings, sometimes paired in courses (where two strings are closely strung together in unison or octave to be fingered as a single string), giving the instrument a total of six or eight strings. Traditional standard tuning for the soprano ukulele is the D6 tuning (Figure 4.13):

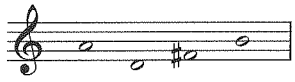


Figure 4.13. Standard ukulele tuning

Today the so-called C6 tuning is favored instead (Figure 4.14):

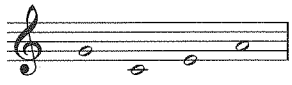
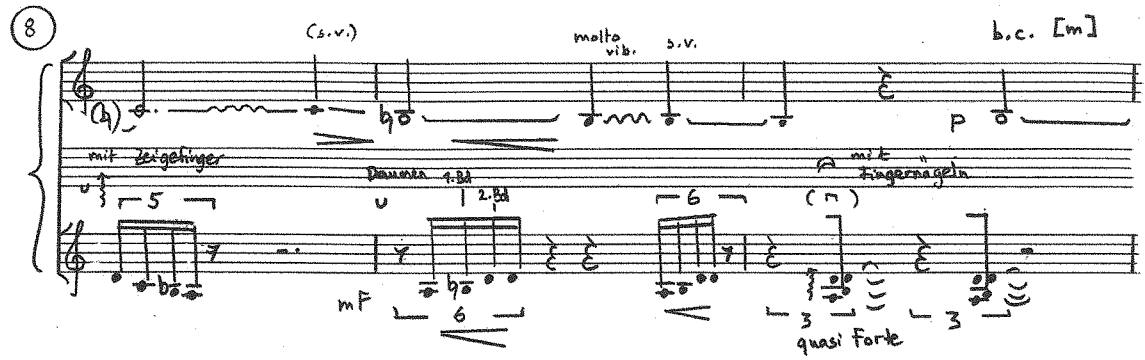


Figure 4.14. Alternative ukulele tuning

In Example 4.6, Sarah Nemtsov has a single performer both play the ukulele and sing. The ukulele is tuned to an unorthodox scordatura (*A–B♭–C–D*). The performer first strums slowly across the strings in the manner of *stile brisé* and then performs a rapid arpeggio followed by a blocked chord. The upper stave indicates the soprano voice.

142 Another version of the machete, the *machete da rajao*, had five strings and may have been the basis for the "taro-patch fiddle," a large ukulele.



Example 4.6. Sarah Nemtsov, *Brief—Vokalise*, measures 8–10, manuscript (Tempo = ♩ ca. 80)

4.5 Acoustic steel-string "flat-top" guitar

The acoustic steel-string guitar is a product of the demand for a guitar with a more powerful sound, especially on the part of American folk musicians in the early twentieth century. The development of the steel string during roughly the same era gave guitar makers the means to fulfill this need. In stark contrast to the modern classical guitar, acoustic steel-string guitars come in several different conformations, whose proportions and overall sizes help determine the tonal balance and "native sound" of a particular body style. A common colloquialism among steel-string guitarists is that "the larger the body, the louder the volume." With its greater sound projection and sustain, particularly with harmonics, the acoustic steel-string guitar offers the contemporary composer tremendous potential, much of which as yet remains untapped.

Steel-string guitars can be divided into four major types according to either the size or shape of the soundbox:

Grand Concert or "00" (Double-oh)

This is the style most directly derived from the classical guitar. It has the shallowest soundbox and is the smallest overall of the four main styles.

Grand Auditorium or "000" (Triple-oh)

This type is very similar in design to the Grand Concert, but has a slightly wider and deeper soundbox. These guitars may also have a convex back panel.

Dreadnought

This style probably ranks as the most common for steel-string guitars. Although its soundbox is even deeper than that of the Grand Auditorium, it has a narrower and shallower upper bout, a modification that gives it a distinctive wedge-shaped profile recalling that of the class of battleship after which it is named (Figure 4.15). The Dreadnought style was designed by Martin Guitars to produce a rich sound with a pronounced lower register.

Jumbo

This style is bigger than the Grand Auditorium and its girth has made it an iconic instrument for country and western music. The name was coined by Gibson Guitars to designate instruments measuring at least 16 inches across the lower bout.

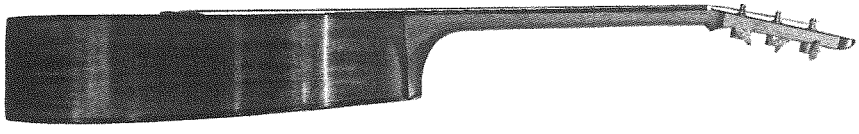


Figure 4.15. Profile view of the Dreadnought steel-string guitar

The soundboard of acoustic steel-string guitars is usually made of spruce, either from the Sitka or Alpine species. The back and sides are typically made of East Indian rosewood and so-called Honduran mahogany (i.e., Big-leaf mahogany), which has a rapidly shrinking range from Mexico to Brazil. Owing to its decorative "flame" and "quilt" patterns, figured maple is also a highly coveted wood for steel-string guitars.

The body and neck of the steel-string guitar are both reinforced in order to counteract the higher tension and greater mass of the strings. Internal bracing is sturdier than on a classical guitar to compensate for the additional duress on the bridge and soundboard. A metal bar called a *truss rod* is inserted in the neck in order to strengthen it and provide adjustable counter-tension to the stress induced by the strings. Typically, a steel-string guitar also possesses a larger soundbox than a standard classical guitar but has a somewhat narrower fretboard, which on most steel-string instruments joins the body at the fourteenth fret. Many steel-string guitars, irrespective of style, feature a *cutaway*. A cutaway model has an upper bout from which a section on the treble side near the neck has been scooped out. It affords a player easier access to the fretboard in the higher registers where the neck conjoins the body of the instrument.

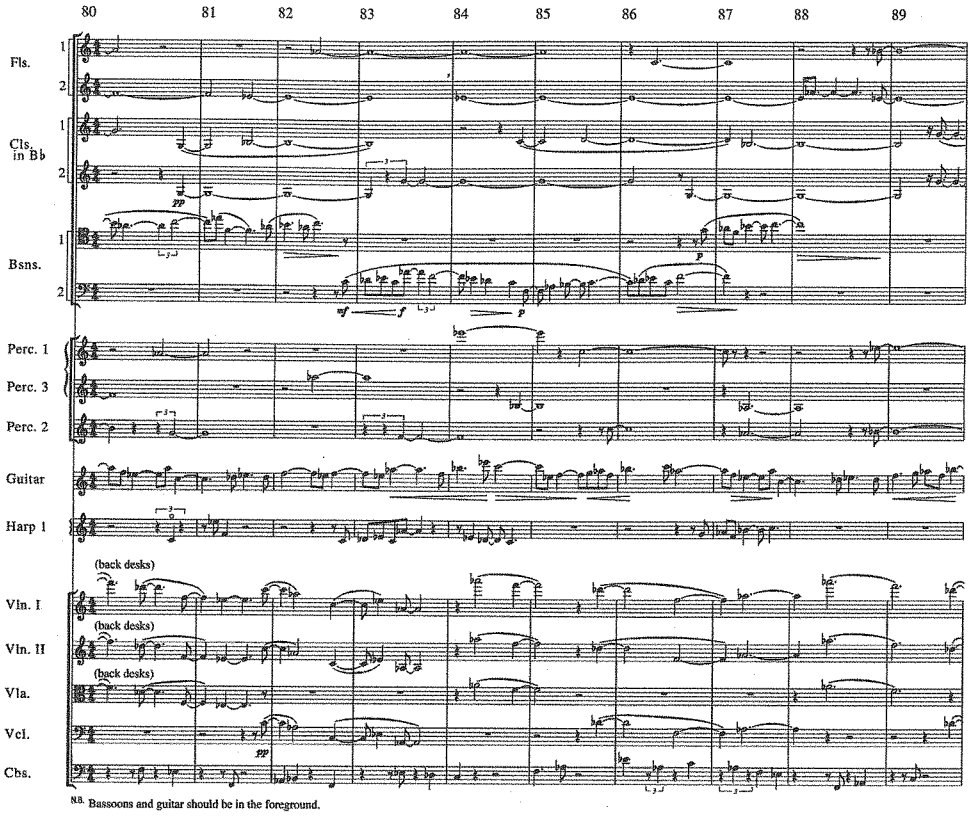
The following acoustic properties distinguish the acoustic steel-string guitar from the classical guitar:

(a) The steel-string guitar has greater sustain, particularly on the upper three strings. Harmonics, in particular, can be executed on the steel-string guitar with greater resonance and clarity.
(b) The third string of a steel-string guitar is round wound, providing a different timbre, and thereby having significantly more presence than the classical guitar's third string.
(c) The overall sound of a steel-string guitar has more "punch" and greater amplitude, especially when the guitar is played with a plectrum.

To play the steel-string guitar, guitarists have traditionally used a plectrum, and this vernacular style has carried over into classical contexts. As discussed in Chapter 1, the type of plectrum—size, shape and material—can have markedly different influences on the sound of the instrument. In comparison to plucking with the fingernails, the plectrum has a richer, bolder attack yet produces a thinner timbre. The more incisive quality of attack also imbues the guitar's sound with greater presence and volume. On the other hand, the plectrum limits some of the guitarist's technical options in that it makes playing on multiple strings simultaneously or large leaps between strings prohibitive. Therefore, playing is normally limited to simple arpeggios, chordal textures, single melodic lines, and strumming.

For several reasons, steel strings also inhibit direct use of the RH fingers, although these fingers *can* be used for plucking much as they are on a classical guitar. Not only do the steel strings have greater tension and mass, but they are also spaced much more closely together, an arrangement designed specifically to accommodate rapid plectrum technique. The additional manual pressure required to depress the strings can eventually tire the LH, while the proximity of the strings to each other can interfere with RH finger plucking.

The steel-string guitar has not been used widely in contemporary music, despite its distinctive character and its potential to project more effectively than its classical cousin in ensemble and orchestral situations. In Example 4.7, Adams exploits the special character of the steel string guitar to project a lyrical melody above a glistening orchestral texture. This is a unique example of the steel-string guitar used in an orchestral context.



Example 4.7. John Adams, *Naive and Sentimental Music*, measures 80–89, Boosey & Hawkes (Tempo: ♩ = 72)

4.5.1 Ebow

One advantage of a steel-string guitar is that the composition of its strings allows for the use of an *ebow*, which is short for "electronic bow" or "energy bow". Introduced to the public in 1976, and generally marketed under the brand name EBow, an ebow is a hand-held, electronically operated device that "bows" the guitar string with a magnetic energy field (Figure 4.16). Originally designed for use with the electric guitar, the ebow focuses a sympathetic oscillating magnetic field on a single string and causes it to vibrate. The resultant sound features the slow-swelling response and decay characteristic of sounds produced by actual bowing. It often approaches a "sine tone" but with the seductive warmth of a clarinet and potentially infinite sustain.

The ebow—and the properties of sounds that it generates—has been used effectively and inventively by a number of composers writing for the steel-string guitar. Ebows have even been applied to supine steel-string guitars in order to produce sonic drones automatically. However, despite the many exciting conjunctions of the steel-string guitar and the ebow, they are not ideally suited: unlike the electric guitar, the acoustic steel-string guitar lacks magnetic pickups, a deficit which curtails its sensitivity to—and thereby limits the possible applications of—the device.

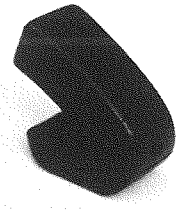
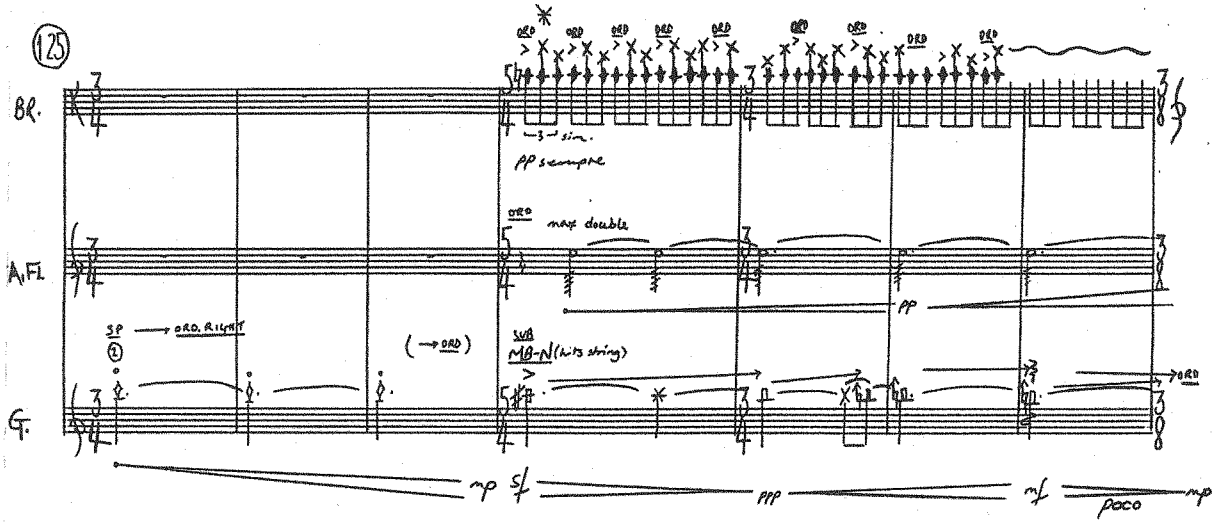


Figure 4.16. Ebow™

To operate an ebow, one grasps it with the RH and places it over a select string, which the device then induces to vibrate. An ebow can affect only one string at a time, and then not instantaneously. On the steel-string guitar, the absence of magnetic pickups delays the onset of vibrations, so it generally takes a few moments for the device to work. Consequently, moving the ebow rapidly from one string to another will prove futile, since the strings will rarely sound. In other situations, however, the ebow may elicit sounds that are unwanted, rather than no sound at all. If the guitarist wants to use the ebow to sound the fundamental note of a stopped pitch or open string, they must avoid setting the ebow on a harmonic node (e.g., the octave or fifth) or risk the harmonic sounding. Similarly, placing the ebow close to the bridge will cause high harmonics to sound but never the fundamental. Experience suggests that the most reliable position for exciting the fundamental with an ebow is over either the eleventh or the thirteenth fret.

