Arcomusical

Composition, Notation, and Style Guide

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About Arcomusical

Arcomusical is a 501(c)(3) non-profit organization with a mission to spread the joy of the Afro-Brazilian musical bow known as the *berimbau* through the development of innovative and excellent musical repertoire. Arcomusical supports this mission through six pillars of activity:

performance
education
composition
publication
research
community

The berimbau is one member of the "musical bow" family of instruments found all over the world. Interestingly, that family also includes the well-known jaw harp which is considered a mouth resonated musical bow. In fact, in Portuguese the jaw harp is referred to as the *berimbau-de-boca* (or berimbau of the mouth, as distinguished from the *berimbau-de-barriga* (or berimbau of the stomach). The latter is classified as a gourd-resonated bow, and it maintains gourd-resonated relatives found throughout southern Africa. The closest relative to the Brazilian berimbau is the northern Angolan *hungo*, and its more distant cousins can be found in southwestern Angola (e.g. the Humbi *mbulumbumba*), South Africa (e.g. the Zulu *umakhweyana* and the Xhosa *uhadi*), and Mozambique (e.g. the Tsonga *xitende*).

Arcomusical has developed a vibrant culture for creative berimbau performance. Through transcription, composition, collaboration, and commission of new works, Arcomusical places the berimbau in diverse performance contexts.

Having created a diverse and substantial repertoire for contemporary berimbau performance, Arcomusical has become a publishing entity offering scores ranging from solos to sextets, from concerti to mixed ensembles, and from acoustic to fixed and interactive multimedia environments.

In 1999 Arcomusical Artistic Director Gregory Beyer fell in love with the berimbau via the music of famous Brazilian percussionist, **Naná Vasconcelos (1944-2016)**. What began as a simple transcription of a track from Vasconcelos's 1980 ECM recording "**Saudades**," gradually blossomed into a 200+ page **DMA thesis**. Completed in 2004, Beyer's writing discusses the musical bow in three musical contexts: Brazilian, African, and contemporary. In 2007, Beyer traveled to Brazil to Vasconcelos' hometown of Recife to conduct an **interview with Naná** that was subsequently published in ***Percussive Notes***, the research journal of the Percussive Arts Society. In 2015 Beyer returned to Brazil as a Fulbright Scholar. Through an

invitation from percussionist **Fernando Rocha**, he taught percussion and berimbau at the School of Music of the Federal University of Minas Gerais (UFMG). Simultaneously, through recommendations in the capoeira community, he trained in capoeira Angola with **Mestra Alcione Oliveira**. Once in Brazil, through an invitation from well-known capoeirista **Mestre Cobra Mansa**, Beyer traveled to **Durban, South Africa** to present and perform at the **First International Bow Music Conference**, hosted by **Sazi Dlamini.** Beyer organized with five talented percussion students from UFMG to find funding, rehearse, travel to Africa and perform together, and today that group continues to perform together in Belo Horizonte under the name **Arcomusical Brasil**. When Beyer returned to the United States, he and NIU alumna **Alexis C. Lamb** co-founded Arcomusical as a 501(c)(3) non-profit organization. Beyer has on multiple occasions returned to Brazil and Africa to perform, teach, and research, building community with every step.

Arcomusical is now a central locus for a global community interested in research and creative uses for the berimbau in capoeira and beyond. In Brazil, the United States, and around the globe, Arcomusical is creating important connections inside the world of capoeira Angola and among the expanding circle of creative musicians who use the berimbau as a primary vehicle for expression.

Preface

Where to begin writing a new work for Arcomusical?

Arcomusical has created this **Composition, Notation, and Style Guide** to offer interested composers a thorough examination of the possibilities of this deceptively simple and beautiful instrument. This guide illustrates a thorough list of technical considerations, harnessing the many excellent video examples of the berimbau in action that already available on our **Arcomusical website** and **YouTube channel.**

The purpose of this guide is twofold:

Section 1, Composition and Notation Guide, begins with fundamental information about both the traditional berimbau and the custom berimbaus that Arcomusical has developed for its music. This section then takes a comprehensive look at Arcomusical repertoire composed over the past two decades, presenting a series of musical scenarios and sonic possibilities for creative composition.

This section of the guide illuminates and demystifies the compositional tools that have proven effective in writing for the berimbau in solos and in ensembles. Our intention is not to be exhaustive but rather to encourage creativity in order to

continue to develop a rich body of repertoire for the musical bow - one of humankind's oldest instruments.

Section 2, Style Guide, details the essential aspects of style that Arcomusical has adopted for its publications and online presence. Arcomusical is committed to publishing every score that we perform, provided that both the composer and Arcomusical agree that the music is ready for publication and that Arcomusical is the best publisher for the piece. Prior to signing a publication contract, the composer and Arcomusical work together to format the score and parts in the Arcomusical "house style" as defined in this section.

Composers may benefit from and save a lot of time by using Arcomusical's free templates for **Finale and Sibelius**, available for download from the **Arcomusical website's Composition page.**

When doubts and questions inevitably arise, Arcomusical will always be available to dialog, workshop, and collaborate as a new piece of music comes into focus.

Get in touch with us at **info@arcomusical.com.**

Composition and Notation Guide

1.1. Anatomy of a Berimbau

The **berimbau** is perhaps the most well-known member of the **musical bow** family of instruments. A traditional berimbau is simply constructed, as can be seen in the following figure.