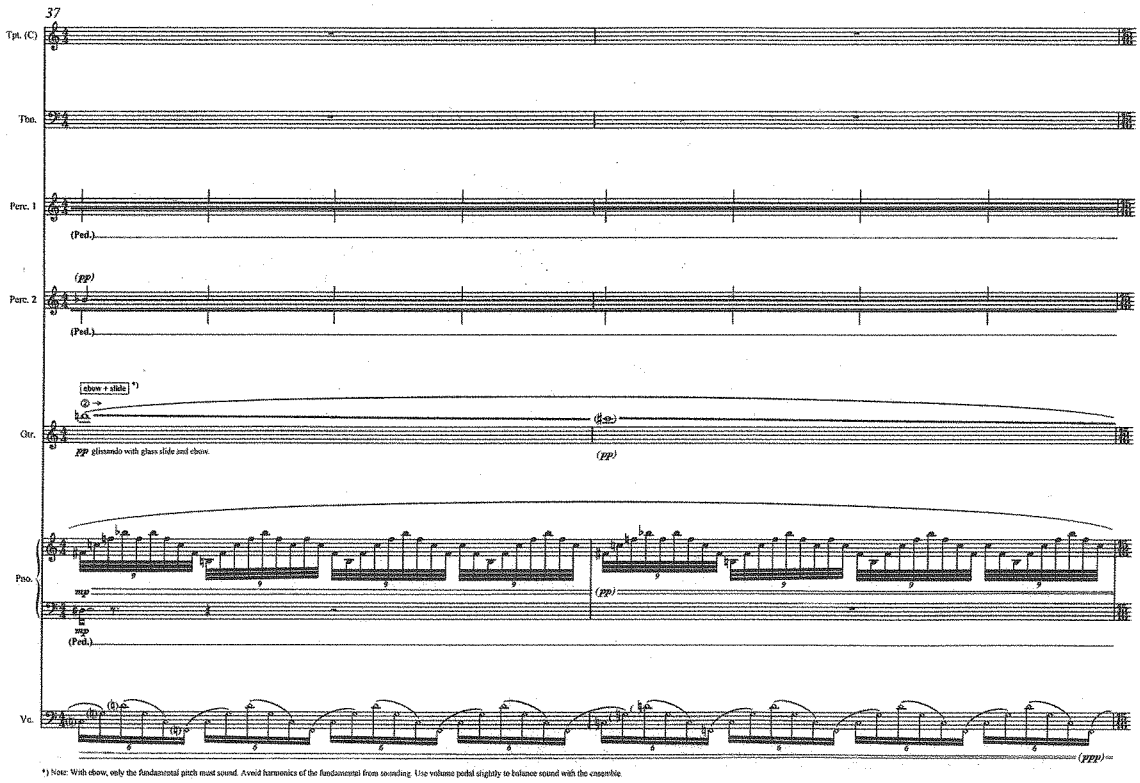
The current ebow design has two settings: (1) *normal* and (2) *overdrive*. Overdrive elicits the higher partials of the vibrating string, but never the fundamental. It is thus important to indicate to a performer which setting is to be used. Like a violin bow, the ebow can affect the string in many ways. Moving the ebow closer to the string increases the volume of the string's vibrations, and vice versa. Wiggling the ebow can thus vary the volume, which creates a slight tremolo. In a manner similar to a *jetté* on a string instrument, it is also possible to bounce the ebow so its plastic shell intermittently hits the string and interrupts the string's vibration, producing a quasi-percussive effect.

Saunders was one of the first to experiment with the possibilities of employing the ebow on an acoustic steel-string guitar. In Example 4.8, the ebow is used to create a dynamic swell on a LH harmonic (measures 125-127). The guitarist is to move the ebow closer to the string while subtly altering the sound's timbre by shifting the ebow's position from sul ponticello to *ordinario*. As a result, a range of sounds emerges, from the fundamental to its higher harmonics, whose volume also increases. In measures 128-131, a percussive noise is elicited by hitting the string audibly with a glass slide in the LH while the RH lightly presses the ebow down on the string, distorting its sound (the *x*-noteheads). Upon each ebow contact, the slide proceeds to create a microtonal glissando, which is indicated by the long arrow above the notes.



Example 4.8. Rebecca Saunders, *Molly's Song 3: Shades of Crimson*, measures 125–131, Edition Peters (Tempo: ♩ = 84)

In Example 4.9, from a work by Tsao, the guitarist uses a glass slide and an ebow to create a shimmering glissando against the sustained, bowed vibraphones in the percussion and the arpeggiations in the cello and piano. Since this guitar part is performed on an acoustic-electric guitar (a steel-string guitar fitted with a pickup or microphone), Tsao indicates that the amplifier volume should be raised slightly in order to match the ebow sound (which is quite soft) with the rest of the ensemble, as well as that the ebow must be placed over the string in a position where only the fundamental sounds.



Example 4.9. Ming Tsao, *(Un)cover*, measures 37–38, Edition Peters (Tempo: ♩ = 42)

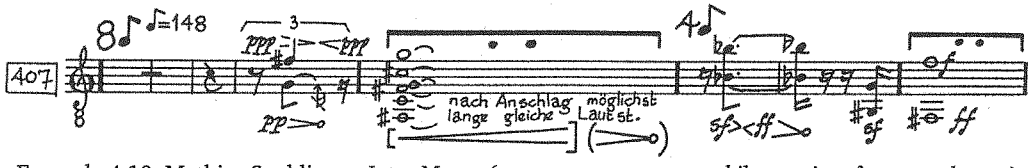
4.5.2 Acoustic–electric guitar

Amplification has been employed on acoustic steel-string guitars since the 1970s. Initially, efforts at amplification focused on systems that would preserve the essential acoustic character of the instrument, despite the "boost" in volume. Today, more often than not, the use of amplification is less about volume and more about suggesting a different kind of acoustic presence for the guitar. Built-in pickups, each with specific, properties, are common features in dozens of models of steel-string guitars. Such components permit acoustic guitars to be transformed at any time into quasi-electric instruments, each with a characteristic sound. However, the ultimate results of amplification depend not only on the type of pick-up system and guitar design (which may or may not include a built-in equalizer), but also on the choice of speaker. Furthermore, amplification allows for the use of other sound effects such as reverb or frequency modulation, which in itself may take several forms, including chorus, phasing, tremolo, and delay.

Amplification can be very effective in ensemble and orchestral situations, particularly when it is combined with a volume pedal. A good volume pedal facilitates control over amplification. On an acoustic-electric guitar it can not only ease

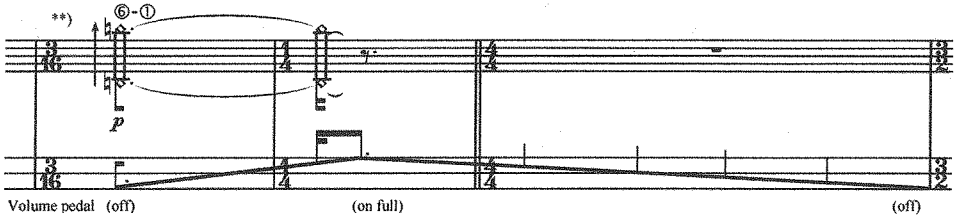
the transition between acoustic and amplified sound but also help shape the amplitude of sound upon any attack on the strings. The sound level induced by a volume pedal never exceeds the highest volume setting on the amplifier. Special care must be taken so that the maximum volume on the amplifier does not create feedback, which is prone to occur with any acoustic-electric guitar.

The subtle expressive effects that a volume pedal can lend to the sound of an acoustic-electric guitar have inspired several contemporary composers. In Example 4.10, Spahlinger uses the volume pedal to create extreme dynamic swells within the orchestral texture. Indeed, throughout *inter-mezzo*, he exploits the full volume spectrum between solely acoustic (zero volume) and fully amplified sound.



Example 4.10. Mathias Spahlinger, *Inter-Mezzo (concertato non concertabile tra pianoforte e orchestra)* measures 407–412, Peer Musikverlag

For *(Un)cover*, Tsao notates the use of the volume pedal on a lower, three-line stave. He indicates the volume pedal levels only at specific junctures, but draws connecting lines to show the gradual transitions in amplitude between them. In Example 4.11, the volume pedal is activated after the acoustic attack of a harmonic chord, foregrounding the chord's resonance.

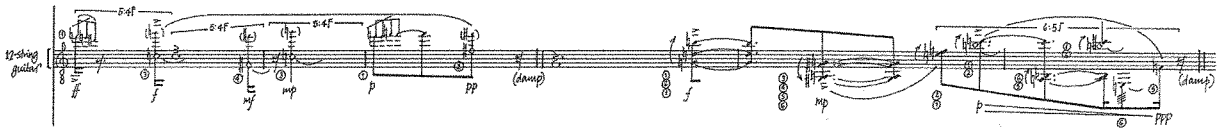


Example 4.11. Ming Tsao, *(Un)cover*, measures 10–12, Edition Peters (Tempo: ♩ = 64)

4.5.3 Twelve-string acoustic guitar

The twelve-string guitar, a steel-string double-coursed guitar, was first developed in the United States toward the end of the nineteenth century. Its origins are somewhat obscure: one hypothesis is that it emerged as a result of the mandolin's popularity—the mandolin also being a double-coursed instrument. Normally the four lower courses are tuned in octaves and the higher two courses are tuned in unison, a tuning which produces a striking chorusing effect. Because the strings are steel and double in number, their tension and mass are such that it is almost impossible to manipulate them with the bare fingers and thus almost always necessary to use a plectrum instead.

In Example 4.12, Barrett has the guitarist employ a hard plectrum to play a twelve-string acoustic guitar. Note that each notated pitch on strings 6–3 will be accompanied by its octave above.



Example 4.12. Richard Barrett, *Negatives, 5. entstellt*, measures 29–34, United Music Publishers (Tempo: ♩ = 101)

4.5.4 Resonator guitar/slide guitar/Dobro®

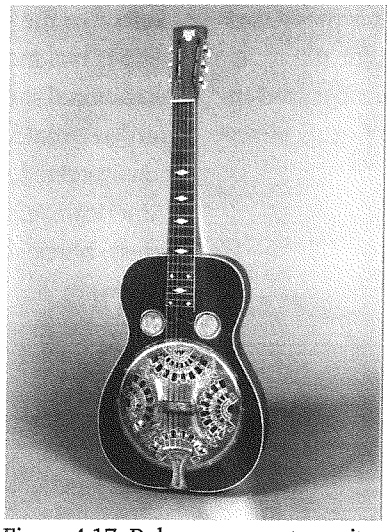


Figure 4.17. Dobro or resonator guitar

The resonator guitar was developed in the United States during the early twentieth century in response to tremendous ferment and emerging trends in popular music. Two companies, the National String Instrument Corporation and the Dobro Manufacturing Company, were primarily responsible for its production. Among its precursors was the steel-string Hawaiian or "Hawaii" guitar, whose influence at the time stretched as far as Europe. Indeed, by the 1930's, the Hawaiian guitar—and Hawaiian music—had insinuated itself to such an extent that it appeared in works ranging from Weill's *Die Dreigroschenoper* to Dmitri Shostakovitsch's *Jazz Suite II*. The huge and growing popularity of jazz dance music in this era also had a profound impact, for it meant that any steel-string guitar had to compete with more acoustically assertive instruments.

Today many models of resonator guitar exist, including electric versions to which pickups have been added. The defining feature of the resonator guitar is the inclusion of one or more resonating "cones". The classic Dobro contains a single inverted cone, with the apex pointing down. Made of aluminum, these cones are installed in the soundbox and function as small speakers. They significantly augment an instrument's projection, which is an asset when the guitar is pitted against brasher instruments like the horn, as it often was in the dance bands of yore. The bodies of resonator guitars are made from either wood or metal. Resonators, however, are always aluminum, although they do come in different conformations depending on the manufacturer. Consequently, the cones all possess a distinctly metallic sound, regardless of their exact size, shape, or orientation.

Resonator guitars have either squared or rounded necks. The strings are secured approximately an inch away from the fretboard, giving them very high action. On square-necked models, the action cannot be adjusted down, so pitches on the fretboard can only be "stopped" with a slide. The conformation of the neck also impinges somewhat on LH movement. Such guitars are almost always placed supine on the lap in "lap-steel style" so as to facilitate LH slide actions. On round-necked models, the string action is highly adjustable, so pitches can be played equally well with or without a slide, and the position of the guitar can be adapted accordingly. The resonator guitar slide has a grip running its full length meant to be grasped by the LH. Usually a narrow bar of solid steel, often with specially curved beveled edges along the bottom, it is substantially heavier than

either the bottleneck slide or the *Gleitstahl*, and its greater weight adds body and sustain to the sounds it activates. Special RH thumb picks and finger picks have also been designed for the resonator guitar, and while these are typically used in play, the instruments can be plucked just as effectively with the fingers of the RH.

Apart from the standard tuning, diverse scordatura are used for the resonator guitar. Occasionally, variants like the open D tuning are employed (Figure 4.18), but most tunings have been adopted from traditional sources, some close to home and others farther afield. The majority of these scordatura have evolved from tunings typical of various North American vernacular styles of music, namely, bluegrass, blues, and country (Figure 4.19).

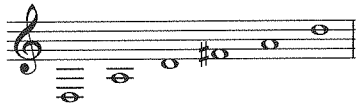


Figure 4.18. Open D tuning

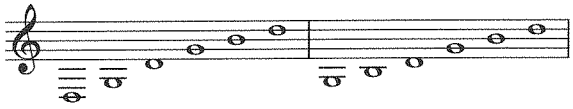
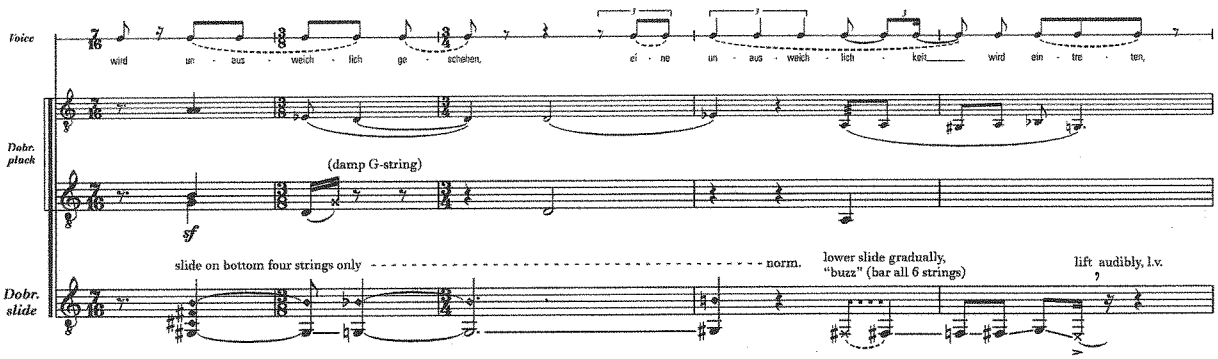


Figure 4.19. Some popular bluegrass tunings

It is still unusual to find the resonator guitar in classical contexts, but a few contemporary composers have incorporated it very effectively in their work. Marc Sabat's *Garden Songs* is a piece for prerecorded voice-track, percussion, alto flute and Dobro. The part for resonator guitar—in this case, a Dobro—is notated on the three lower staves: the lowest of these is an action stave stipulating the movements of the LH, which operates a slide (all dampening motions for the LH are notated as well); the middle stave shows which of the six strings are to be plucked, with the standard guitar tuning used to signify each of the six strings; and the upper stave indicates the sounding pitches, since the guitar is tuned in a scordatura based on just intonation (Example 4.13). Sabat exploits several of the instrument's special qualities here, including a "buzz" that occurs naturally when one gently lifts the metal slide from the string. Indeed, throughout the composition, the slide enables micro-intervallic movements on the strings that transform the Dobro into a highly expressive vehicle within a rarefied aesthetic universe.



Example 4.13. Marc Sabat, *Garden Songs*, measures 11–15, Plainsound Music Edition (Tempo: ♩ = 120)

5

Appendices

5.1 Technical notes

5.1.1 Helmholtz resonator

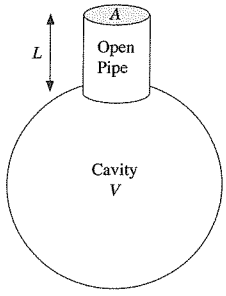


Figure A.1. Helmholtz resonator

"The resonant frequency of a Helmholtz resonator is inversely proportional to the square root of the volume of the body and is approximated with the following formula:

$f = c/2\pi\sqrt{A/VL}$

where c is the speed of sound, V is the volume of air in the container, A and L are the cross-sectional area and the effective length of the opening respectively. Therefore, the mass of the air in the neck is, where is the air density. The effective length of the neck is greater than its geometrical length since an extra volume of air both inside and outside moves with the air in the neck. The extra length that should be added to the geometrical length of the neck is typically (and roughly) of 0.6 times the radius of the outside end, and one radius at the inside end. In a guitar body acting as a Helmholtz resonator, the opening is the tone hole. The area of the tone hole is round and is easy to determine. The geometrical length of the neck is very short (only a couple of millimeters thick). The effective length of the neck can be approximated to about 1.7 times the radius of the tone hole."[143]

5.1.2 Multiphonic analysis

Our analysis was conducted with three different guitars: Imai classic (cedar top), Southwell A-series classic (Spruce top), and Ovation steel string. Hannabach Goldin strings were used for the two classical guitars and D'Addario strings for the steel-string guitar. For each of the multiphonics in Table A.1, the analysis was based on spectrograph readings at three different times during the morphology of the multiphonic sound: 100–150 milliseconds, 400–500 ms, 800–1000 ms. The resultant chords in Figures A.2–A.4 were derived from those harmonics that were present over the entire course of the multiphonic's morphology. However, our analysis revealed that

143 Traube, "Timbre of the Classical Guitar," 17-18.

the strength of each chord's harmonics changed over time in that weaker harmonics occasionally gained strength as the multiphonic sound evolved (see Table A.1).

Time in milliseconds	100–150 ms	400–500 ms	800–1000 ms
Multiphonic Number	**Harmonic Number**: left to right ordering indicates a decrease in amplitude. Numbers in parentheses indicate octaves of harmonics that occur in the vicinity of the stopped finger.		
XIV.25 (string 6)	9>2>7>16>(4)	7>9>2>16	7>2>9>(4)>16
IV.5 (string 5)	4>13>17>(8)>9	4>13>17>9>(8)	4>13>9>17
III - (string 4)	13>7>6>19	13>7>6>19	6>13>7>19

Table A.1

Figures A.2–A.4 show three different snapshots of Multiphonic XIV.25 (string 6) at three different periods in its morphology. The horizontal axis of the graph denotes frequency in kHZ (kilohertz). The vertical axis denotes amplitude in mV (millivolts). These three snapshots support the data in Table A.1, which shows how the relative strength of the harmonics changed over time.

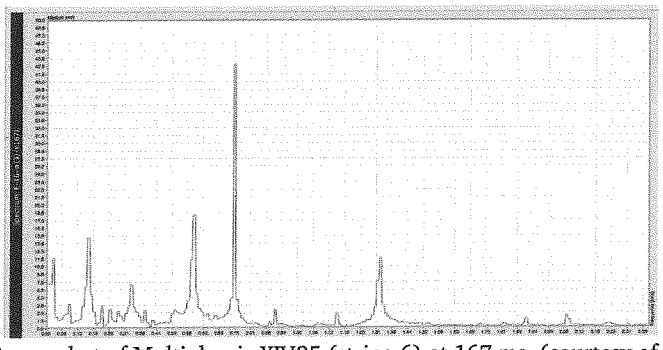


Figure A.2. A snapshot of Multiphonic XIV.25 (string 6) at 167 ms. (courtesy of Marc Sabat)

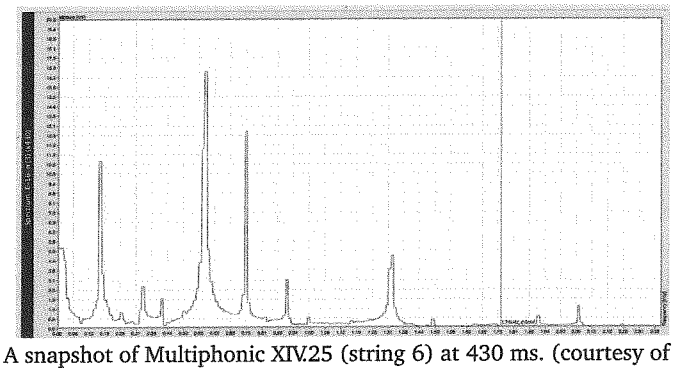


Figure A.3. A snapshot of Multiphonic XIV.25 (string 6) at 430 ms. (courtesy of Marc Sabat)

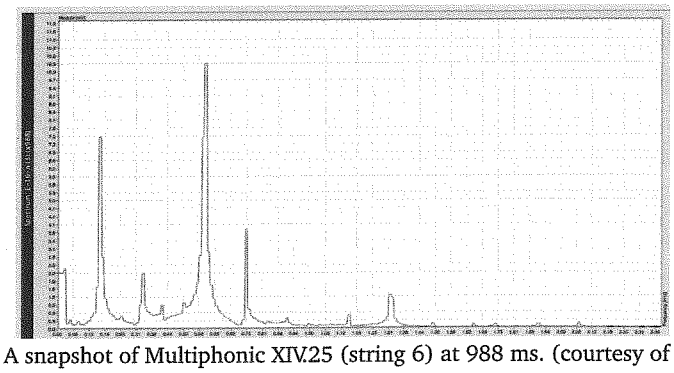


Figure A.4. A snapshot of Multiphonic XIV.25 (string 6) at 988 ms. (courtesy of Marc Sabat)

5.1.3 Bi-tone formula for yielding hertz

An interval in twelve-tone equal temperament (ET) can be described as:

$F_i = 2^{i/12} F_0$, where i is an integer and F_0 is a standard reference frequency (such as A, 110 Hz).

Thus, $F_i/F_0 = 2^{i/12}$, where F_i/F_0 is an interval in ET. If the interval is positive, the ratio $2^{i/12}$ will be > 1, and if negative the ratio will be < 1.

Since the frets of the guitar are usually at ET spacing we can use the ET equation to describe the relationships of the length of a string on either side of the fret. It is useful to *normalize* the ratios (i.e., to have them add up to 1), so one can easily see the relationship between the two ratios. (For a guitar, this equation assumes a fret of infinite thinness, so depending on the flatness of the fret, there will be some minor pitch variation).

If a string is stopped at a given fret, this fret creates an interval to the open string. One can think of the total string length as L_0 and length at the fret to the bridge as L_1, and from the fret to the nut as L_2. The ratio of lengths can be inverted for simplicity (i.e., where the interval is positive, the ratio of the length will be < 1 since one is using a smaller portion of the string). If one calculates $2^{-i/12}$ to derive the length ratio L_0/L_1, then $L_0/L_2 = 1 - (L_0/L_1)$ for the ratio of string length from the fret to the nut.

One can then use Hz and replace L_0 with the string frequency F_0, and let $L_1 = F_1$ and $L_2 = F_2$. Thus, for the A string where $F_0 = 110$ Hz, at the eleventh fret:

$F_1 = 110/2^{-11/12} = 110/0.529732 = 207.65$ Hz $\approx G^{\sharp 3}$

$F_2 = 110/(1 - 2^{-11/12}) = 110/0.470268 = 233.91$ Hz $\approx A^{\sharp 3} + 6.13¢$

At the twelfth fret, F_1 and F_2 are equal:

$F_1 = 110/2^{-11/12} = 110 / 0.5 = 220$ Hz $= A^3$

$F_2 = 110/(1 - 2^{-11/12}) = 110 / 0.5 = 220$ Hz $= A^3$

These calculations are for pitches on either side of a physical fret, labeling F^2 the auxiliarly tone. For a bi-tone with the finger at the twelfth fret, for example, one would hear the string length of the twelfth fret to the bridge but the string length of the eleventh fret to the nut.

5.2 Diverse preparations and descriptions from Yates and Elgart

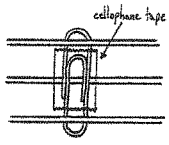
Yates and Elgart, Prepared Guitar Techniques, 6–12. Illustrations by Peter Yates. Reprinted with permission from the California Guitar Archives, Los Angeles. www.calguitar.com

PREPARATION MATERIALS

Please note that not all examples are illustrated. Space has been left for the reader to make any sketches necessary to recall the preparations as they appear on the reader's instrument.

A. METAL

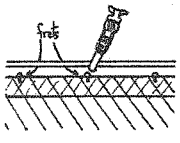
1. Nuts and Bolts. One or more small bolts can be clamped onto a string by pinning the string between the head of the bolt and a nut. A low gong sound is produced.



2. Nails, Hairpins, Paper Clips, and Screws. Any of these materials can be woven between three or more strings to produce a "steel drum" sound. If necessary a small piece of tape can be used to keep them from working themselves free during playing.

3. Alligator Clips. These versatile items are available in a variety of sizes and either with or without teeth. They can be clamped onto any string to produce a very clear gong of definite pitch.

If a clip is placed directly over a fret it can produce a snare drum effect by rattling against the fret when the string is plucked.

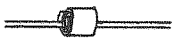


A very satisfying "rattlesnake" sound can be created by attaching a small clip above a fret that is near the nut (usually the third or fourth fret and the first or second string work best) and then suddenly bringing the string into contact with a fret near the string's midpoint. When the string is so activated, the clip rattles against the edge of the fret in a steadily accelerating buzz. Even among clips of the same size and type, some will produce better rattles than others, so the preparer is advised to try several clips before making a final decision.

7. Split-Shot (Lead Fishing Sinkers). These sinkers are available in a variety of sizes and can be attached and removed from a string without damaging it. (If possible, obtain varieties that are designed to be attached and removed by hand.) They produce a deep gong effect much like that produced by nuts and bolts.

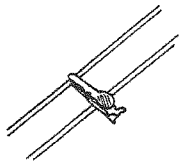
NOTE: keep a ready supply of extra sinkers; they should be replaced after two or three uses due to metal fatigue. If the metal wears too much the sinker will fly off the string.

8. Metal Foils and Sheet Metal. Small pieces of metal foils (aluminum foil or the lead foil used to seal wine bottles) can be wrapped, folded or bunched around a string. The resulting sound can be clear as a bell or muted and subtle like a wooden gong, depending on the amount of a string's length that is wrapped.



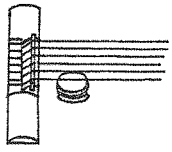
Alligator clips (continued)

A bouncing sound resembling that of a dropped ping-pong ball can be achieved by attaching a clip to a wound string and letting it lean by gravity against another string. When the latter string is plucked, the clip bounces against it.

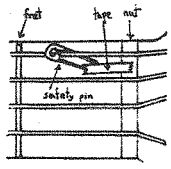


4. Aluminum bottle cap. When a threaded aluminum cap from a quart-sized bottle is lightly pinned between a string and the soundboard, the flexible, rounded top of the cap will cause the string to buzz like a sitar string. By carefully adjusting the position of the bottle cap a surprisingly haunting sound with great sustaining power can be obtained. Caps of varying sizes should be tried in order to determine which provide the preferred sounds.

NOTE: any plastic gaskets that are attached to the cap should be removed in order to allow the cap to vibrate freely.



5. Metal Wire. A soft buzzing sound can be produced by looping a short piece of wire around part of another object, such as an alligator clip. Pieces of wire can also be looped directly around a string, but will have a tendency to move along the string unless they are held in position by masking tape "leashes" connecting them to another part of the guitar.



6. Safety Pins. Small safety pins can also be used to produce buzzing sounds. They can be closed loosely around a string and then anchored, as in the previous example, with a thin leash of masking tape.

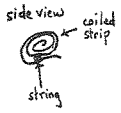
2. Cork. Cork is another material which can be partly split and pushed onto a string. Its spongy consistency gives a thick, muted quality to the resultant sounds. One advantage of cork is that very small pieces can be used, thereby allowing preparation near the nut of the guitar, where the strings are quite close to the fingerboard.

NOTE: Once a piece of cork is on a string, its split end can be taped together to help secure it.

3. Masking Tape. Paper masking tape can be folded over a string to produce a wide variety of sounds. A string can be made to sound like a drum or gong depending on the amount of tape that is used and the percentage of string length that is covered.

NOTE: A bit of gum residue is sometimes left on a string when tape is removed, but it can be rubbed off easily.

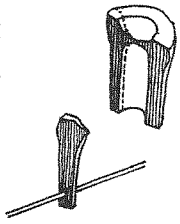
With thicker, more springy sheet metal, such as pie tin aluminum, a coiled strip can be fashioned to actually clamp onto a string. This technique is particularly useful in producing bell-like sounds from the wound bass strings.



B. WOOD

1. Bamboo. Bamboo's fibrous and resilient nature makes it well suited for preparations. Pieces of almost any size can be attached to a string by splitting them slightly along the grain and then pushing the string into the crevice that is thus created.

Longer pieces of bamboo can be woven between three or more strings to create a kalimba-like sound.

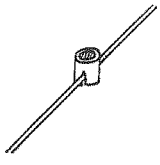


D. RUBBER AND PLASTIC

1. Rubber Erasers. Pencil erasers of the "cap" type or pieces of larger erasers can be pinned between a string and the nut, fingerboard, soundboard, or saddle of the guitar. Results range from soft thuds of indefinite pitch to penetrating sounds of definite pitch which suggest Chinese wood blocks.

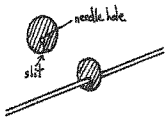
2. Rubber Tubing and Rubber Washers. Pieces of various types of rubber tubing, such as surgical tubing or automobile fuel line, can be partly split and pushed onto a string to create a low drum sound. Small pieces cut from rubber washers can also be used in this way, and are particularly useful near the nut, where clearance is limited.

NOTE: the split ends can be taped together once the preparation is in place in order to help keep it from working its way off the string during playing.



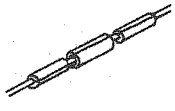
3. Sheet Plastic. Many types of sheet plastic, ranging from the soft varieties used for bread bag fasteners to the brittle, stiff varieties used for guitar picks, can be cut into suitable shapes and attached to a string. Once a piece of plastic is chosen and cut, it should be pierced near its middle with a needle in order to provide a "seat" for the string and then slit with a scissors from its edge to the needle hole. It can then be pushed onto the string until the string snaps into the needle hole and the piece of plastic is firmly held in place.

NOTE: the size of the needle hole should be gauged to suit the string for which the preparation is intended. The hole should be slightly smaller in diameter than the string.



Wire Insulation (continued)

Two small, tight-fitting pieces of insulation can be used to surround, and thus keep in place, a loosely fitting object (such as a larger piece of insulation). This creates a buzzing or rattling sound.



E. MISCELLANEOUS

1. Wax. Paraffin or beeswax can be molded around any of the monofilament treble strings to produce a dependable bell sound. Although the wax is a bit messy to remove, it stays in place well and will not harm the string. This technique should be avoided for the bass strings, where removal of wax from the interstices of the wire wrappings would be difficult.

C. CLOTH

1. Felt. Small blocks of very dense felt, such as the types used by piano technicians, can be pinned between a string and the nut, fingerboard, soundboard, or saddle of the guitar. It is tempting to use the word "wooly" to describe the muted sound that results.

2. String and Cloth Tape. Small pieces of string can be tied around a string to achieve a subtle or pronounced muting, depending on the quantity of string and its location. Cloth tape, like paper masking tape, can be folded around a string in various amounts to produce sounds ranging from bell-like chords to dull thuds.

Sheet Plastic (continued)

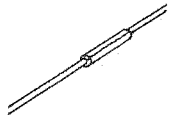
The stiff, brittle plastics result in a marvelously clear "church bell" sound, particularly on the treble strings of the guitar.

Larger pieces of plastic, such as an entire guitar pick, can be woven between three or more strings to produce a steel drum or Kalimba sound. They may be held in place with a bit of tape, if necessary.

4. Foam Rubber and Polyurethane Foam. A block of dense, resilient foam rubber or spongy polyurethane can be pinned between a string and the nut, fretboard, soundboard, or saddle of the guitar. A foam block near the bridge under one of the treble strings produces a muted tone but with a surprisingly loud, percussive "pop" attack. The "pop" is especially noticeable when the string is fretted high on the fretboard, close to the foam.

Certain types of foam are resilient enough to stay in place when partly split and pushed onto a string. A soft drum sound is usually produced with this method.

5. Wire Insulation. Insulated electrical wire is sold in a wide variety of standardized sizes. After being stripped off a piece of wire, the insulation can be cut to an appropriate length and then slit lengthwise with a small scissors so that it can be slipped onto a string. The insulation can be made to fit either tightly or loosely, depending on the size of the string and the size of the wire that is chosen. Short pieces of insulation that fit tightly around a treble string will yield a remarkable bell-like sound, with two clear fundamentals.



2. Pipe Cleaner. A pipe cleaner, wrapped tightly around a string, can produce a satisfying gong sound and has the added virtue of being a very secure preparation.

F. HYBRID PREPARATIONS

The term *hybrid preparations* was coined by Bunger to refer to preparations in which more than one object is attached to a string. On a guitar, hybrid preparations can be used to produce different combinations of timbres depending on where the string is fretted and plucked. These preparations are useful in expanding the vocabulary of sounds that can be used in any one piece. One interesting hybrid can be created by attaching a small disc of sheet plastic (cut from a medium gauge guitar pick) to the first string near the nut of the guitar, and then pinning an aluminum bottle cap between the same string and the soundboard, near the bridge. When the unstopped, or "open" string is plucked, one hears a combination of a bell sound and a "sitar" buzz. However, when the string is fretted anywhere between the sheet plastic disc and the bottle cap, only the sitar effect is heard.

5.3 CD Track List

1. Pitches beyond the fretboard (Chapter 1.7.3)
2. Glissando: two examples of glissandi on upper and lower strings (Chapter 1.7.12)
3. Portamento (Chapter 1.7.12)
4. String Bend.two examples of string bend on upper and lower strings (Chapter 1.7.13)
5. *Apoyando* versus *tirando* (Chapter 1.8.2)
6. RH plucking areas.five examples of plucking at the various positions, *molto sul ponticello, sul ponticello, ordinario, sul boca, sul tasto* (Chapter 1 Figure 1.43)
7. Angling the RH fingernail.four examples of angling the RH fingernail on upper and lower strings of *fingernail inclined, fingernail straight, side of fingernail, with the fingertips (no nail)* (Chapter 1 Figure 1.45)
8. Filtering.two examples of fast and slow filtering with the RH (Chapter 1.8.6)
9. Wah-wah effect (Chapter 1.8.6)
10. *Rasgueado*.five examples of various rasgueado strumming patterns, *a-m-i, e-a-m-i, e-a-m-i-p, a-m-i-a-m-i, e-a-m-i-e-a-m-i,* and *slow motion rasgueado* (Chapter 1.8.7)
11. Timbral transformation of rasgueado from molto sul pont. to sul tasto (with strings muted by the LH) (Chapter 1.8.7)
12. RH muting or pizzicato (Chapter 1.8.8)
13. Strumming with plectrum versus strumming with nails (Chapter 1.8.10)
14. Same harmonic produced on different positions of the string (Chapter 2.2.2)
15. Natural harmonic versus artificial harmonic.four examples on upper and lower strings (Chapter 2.8.1)
16. RH pizzicato non-appuyé (Chapter 2.8.4)
17. Half harmonics (Chapter 2.5)
18. Half harmonic glissando (Chamber 2.5)
19. Multiphonic.String 6, *F* (Chapter 2 Figure 2.9)
20. Multiphonic.String 6, *G* (Chapter 2 Figure 2.9)
21. Multiphonic.String 6, *J* (Chapter 2 Figure 2.9)
22. Multiphonic.String 5, *G* (Chapter 2 Figure 2.10)
23. Multiphonic.String 5, *L* (Chapter 2 Figure 2.10)
24. Multiphonic.String 5, *Q* (Chapter 2 Figure 2.10)
25. Multiphonic.String 4, *G* (Chapter 2 Figure 2.11)
26. Multiphonic.String 4, *I* (Chapter 2 Figure 2.11)
27. Multiphonic.String 4, *J* (Chapter 2 Figure 2.11)
28. Attackless harmonic chord (Chapter 2.9)
29. Filtering of a harmonic chord (Chapter 2.9)
30. RH pitched tapping (Chapter 3.2)
31. LH pitched tapping (Chapter 3.1.1)
32. RH unpitched tapping (Chapter 3.2.3)
33. Auxiliary Tone.scale along string 6 (Chapter 3.3.2)
34. Auxiliary Tone.scale along string 2 (Chapter 3.3.2)
35. Auxiliary Tone.chord (Chapter 3.3.2)
36. Auxiliary Tone.two examples of "koto" pizz. on high and low strings (Chapter 3.3.2)
37. Pizz. behind nut.all six strings (Chapter 3.3.2)
38. Battutto.plectrum in various positions and on various strings (Chapter 3.4)
39. Battutto.slide with some slide movement in various positions along various strings (Chapter 3.4)
40. Tambour (pitched) (Chapter 3.6)
41. Tambour (unpitched) (Chapter 3.6)
42. Percussive map.sixteen examples illustrating the four positions along area E, first using the nail in all four positions, followed by back of nail in all four positions, then outstretched finger in all four positions, and finally the knuckle in all four positions (Chapter 3 Figure 3.13)
43. Percussive map.sixteen examples illustrating the four positions along area F using the nail, back of nail, outstretched finger, and knuckle as in Track 42 (Chapter 3 Figure 3.13)
44. Percussive map.sixteen examples illustrating the four positions along area T using the nail, back of nail, outstretched finger, and knuckle as in Track 42 (Chapter 3 Figure 3.13)
45. Percussive map.sixteen examples illustrating the four positions along area B using the nail, back of nail, outstretched finger, and knuckle as in Track 42 (Chapter 3 Figure 3.13)
46. Percussive map.twelve examples illustrating the three positions along area N using the nail, back of nail, outstretched finger, and knuckle as in Track 42 (Chapter 3 Figure 3.13)
47. Tamburo.five examples crossing at fifth through ninth frets (Chapter 3.9)
48. Brushing along the strings (Chapter 3.10)
49. Scraping along a string including scraping at harmonic positions and slow scraping (Chapter 3.10)
50. Rubbing (Chapter 3.10)
51. Rubbing and brushing in cobination (Chapter 3.10)

52. "Guero".with plectrum along the neck (Chapter 3.10.1)
53. "Guero".with plectrum behind the saddle of the bridge (Chapter 3.10.1)
54. String buzz with LH nail (Chapter 3.11)
55. Slide.two examples of a slow glissando along a single string and all six strings (Chapter 3.13.1)
56. Slide.two examples of a fast glissando along a single string and all six strings (Chapter 3.13.1)
57. Slide.two examples of vibrato along a single string and all six strings (Chapter 3.13.1)
58. *Gleistahl*.slow and fast glissandi and vibrato (Chapter 3.13.1)
59. Bowed guitar across a single string and all six strings (Chapter 3.13.2)
60. Threaded metal rod across strings 1–4 (Chapter 3.13.2)
61. Preparations with spoons (Chapter 3.14.2)
62. Preparations with putty (Chapter 3.14.3)
63. Preparations with alligator clips (Chapter 3.14.3)
64. Steel-string ebow.example on an open string (Chapter 4.5.1)
65. Steel-string ebow.example of a glissandi with the slide (Chapter 4.5.1)
66. Steel-string.volume pedal (Chapter 4.5.2)

5.4 Bibliography

5.4.1 Solo works for the guitar

Applebaum, Mark. "DNA." Manuscript, 2004.

Ambrosini, Claudio. "RAP." Manuscript, 1994.

Babbitt, Milton. *Sheer Pluck (Composition for Guitar)* (1984). New York: Edition Peters, 1984.

Bailie, Joanna. "Primary Interpolations." Manuscript, 1997.

Barlow, Klarenz. *...until...* (Version 7, 1980–81). Cologne: Feedback Studio, 1982.

Barrett, Richard. *Colloid* (1988–1991). London: United Music Publishers, 1991.

Berio, Luciano. *Sequenza XI* (1988). Vienna: Universal Edition, 1988.

Beyer, Stefan. "Schabefleisch." Manuscript, 2010–2011.

Billian, Christian. "Inbezugnahme: zu zwei Capricchos von Francisco Goya." Manuscript, 2003.

Bland, William. "Untitled Compositions in Three Sections." Manuscript, 1975.

Brindle, Reginald Smith. *El Polifemo de Oro (Four Fragments for Guitar)* (1956). Florence: Aldo Bruzzichelli, 1963.

———. *Do Not Go Gentle* (1976). Milan: Edizioni Suvini Zerboni, 1976.

Britten, Benjamin. *Nocturnal,* op. 70 (1963). London: Faber Music, 1965.

Carter, Elliott. *Changes* (1983). New York: Boosey & Hawkes, 1983.

Clementi, Aldo. *Dodici Variazioni per chitarra* (1980). Milan: Edizioni Suvini Zerboni, 1985.

Company, Alvaro. *Las Seis Cuerdas* (1963). Milan: Edizioni Suvini Zerboni, 1965.

Corbett, Sidney. *Arien IV: Solo Music for Guitar* (1986). Celle: Moeck Verlag, 1994.

Davidovsky, Mario. *Synchronisms No. 10* (1992). New York: Edition Peters, 1995.

Davies, Peter Maxwell. *Lullaby (for Ilian Rainbow)* (1972). London: Boosey & Hawkes, 1978.

De Falla, Manuel. *Homenaje Pour Le Tombeau de Claude Debussy*. London: J. & W. Chester, 1926.

Dillon, James. *Shrouded Mirrors* (1987). London: Edition Peters, 1988.

Donatoni, Franco. *Algo: Due pezzi per chitarra* (1977). Milan: Edizioni Suvini Zerboni, 1978.

Edgerton, Michael Edward. "Tempo Mental Rap." Manuscript, 2005.

Eggert, Moritz. "Vermillion Sands." Manuscript, 1999.

Ferneyhough, Brian. *Kurze Schatten II* (1983-90). London: Edition Peters, c1989 [1990].

Finnissy, Michael. *Song 17* (1976). London: British Music Information Centre, 1976.

Fox, Christopher. *Chile* (1991). London: Fox Edition, 1991.

Francesconi, Luca. "Alborada." Manuscript, 1989.

Gadenstätter, Clemens, and Lisa Spalt. "Tal para qual (Szene nach Goya für Stimme und Gitarre einer Person)." Manuscript, 2003.

Hayden, Sam. *AXE(S)* (1997). London: British Music Information Centre, 1997.

Henze, Hans Werner. *Royal Winter Music—First Sonata based on Shakespearean Characters* (1975–1976). Mainz: B. Schott's Söhne, 1976.

Hespos, Hans-Joachim. *KITARA* (1971). Munich: Edition Modern, 1971.

Hosokawa, Toshio. *Serenade* (2003). Mainz: Schott Japan, 2003.

Hübler, Klaus K. *Reißwerck* (1987). Wiesbaden: Breitkopf & Härtel, 1992.

———. *Zwei Skizzen* (1981). Celle: Moeck Verlag, 1981.

Ingvarsson, Sebastian. "Suggestions." Manuscript, 2010.

Klich, Tobias. "grüntrübe Ritornelle beim Verlassen des Territoriums." Manuscript, 2009–2010.

Kronengold, Charles. "Berlioz." Manuscript, (199–?).

Levine, Josh. "Downstream." Manuscript, 1991–1992.

Maderna, Bruno. *Y Después* (1971). Milan: G. Ricordi & Co., 1973.

Maïda, Clara. "Gitter für Gitarre." Manuscript, 2009.

Mendoza, Elena. *Breviario de espejismos* (2005). Frankfurt a.M.: Edition Peters, 2005.

Mercer, Chris. "A Snowball's Chance." Manuscript, 2004.

Milliken, Catherine. "'Los Caprichos' No. 61 Volaverunt." Manuscript, 2004.

Murail, Tristan. *Tellur* (1977). Paris: Éditions musicales transatlantique, 1978.

Newland, Paul. *Essays in Idleness* (2001). London: British Music Information Centre, 2001.

Oehring, Helmut. *Foxfire Eins <natriumpentothal>* (1993). Berlin: Bote & Bock, 1993.

Ohana, Maurice. *Si le jour paraît ...* (1963–1964). Paris: Gérard Billaudot éd., 1972.

Pisaro, Michael. *mind is moving (I)* (1995). Berlin: Edition Wandelweiser, 1995.

Pisati, Maurizio. *Caprichos de simios y burros* (2003). Maurizio Pisati-Zone, 2003.

———. *Poema della Luce* (2002). Maurizio Pisati-Zone, 2003.

———. *Sette Studi* (1990). Milan: Casa Ricordi S.r.l., 1991.

Pousseur, Henri. *L'ibericare* (1975). Brussels: Centre Belge de Documentation Musicale, 1998.

Pritchard, Alwynne. *Nostos on Topos II* (2000). London: British Music Information Centre, 2000.

Radulescu, Horatio. *Subconcious Wave,* op. 58 (1984). Stuttgart: Lucero Print, 1984.

Riehm, Rolf. *Toccata Orpheus* (1990). Munich: G. Ricordi & Co., 1996.

Rojko, Uroš. *Chiton (Pst!) (nach Capricho 28 von Francisco de Goya)* (2003). Berlin: Verlag Neue Musik, 2009.

Sanchéz-Verdú, José. *Lux ex tenebris (Goya-Zyklus)* (2003–2009). Wiesbaden: Breitkopf & Härtel, 2011.

Sandström, Sven-David. *Surrounded* (1972). Stockholm: AB Nordiska Musikförtlaget/Edition Wilhelm Hansen, 1975.

Scelsi, Giancinto. *Ko-Tha pour guitare traitée comme un instrument de percussion* (1967). Paris: Éditions Salabert, 1989.

Schwehr, Cornelius. *sub-version* (1988). Wiesbaden: Breitkopf & Härtel, 1992.

Scodanibbio, Stefano. "Dos abismos." Manuscript, 1992.

Shaked, Yuval. *einseitig ruhig* (1982). Celle: Moeck Verlag, 1982.

Stäbler, Gerhard. *...schloß die Augen, vor Glück...* (1993). Munich: G. Ricordi & Co., 1993.

Stahnke, Manfred. *Ansichten eines Käfers* (1991). Hamburg: Stahnke Verlag, 1991.

Steen-Andersen, Simon. "in-side-out-side-in..." Manuscript, 2000–01.

Takemitsu, Toru. *All in Twilight* (1988). Tokyo: Schott Japan, 1989.

———. *Equinox* (1993). Tokyo: Schott Japan, 1995.

Tsao, Ming. *If ears were all that were needed...* (Los Caprichos #38) (2007). Frankfurt a.M.: Edition Peters, 2010.

Vivier, Claude. *Pour guitare* (1975). Doberman-Yppan/Boosey & Hawkes, 1987.

Wuorinen, Charles. *Guitar Variations* (1994). New York: Edition Peters, 1994.

Zimmermann, Walter. "15 Zwiefache." Manuscript, 1979.

5.4.2 Guitar solo with ensemble/orchestra

Crumb, George. *Quest* (1994). New York: Edition Peters, 1996.

Schöllhorn, Johannes. *Tiento* (1999). Paris: Editions Henry Lemoine, 1999, 2001.

5.4.3 Chamber music with guitar

Alessandrini, Patricia. "Funeral Sentences." Manuscript, 2008.

Bussotti, Sylvano. *Rara (eco sierologico)* (1967). Milan: Casa Ricordi S.r.l., 1967.

Demers, Inouk. "Djenoun." Manuscript, 2002.

Donatoni, Franco. *ÅSE: Due pezzi per chitarra e voce femminile (soprano)* (1990). Milan: Edizioni Suvini Zerboni, 1990.

Ferneyhough, Brian. *no time (at all)* (2004). London: Edition Peters, 2005.

Finnissy, Michael. *Obrecht Mottetten II* (1988). Oxford: Oxford University Press, 1988.

Furrer, Beat. *Fragmentos de un libro futuro* (2007). Kassel: Bärenreiter, 2007.

Gadenstätter, Clemens. *variationen und alte themen* (1996). Vienna: Ariadne Verlag, 1996.

Grainger, Percy Aldridge. *Hubby and Wifey (Husband and Wife/Manden og Kogen) Danish Folk Music Setting No. 5* (1923). Aylesbury: Bardic Edition, 2000.

Hayden, Sam. *presence/absence* (2000). London: British Music Information Centre, 2000.

Henze, Hans Werner. *El Cimarrón* (1969–1970). Mainz: B. Schott's Söhne, 1972.

Huber, Klaus. *La terre tourne sur les cornes d'un torreau* (1992/94). Munich: G. Ricordi & Co., 1994.

———. *"Luminescenza" piccola musica enigmistica per Brian Ferneyhough* (1992). Munich: G. Ricordi & Co., 1993.

———. *Plainte—lieber spaltet mein herz I* (1990–92). Munich: G. Ricordi & Co., 1992.

Kagel, Mauricio. *Sonant* (1960/....). Frankfurt a. M.: Edition Peters, 1964.

Kurtág, György. *A Kis Csáva,* op. 15.b (1978). Budapest: Editio Musica Budapest, 1981.

Lachenmann, Helmut. *Salut für Caudwell* (1977). Wiesbaden: Breitkopf & Härtel, 1985.

Lervik, Olav. "Vortex II." Manuscript, 2008.

Maderna, Bruno. *Aulodia per Lothar* (1965). Milan: Edizioni Suvini Zerboni, 1977.

Mahnkopf, Claus-Steffen. *Kurtág-Duo* (2000). Freiburg: CSM (Claus-Steffen Mahnkopf), 2000.

Mercer, Chris. "A Snowball's Second Chance." Manuscript, 2005.

Nemtsov, Sarah. "Brief—Vokalise." Manuscript, 2012.

Oehring, Helmut. *CAYABYAB* (1993). Berlin: Boosey & Hawkes, 1993.

———. *Nr. 1 (aus: Koma)* (1988). Berlin: Bote & Bock, 1988.

Olofsson, Kent. "Wheel within a Wheel." Manuscript, 2005–2006.

Pattar, Frédéric. "tresse-ébresztés." Manuscript, 2010.

Petrassi, Goffredo. *Seconda Serenata* (1962). Milan: Edizioni Suvini Zerboni, 1962.

Pisaro, Michael. *Leaves* (1994). Berlin: Edition Wandelweiser, 1994.

Sabat, Marc. *Garden Songs* (2009). Berlin: Plainsound Music Edition, 2009.

Sánchez-Verdú, José. *Lux ex tenebris (Goya-Zyklus)* (2003–2009). Wiesbaden: Breitkopf & Härtel, 2009.

Saunders, Rebecca. *Molly's Song 3: Shades of Crimson* (1996). Frankfurt a. M.: Edition Peters, 1996.

Sciarrino, Salvatore. *Esplorazione del bianco II* (1986). Milan: Casa Ricordi S.r.l., 1986.

Schöllhorn, Johannes. *Hexagramm* (1989). Paris: Editions Henry Lemoine, 1991, 2001.

Seroussi, Ruben. *Vueltas Y Revueltas (Returns and Revolts)* (1999). Tel Aviv: Israel Music Institute, 2000.

Spahlinger, Mathias. *música impura* (1983). Hamburg: Peer Music, 1985.

Stäbler, Gerhard. *bittersüß : Bagatelle für Gitarre und Glasspiel* (1994). Mülheim an der Ruhr: EarPort edition, 1994.

Steen-Andersen, Simon. "Drownwords." Manuscript, 2003.

Stravinsky, Igor. *Four Songs* (1918, instr. 1953–1954). London: J. & W. Chester/Edition Wilhelm Hansen London, 1955.

Takemitsu, Toru. *Valeria* (1965/69). Vienna: Universal Edition, 1973.

Tsao, Ming. *Not Reconciled* (2003). Frankfurt a.M.: Edition Peters, 2011.

———. *(Un)cover* (2007–2008). Frankfurt a.M.: Edition Peters, 2011.

Villa-Lobos, Heitor. *Sextuor mystique.* Paris: Editions Max Eschig, 1917.

Walter, Caspar Johannes. *durchscheinende Etüde IVa* (1991). Cologne: Thürmchen Verlag, 1991.

Webern, Anton. *Drei Lieder,* op. 18. Vienna: Universal Edition, 1925.

Willcock, Ian. *I Memory* (1990). London: Forward Contemporary Music, 1990.

5.4.4 Large ensemble/orchestral/choral/ stage works with guitar

Adams, John. *Naive and Sentimental Music* (1998-1999). New York: Boosey & Hawkes, 2000.

Barraqué, Jean. *Concerto* (1962–1968). Florence: Aldo Bruzzichelli edition, 1968.

Barrett, Richard. *Dark Matter* (2002). London: United Music Publishers, 2002.

———. *Negatives* (1988–1993). London: United Music Publishers, 1993.

———. *Opening of the Mouth* (1992–1997). London: United Music Publishers, 1997.

———. *Unter Wasser* (1997–1998). London: United Music Publishers, 1998.

Berg, Alban. *Wozzeck* (1914–1922). Vienna: Universal Edition, 1926.

Berio, Luciano. *Chemins V (su Sequenza XI)* (1992). Vienna: Universal Edition, 1992.

Boulez, Pierre. *Eclat* (1965). Vienna: Universal Edition, 1965.

———. *Le Marteau sans Maître* (1954). London: Universal Edition, 1957.

Carter, Elliott. *Syringa* (1978). New York: Associated Music Publishers, 1980.

Czernowin, Chaya. *Sheva* (2008). Mainz: Schott Music, 2008.

Donatoni, Franco. *Refrain* (1986). Milano: Ricordi, 1986.

Ferneyhough, Brian. *Les Froissements d'Ailes de Gabriel* (2003). London: Edition Peters, 2005.

Goeyvaerts, Karel. *Nr. 6 met 180 klankvoorwerpen* (1954). Brussels: Centre Belge de Documentation Musicale, 1994.

Grainger, Percy Aldridge. *The Lonely Desert Man Sees the Tents of the Happy Tribes—Room Music Tit Bits No. 9* (1911–16/49). Aylesbury: Bardic Edition, 1996.

———. *Random Round—Room Music Tit Bits No. 8* (1912–14/43). Aylesbury: Bardic Edition, 2006.

———. *Scotch Strathspey and Reel—British Folk Music Setting No. 28* (1901–1911). London: Schott Music, 1924.

———. *Shallow Brown—Sea-Chanty Settings No. 3* (1927). London: Schott Music, 1927.

Krenek, Ernst. *Sestina*, op. 161 (1957). Kassel: Bärenreiter, (19--?).

Lachenmann, Helmut. *Concertini* (2004–2005). Wiesbaden: Breitkopf & Härtel, 2005.

———. *‚...zwei Gefühle...' Musik mit Leonardo* (1992). Wiesbaden: Breitkopf & Härtel, 1992.

Oehring, Helmut. "Nr. 3 (aus: Koma)." Manuscript, 1989.

Scelsi, Giancinto. *TKDRG* (1968). Paris: Editions Salabert, 1968.

Schönberg, Arnold. *Moses und Aron* (1930-32, unfinished). Mainz: B. Schott's Söhne, 1958.

———. *Serenade*, op. 24. Copenhagen: Wilhelm Hansen Edition, 1924.

———. *Von heute auf morgen*, op. 32 (1928). Mainz: B. Schott's Söhne, 1958.

Schreker, Franz. *Der Ferne Klang* (1910). Schliengen: Edition Argus/Verlag Ulrich Schmitt, 1998.

———. *Suite* "Der Geburtstag der Infantin". Leipzig: Universal Edition, 1923.

Spahlinger, Mathias. *Inter-Mezzo* (concertato non concertabile) (1986). Hamburg: Peer Music Classical, 1986.

Tsao, Ming. *Geisterinsel* (2010–2011). Frankfurt a.M.: Edition Peters, 2011.

———. *Plus Minus* (2012–2013). Frankfurt a.M.: Edition Peters, 2013.

———. *Serenade* (2012). Frankfurt a.M.: Edition Peters, 2012.

Webern, Anton. *Fünf Stücke*, op. 10 (1913). Vienna: Philharmonia (UE), 1923/renewed 1951.

———. *Zwei Lieder*, op. 19 (1926). Vienna: Universal Edition, 1928/renewed 1956.

Weill, Kurt, and Berthold Brecht. *Die Dreigroschenoper* (1928). Vienna: Universal Edition, 2000.

Zemlinsky, Alexander. *Der Traumgörge* (1904–1906). Milan: Casa Ricordi, 1990.

Zender, Hans. *Schuberts "Winterreise"—Eine komponierte Interpretation.* Wiesbaden: Breitkopf & Härtel, 1993.

Zimmermann, Bernd Alois. *Die Soldaten* (1957 - 64). Mainz: Schott Music, 1975.

5.4.5 Literature cited

Aplvor, Denis. *An Introduction to Serial Composition for Guitarists*. Bimport: Musical New Services, 1982.

Blatter, Alfred. *Instrumentation and Orchestration.* New York: Schirmer Books, 1997.

Bowen, Jeffrey. "Tristan Murail's Tellur: A Piece of Spectral Music and an Exploration of Compositional Possibilities for the Classical Guitar," *Nota Bene: Canadian Undergraduate Journal of Musicology*, Vol. 3, no. 1 (2010): Article 7 (accessed 26 November 2013) http://ir.lib.uwo.ca/notabene/vol3/iss1/7

Boye, Gary R. "Montesardo, Girolamo *Nuova inventione d'intavolatura* (1606)." Updated 31 October 2013 (accessed 15 November 2013). http://applications.library.appstate.edu/music/guitar/1606montesardo.html

———. "The Rasgueado (Strummed) Style: Chronological List of Rasgueado Tablatures." Updated 29 January 2013 (accessed 25 February 2011) http://applications.library.appstate.edu/music/guitar/strummed.html

———. "Granata, Giovanni Battista. *Nuova Scielta* (1651)." Updated 4 November 2013 (accessed 22 November 2013). http://applications.library.appstate.edu/music/guitar/1651granata.html

Brooke, Matthew. "Numerical Simulation of guitar radiation fields using the boundary element method." Ph.D. diss., University of Wales Cardiff, 1992.

Bruck, Wilhelm, ed. *Pro Musica Nova: Studien zum Spielen Neuer Musik*. Wiesbaden: Breitkopf & Härtel, 1992.

Byers, Gregory. "And the Woods Still Sing... : A Survey of Woods used in Classical Guitars." *GFA Soundboard*, Vol. 29, no. 4 (2003): 13–25.

De Kloe, Jan. *Cross-String Ornamentation Technique: A Practical Guide for guitarists.* Québec: Doberman-Yppan, 2007.

Delume, Caroline, ed. *Guitare: Méthodes-Traités-Dictionnaires et Encyclopédies-Ouvrages généraux*, Vol. 2. Série 1, France 1600–1800. Bressuire: J.-M. Fuzeau, 2003.

Fletscher, Neville H., Rossing, Thomas D. *The Physics of Musical Instruments.* New York: Springer-Verlag, 1998.

Gould, Elaine. *Behind Bars*. London: Faber Music, 2011.

Hall, Monica. "The *chittarra atiorbata* and the *guittare theorbée*: a reappraisal." *Early Music*, Vol. 39, no. 1 (2011): 25–34.

Hoban, Wieland. "Zur Musik Klaus K. Hüblers." *Fragmen: Beiträge, Meinungen und Analysen zur neuen Musik* (43). Saarbrücken: PFAU-Verlag, 2005.

Horvath, Christian, and Gunter Schneider, eds. *verwegene wege: neue Musik für Gitarre aus Österreich*. Vienna: Universal Edition, 1995.

ANADOLU ÜNİVERSİTESİ Merkez Kütüphanesi

Johnson, Julian. *Webern and the Transformation of Nature.* Cambridge: Cambridge University Press, 2000.

Kachian, Chris. *Composer's Desk Reference for the Classical Guitar*. Pacific: Mel Bay Publications Inc., 2006.

Kirkpatrick, Ralph. *Domenico Scarlatti.* Princeton: Princeton University Press, 1983, 1953.

Li, Christopher, and Conny Restle. *Faszination Gitarre*. Berlin: Nicolaische Verlagsbuchhandlung, 2010.

Lunn, Robert Allan. "Extended Techniques for the Classical Guitar: A Guide for Composers." D.M.A. diss., Ohio State University, 2010.

Marincola, Federico. "The Instructions from Vincenzo Capirola's Lute Book: A New Translation." *The Lute* 23 (1983): 23–28.

Marriott, David Franklin, Jr. "Contemporary Guitar Composition: Experimental and Functional Practices Since the 'Second Viennese School.'" Ph.D. diss., Univeristy of California, San Diego, 1984.

Mas, Jean-Luc. *Sonorités Nouvelles Pour Guitares*. Paris: Gérard Billaudot, 1984.

McCreadie, Sue, ed. *Classical Guitar Companion*. Dorset: Musical New Services, 1982.

Meyer, Jürgen. *Akustik der Gitarre in Einzeldarstellungen.* Frankfurt a.M.: Verlag Erwin Boschinsky, 1985.

Morris, Geoffrey. "Contemporary Guitar Repertoire: A Performer's Examination of Preparation and Performance." Ph.D. diss., University of Newcastle, 2007.

Ophee, Matanya. "A Short History of the use of the left-hand thumb: some considerations of its practical use in performance today." Updated 22 February 2008 (accessed 22 November 2013). http://www.guitarandluteissues.com/LH-Thumb/lh-thumb.htm

Östersjö, Stefan. "Shut Up N' Play!: Negotiating the Musical Work." Ph.D. diss., Lund University, 2008.

Pujol, Emilio. *Escuela Razonada de la Guitarra*. Vols. 1, 3, & 4. Buenos Aires: Ricordi Americana, 1954–1971.

Rebizzi, Patrizia, and Ruggero Tajè. *La Chitarra nella Musica de '900 (tecniche e semiografia nella musica contemporanea)*. Milano: Casa Musical Sonzogno di Piero Ostali, 1987.

Ruymar, Lorene, comp. *The Hawaiian Steel Guitar and its Great Hawaiian Musicians*. Anaheim Hills: Centerstream Publishing, 1996.

Sainsbury, Christopher. "Bi-tone Techniques and Notation in Contemporary Guitar Music Composition." Master's thesis, NSW Conservatorium of Music, 2001–2002.

Schneider, John. *The Contemporary Guitar.* Los Angeles: University California Press, 1985.

Segovia, Andrés. "The Romance of the Guitar." *The Etude*, Vol. 48, no. 5, (May 1930): 317–318, 367.

Sethares, William A. *Tuning, Timbre, Spectrum, Scale*. London: Springer-Verlag London, 2005.

Shaw, Robert. *Great Guitars*. Fairfield: Hugh Lauter Levin Associates, 1997.

Sluchin, Benny. *Practical Introduction to Contemporary Trombone Techniques*. Paris: Editions Musicales Européenes, 1995.

Sparks, Paul, and James Tyler. *The Guitar and its Music: From the Renaissance to the Classical Era.* Oxford: Oxford University Press, 2002.

Stenstadvold, Erik. "The Evolution of Guitar Notation, 1750–1830." *GFA Soundboard*, Vol. 31, no. 2/3 (2006): 11–29.

Taylor, John. *Tone Production on the Classical Guitar*. London: Musical New Services, 1978.

Titre, Marlon. "Thinking through the guitar: The sound-cell-texture chain." Ph.D. diss., Universiteit Leiden, 2013.

Torres, Rita and Paulo Ferreira-Lopes. "Multiphonics as a Compositional Element in Writing for Amplified Guitar (2)," *CITAR Journal of Science and Technology of the Arts,* Vol. 4, no. 1 (2012): 61–69.

Traube, Caroline. "An Interdisciplinary Study of the Timbre of the Classical Guitar." Ph.D. diss., McGill University, 2004.

Tyler, James. *A Guide to Playing the Baroque Guitar*. Bloomington: Indiana University Press, 2011.

———. *The Early Guitar: A History and Handbook*. London: Oxford University Press, 1980.

Vishnick, Martin. "A Survey of Extended Techniques on the Classical Six-String Guitar with Appended Studies in New Morphological Notation." Ph.D. diss., City University, 2014.

Yates, Peter, and Matthew Elgart. *Prepared Guitar Techniques.* Illustrations by Peter Yates. Agora Hills: California Guitar Archives, 1990.

5.4.6 Historical documents

Abreu, D. Antonio, and P.F. Victor Preito. *Escuela para tocar con perfección la guitarra de cinco y seis órdenes* ... Salamanca, 1799. (US-Wc MT 582.A2.)

Aguado, Dionisio. *The Complete Works for Guitar*. Vol. 4. Heidelberg: Chanterelle Verlag, 1999.

———. *Escuela de la Guitarre*. Madrid: La Imprenta que fue de Fuentenebro, 1825.

———. *Método para guitarra*. Paris: S. Richault, [ca. 1837].

Alberti, Francesco. "Nouvelle Méthode de guitar dans laquelle on y trouve différentes Variations, une Sonate, douze Menuets et six Ariettes ... (1786)." In *Guitare: Méthodes, Traités, Dictionnaires et Encyclopédies, Ouvrages généraux*. Vol. 2, Série 1, France 1600–1800, edited by Caroline Delume. Bressuire: J.-M. Fuzeau, 2003.

Anguera, José de. *The Celebrated Spanish Retreat*. Boston: Oliver Ditson & Co., 1843.

Berlioz, Hector. *Berlioz's Orchestration Treatise: A Translation and Commentary*. Translated and edited by Hugh Macdonald. Cambridge: Cambridge University Press, 2003.

Bermudo, Juan. "Libro Segundo." In *Declaración de instrumentos musicales: Comiença el libro llamado declaracion de instrumentos musicales ....* 1555. Reprint, Madrid: Arte Tripharia, 1982.

Capirola, Vincenzo. *Lute-book*. [ca.1517]. [Edited] by Otto Gombosi. New York: Da Capo Press, 1983.

Carcassi, Mateo. *Méthode complète pour la guitarre*, op. 59. 1825. Reprint, Geneva: Éditions Minkoff, 1988.

Carulli, Ferdinando. *Méthode complète pour le décacorde: nouvelle guitare*, op. 293. 1826. Florence: S.P.E.S. (Studio per Edizioni Scelte), 1981.

Castro de Gistau, Salvador. *Oeuvres choisies pour guitare seule*. Florence: S.P.E.S. (Studio per Editione Scelte) 1981.

Corbetta, Francesco. *Varii capricii: per la ghittara spagnuola*. 1643. Florence: S.P.E.S. (Studio per Edizioni Scelte), 1980.

———. *La guitarre royalle*. 1671. Geneva: Minkoff Reprint, 1975.

Coste, Napoléon. *Six Pièces Originales*, op. 53, no. 4. Monaco: Chanterelle Fascimile Edition, 1981.

Damas, Tomas. *La Macarena* (1867) In *Guitarrista Moderno*, edited by Antonio Romero. Madrid: Preciados, 1945.

Doisy, Charles. *Principes généraux de la guitarre*. 1801. Geneva: Minkoff Reprint, 1977.

Doni, Giovanni Battista. *Annotazioni Sopra il Compendio de' Generi Sopra il Compendio de' Generi, e de' Modi della Musica*. Florence: Bibl. Nazionale Centrale di Firenze, PALAT. C.9.3.22/2, 1630.

Dowland, John. *The Collected Lute Music of John Dowland*. Edited by Diana Poulton and Basil Lam. London: Faber Music, 1978.

Ferandiere, Fernando. *Arte de tocar la guitarra española por música*. 1799. London: Tecla Facsimile Edition, 1977.

———. *Thema con diez variaciones para guitarra: musica caracteristica y porpria de este ynstrumento*. [ca. 1799].

Foscarini, Giovanni Paolo. *Li cinque libri della chitarra alla spagnola*. 1640. Florence: Archivium Musicum, 1979.

Gil, Salvador. *Principios de Música aplicados á la Guitarra...segunda édicion...aumentada con una pequeña escuela de acompañar*. Madrid: Imprenta de E. Aguado, 1827.

Giuliani, Mauro. *Otto Variationi*, op. 6. London: Tecla Facsimile Edition, 1984–1988.

———. *Studio per la Chitarra, opus 1*. London: Tecla Facsimile Edition, 1989.

———. *Variations pour la Guitarre sur un thême favori de L'opéra: Amazilia*, op. 128. London: Tecla Facsimile Edition, 1984–1988.

Marescot, Charles de. *The French Retreat*. 1828. London: Johanning & Co., [ca. 1835].

Merchi, Giacomo. "Traité des agrémens de la musique exécutés sur la guitarre ... œvre XXXVI^{e} (1777)." In *Guitare: Méthodes, Traités, Dictionnaires et Encyclopédies, Ouvrages généraux*, Vol. 2. Série 1, France 1600–1800, edited by Caroline Delume. Bressuire: J.-M. Fuzeau, 2003.

Millioni, Pietro. *Quarta impressione del primo, secondo, et terzo libro d'intavolatura*. Rome: Guglielmo Facciotti, 1627.

Millioni, Pietro, and Lodovico Monte Compagni. *Vero e facil modo d'imparare a sonare et accordare da se medesimo la chitarra spagnola ...* Venetia: Presso Angelo Salvadori, [ca. 1644].

Minguet y Yrol, Pablo. *Reglas y advertencies generals para tañer la guitarra, tiple, y vandola, con varicdad de sones ...* [ca. 1752–1774]. Geneva: Minkoff Reprint, 1981.

Molino, Francesco. *Grande Méthode Complette pour la Guitare*, op. 46. Paris: l'Auteur, [ca. 1827].

Montesardo, Girolamo. *Nvova inventione d'intavolatvra per sonare li balletti sopra la chitarra spagniuola, senza numeri e note; per mezzo della quale da se stesso ogn'vno senza maestro potrà imparare*. Florence: C. Marescotti, 1606.

Moretti, Federico. *Principj per la chitarra*. 1792. Florence: S.P.E.S. (Studio per Edizioni Scelte), 1983.

Murcia, Santiago de. *Saldívar codex, no. 4*. [ca. 1732]. [Edited] by Michael Lorimer, Santa Barbara: M. Lorimer, 1987.

Paganini, Niccolò. *The Complete Solo Works for Guitar*. Edited by Giuseppe Gazzelloni. Heidelberg: Chanterelle Verlag, 1987, 2006.

Parga, Juan. *Concert works for guitar*. Heidelberg: Chanterelle Verlag, 1990.

Roch, Pascual. *A modern method for the guitar (School of Tárrega)*. New York: G. Schirmer, 1921.

Schulz, Leonard. *The Indispensible or Nine Progressive Exercises for the Guitar...*, op. 40 [ca. 1840]. J.G. Holm Facsimile Reproduction, 18--?

———. *The Collected Guitar Studies*. [ca. 1840]. Edited by Erik Stenstadvold, Heidelberg: Chanterelle Verlag, 2011.

Schumann, Robert. *Sinfonie Nr. 4,* op. 120. Erstfassung, 1841. Wiesbaden: Breitkopf & Härtel, 2003.

Schumann, Robert. *Symphony No. 4,* op. 120. Revidierte Fassung, 1853. London: Eulenburg, 2003.

Sor, Fernando. *Cinquième Fantaisie pour la Guitar avec Variations sur l'Air de Paisiello "Nel cor più non mi sento,"* op. 16. [1823]. London: Tecla Facsimile Edition, 1982.

———. *Étude* op. 29, no. 13. In *The Complete Studies for Guitar*, edited by Jan de Kloe. Heidelberg: Chanterelle Verlag, 2009.

———. *Étude* op. 29, no. 21. 1827. London: Tecla Facsimile Edition, 1982.

———. *Fantaisie villageoise*, op. 52. [ca.1832]. London: Tecla Facsimile Edition, 1982.

———. *Method for the Spanish Guitar*. New York: Da Capo Press, 1971.

———. *Méthode pour la guitare*. 1830. (Paris: L'Auteur). Geneva: Minkoff Reprint, 1981.

———. *Méthode pour la guitare/Guitarre-Schule*. Bonn: N. Simrock, 1831.

———. *Op. 1–20.* [ca. 1824]. Reprint, New York: Shattinger International Music Group, 1976.

———. *Thema Varie,* op. 3. [ca. 1810]. London: Tecla Facsimile Edition, 1982.

Sychra, Andrei. *Étude*. 1817. In *The Russian Collection, Vol 2.*, edited by Matanya Ophee. Columbus: Éditions Orphée, 1992.

Tárrega, Francisco. *The Complete Early Spanish Editions*. Heidelberg: Chanterelle Verlag, 2009.

Vargas y Guzmán, Juan Antonio de. *Explicación de la guitarra.* 1773. Edited and with an introduction by Angel Medina Alvarez. Granada: Junta de Andalucia, Consejería de Cultura, 1994.

Venegas de Henestrosa, Luis. *"Libra de cifra nueva para tecla, harpa y vihuela."* In *La Música en la corte de Carlos V/con la transcripción del "Libra de cifra nueva para tecla, harpa y vihuela" de Luys Venegas de Henestrosa*. 1557. Reprinted in *Monumentos de la Musica Espanola*. Vol 2. [Edited] by Higinio Anglès. Barcelona: Consejo Superior de Investigaciones Cientificas, Istituto Español de Musicoloogia, 1944.

5.5 Index

5.6 About the authors

Seth Josel has become one of the leading instrumental pioneers of his generation. After acquiring his Bachelor of Music degree at the Manhattan School of Music Seth Josel enrolled at Yale University and earned the Master of Music, the Master of Musical Arts and the Doctor of Musical Art degrees. His teachers included Manuel Barrueco, Eliot Fisk, Oscar Ghiglia, and Robert Guthrie. He is recipient of numerous awards and prizes including a Fulbright-Hays grant from the United States government and the Artists Stipend from the Akademie Schloß Solitude. As ensemble player and soloist he has been involved in the first performances of more than one hundred works. He has collaborated and consulted closely with such composers as Mauricio Kagel, Helmut Lachenmann, Tristan Murail, and James Tenney. In addition, he has been highly committed to working with several of the leading young composers of our time, including Peter Ablinger, Richard Barrett, Sidney Corbett, Chaya Czernowin, Keeril Makan and Manfred Stahnke, all of whom have written works featuring his talents.

He has concertized throughout Europe as well as the US, Canada, Israel and Japan, and he has been a guest performer with leading orchestras and ensembles, including the New York Philharmonic, the BBC Symphony Orchestra, La Monnaie, the Finnish Radio Orchestra, the South German Radio Choir, the Staatskapelle Berlin and the ASKO/ Schönberg Ensemble. From 1991 till 2000 he was a permanent member of the musikFabrik. In recent seasons he has been guesting regularly with KNM Berlin, Ensemble SurPlus as well as with the Basel Sinfonietta. He is a founding member of the Amsterdam-based CATCH electric guitar quartet.

Seth Josel has appeared as a soloist at several major European festivals including Salzburger Festpiele, Donaueschingen, Huddersfield, MaerzMusik, and The Holland Festival. In addition to his 3 solo CDs featuring American music (New World Records, CRI, O.O. Discs), he has recorded Peter Ablinger's "33-127" for Mode Records as well as Berio's "Sequenza XI" for the complete "Sequenza" cycle – also released on Mode Records in 2006. Further, he has recorded a broad range of repertoire with diverse ensembles and orchestras including musikFabrik, Ensemble Mosaik, Ensemble SurPlus, the DSO Berlin, Rundfunksinfonie-Orchester Berlin, Schönberg Ensemble, Champ d'Action, and CATCH. He is the co-founder of www.sheerpluck.de, a website database dedicated to the contemporary guitar literature.

Ming Tsao is Professor of Composition at Göteborg University in Sweden and holds a PhD in Music Composition from the University of California, San Diego, an MA in Mathematics from the San Francisco State University, an MA in Ethnomusicology from Columbia University and a BM in Music Composition from the Berklee College of Music. Further studies have included logic and philosophy at the University of California, Berkeley.

Performance projects include the opera *Die Geisterinsel* for the Staatsoper Stuttgart in 2011 and his full realization of Stockhausen's *Plus Minus* successfully premiered in the Wittener Tage Festival 2013. His compositions have been performed by ensembles such as the Arditti Quartet, ensemble recherche, ELISION Ensemble, Ensemble SurPlus, Ensemble ascolta in venues such as the Donaueschingen Musiktage Festival, Wien Modern, Wittener Tage Festival, MaerzMusik, Darmstadt New Music Courses. He is currently working on a song cycle *Mirandas Atemwende* based on poetry by Paul Celan and J. H. Prynne to be premiered in 2015.

Music by Ming Tsao can be found on Kairos with performances by the Staatsoper Stuttgart and Gageego!, as well as on Mode Records with performances by the Arditti Quartet, ensemble recherche, Ensemble SurPlus and Ensemble ascolta. Books by Ming Tsao include *Abstract Musical Intervals: Group Theory for Composition and Analysis*. His music is published by Edition Peters.

Die Spieltechnik ...
The Techniques ...

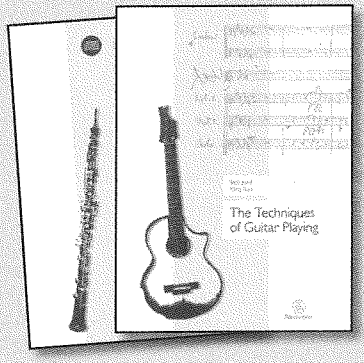
Carin Levine, Christina Mitropoulos-Bott

Die Spieltechnik der Flöte
The Techniques of Flute Playing
(dt./engl.) (4./2012). 143 S.; kart.
ISBN 978-3-7618-1595-3

Die Spieltechnik der Flöte II: Piccolo, Alt- und Bassflöte
The Techniques of Flute Playing II: Piccolo, Alto and Bass
(dt./engl.) (2., rev. 2011).
127 S. mit CD; kart.
ISBN 978-3-7618-1788-9

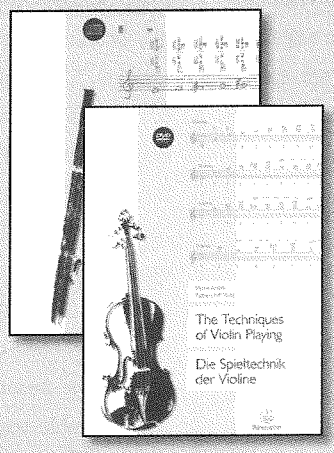
Peter Veale, Claus-Steffen Mahnkopf

Die Spieltechnik der Oboe
The Techniques of Oboe Playing
La technique du hautbois
Ein Kompendium mit Anmerkungen zur gesamten Oboenfamilie (dt./engl./franz.).
(6./2011). 181 S. mit CD; kart.
ISBN 978-3-7618-1210-5



Pascal Gallois

Die Spieltechnik des Fagotts
The Techniques of Bassoon Playing / La technique du basson
(dt./engl./franz.) (2./2012).
126 S. mit 2 CDs; kart.
ISBN 978-3-7618-1860-2



Irvine Arditti, Robert HP Platz

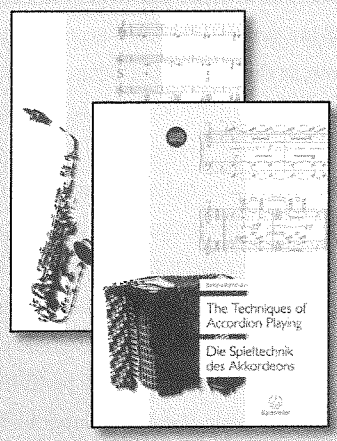
Die Spieltechnik der Violine
The Techniques of Violin Playing
(dt./engl.). 117 S. mit DVD; kart.
ISBN 978-3-7618-2267-8

Seth F. Josel, Ming Tsao

The Techniques of Guitar Playing
(engl.). 233 S. mit CD; kart.
ISBN 978-3-7618-2243-2

Der Gitarrist Seth F. Josel und der Komponist Ming Tsao geben in ihrem Buch einen umfassenden Überblick über zeitgenössische Spieltechniken der klassischen Gitarre.

Die Reihe wird fortgesetzt
The series will be continued

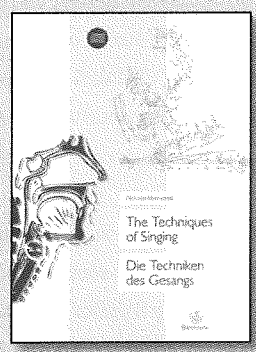


Marcus Weiss, Giorgio Netti

Die Spieltechnik des Saxophons
The Techniques of Saxophone Playing
(dt./engl.) (2., rev./2012).
192 S.; kart.
ISBN 978-3-7618-2114-5

Bettina Buchmann

Die Spieltechnik des Akkordeons
The Techniques of Accordion Playing
(dt./engl.) (2010). 121 S. mit CD und Falttafel; kart.
ISBN 978-3-7618-1930-2



Nicholas Isherwood

Die Techniken des Gesangs
The Techniques of Singing
(dt./engl.). 212 S. mit CD; kart.
ISBN 978-3-7618-1861-9

Der Autor erläutert die Techniken des Gesangs anhand zahlreicher Literatur-Beispiele, gibt praktische Übungstipps für Sänger und führt die Techniken auf der CD auch klingend vor.

Bärenreiter
www.baerenreiter.com

PORTRAIT

Die Instrumenten-Reihe bei Bärenreiter

Sie fängt die Faszination der Instrumente aus fünf Perspektiven ein:

- Musikleben früher und heute
- Wichtige Werke
- Herausragende Interpreten
- Grundlegendes zum Bau
- Tipps für die eigene aktive Laufbahn

Ralf Dombrowski

PORTRAIT SAXOFON

Kultur · Praxis · Repertoire · Interpreten
166 S. mit Abb.; kartoniert
ISBN 978-3-7618-1840-4

Matthias Kornemann

PORTRAIT KLAVIER

Kultur · Praxis · Repertoire · Interpreten
166 S. mit Abb.; kartoniert
ISBN 978-3-7618-1841-1

Jörg Jewanski

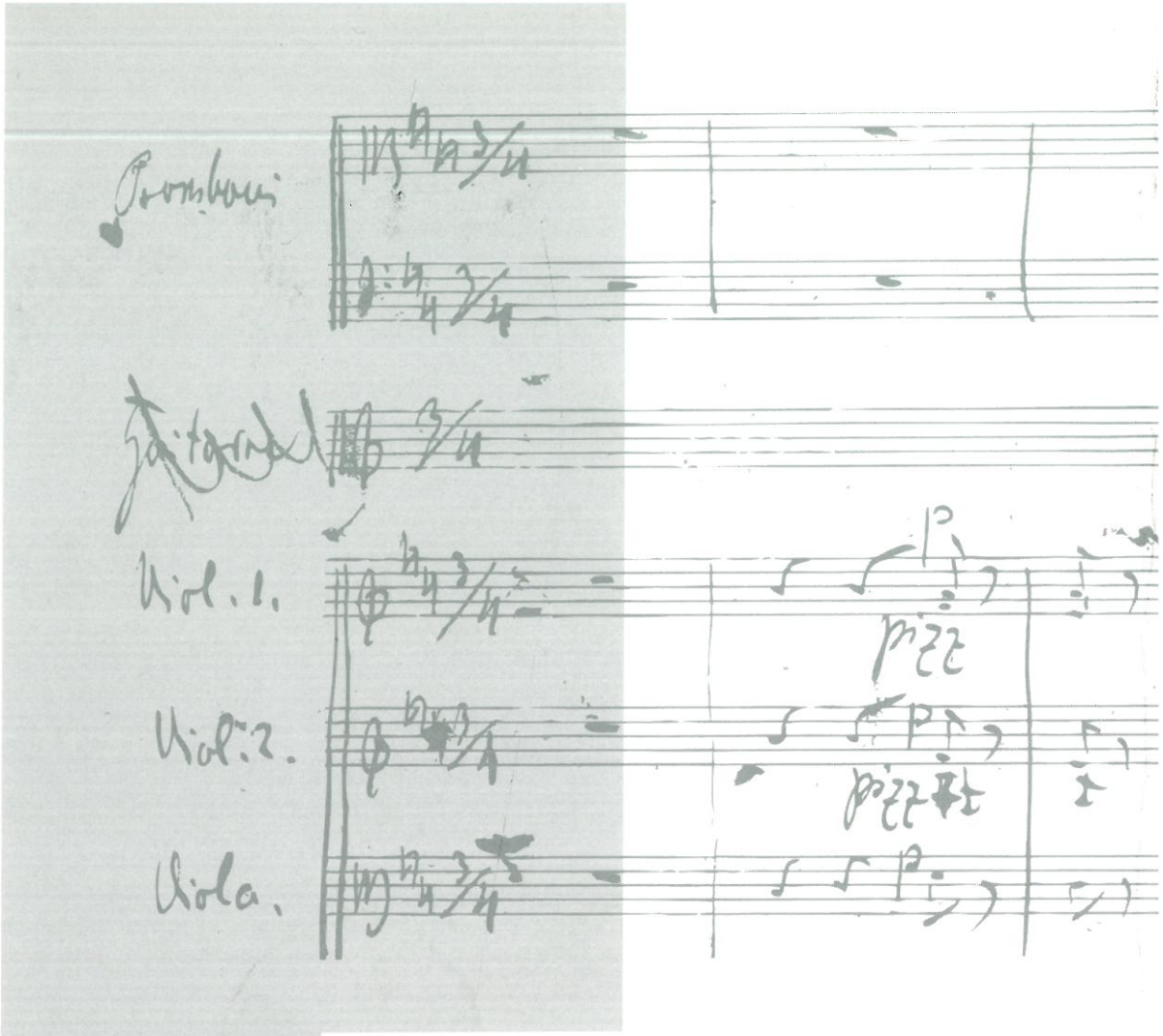
PORTRAIT GITARRE

Kultur · Praxis · Repertoire · Interpreten
153 S. mit Abb.; kartoniert
ISBN 978-3-7618-1843-5

Viele farbige Abbildungen und verschiedene Layoutelemente gestalten die Bände abwechslungsreich und laden zum Schmökern ein.

Die Autoren, bestens vertraut mit der jeweiligen Szene, geben dem Leser außerdem Buch-Tipps an die Hand und empfehlen besondere Aufnahmen.

Bärenreiter
www.baerenreiter.com



This book by pioneering guitarist Seth F. Josel with composer Ming Tsao is dedicated to the presentation and explanation of contemporary guitar techniques. Relying on extensive use of tables, charts and musical examples as well as an accompanying CD, various novel techniques ranging from multiphonics to percussive actions are discussed in detail, including the analysis of salient passages from the literature of the 20th and 21st century. What is unique about this book is the historical contextualization of each technique along with discussions around the orchestration of the guitar in chamber and orchestral musical settings.

"The guitar has through[illegible]y been known for being, unless you are a g[illegible]t, a very difficult instrument to write for – even to the point of destroying those attempting. This view still, in many ways, holds true. However, with the new book by Seth Josel and Ming Tsao, we finally have a unique document about the technicalities of the classical guitar. With this work the authors open up new vistas for the future, but also deepens the connection with tradition. In a time when art has become a question of taste and craft a question of pushing buttons, it is a relief to read this book! Indispensable for composers and guitarists alike." Magnus Andersson

Bärenreiter

ISBN 978-3-7618-2243-2