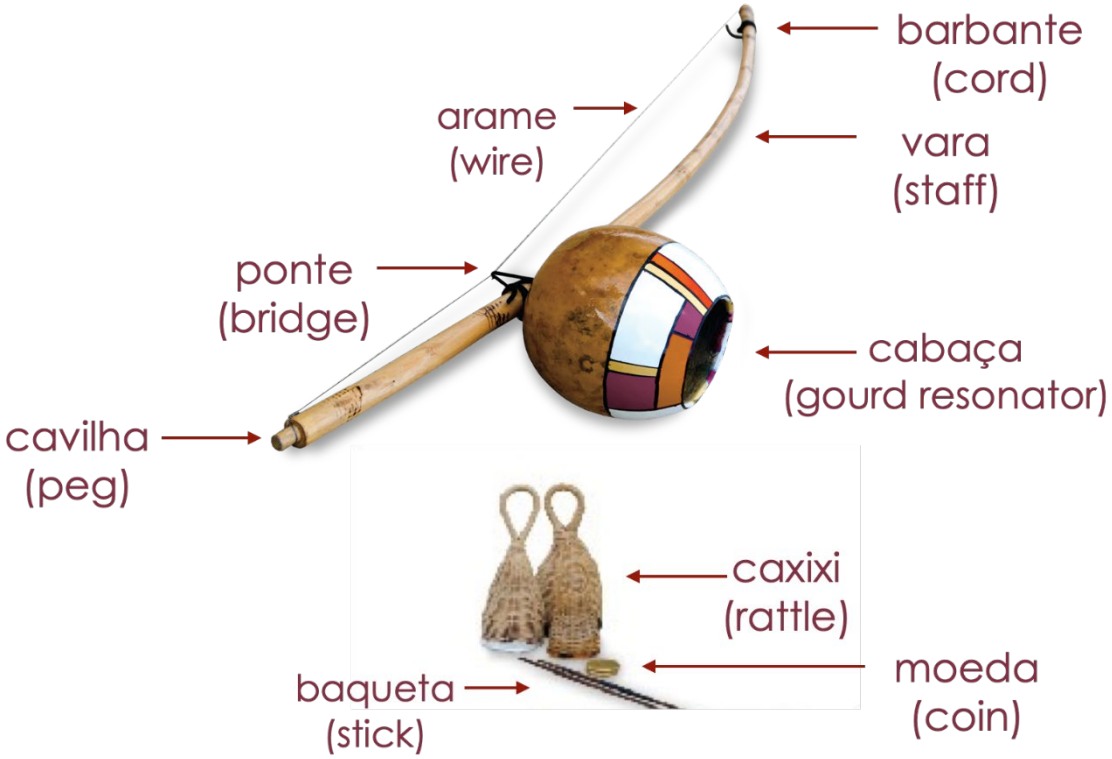


Figure 1.1.1. Traditional berimbau anatomy

- The **vara** (staff) is the body of the instrument onto which a single **arame** (wire) is secured.
- The **arame** is fashioned by hand with two looped knots, one on each end. The bottom loop secures the arame around the **cavilha** (peg) at the bottom of the vara. A **barbante** (cord) is tied using a cow hitch knot through the loop at the top of the arame and is used to secure the arame to the vara by means of one end of a lashing knot. The process of affixing the arame to the vara is referred to as "arming" the berimbau, and involves bending the vara under one knee while pulling the arame barbante over the top tip of the vara (which is cushioned with a thick piece of leather secured to the tip of the vara by two to three small nails), then looping the arame around the vara several times and finally tucking the barbante underneath itself in a sort of lashing knot.

- The **cabaça** (gourd) resonator is tied around both verga and arame with a second **barbante** (cord). This barbante forms a **ponte** (bridge) that divides the wire into two sections (long and short) and serves as the location of the performer's grip.
- In the same hand that holds the instrument, a **moeda** (coin) or **pedra** (stone) is used to "note" (i.e. stop) the portion of the arame above the bridge in order to achieve pitches above the open tuning.
- In the opposite hand, the player holds both a **baqueta** (stick) to strike the wire and a **caxixi** (rattle basket). The caxixi adds "noise" to each stroke of the baqueta on the arame, and on its own is capable of articulating timeline patterns similar to a ganzá shaker, although with greater timbral possibilities. The caxixi is an integral component of the berimbau in traditional capoeira, but its presence or absence in Arcomusical repertoire varies from piece to piece.

Arcomusical uses a carefully designed and handcrafted musical bow first created by **David "Snappy" White** and currently built by Arcomusical luthier **Alex Rolfe**. It is a more complex species of berimbau that we call, not surprisingly, the **"Arcomusical."** Extending the possibilities of the traditional berimbau, its added features include:

- three-ply laminate construction of selected hardwoods: maple, purpleheart, and black walnut).
- a bass guitar tuning machine at one end for precision tuning, eliminating the need to "arm" the berimbau, as described above.
- a triangular wooden bridge placed above the machine to avoid metal on metal buzzing.
- an offset lobe that houses the tuning machine and ensures that the wire crosses the bridge at its midpoint and traverses the center of the staff.

Figure 1.1.2 Arcomusical custom berimbau design

1.2. String Division

Again, the cabaça both resonates the instrument's vibrations and its barbante forms a bridge that divides the wire into two unequal sections (long and short). In *theory*, the location of the gourd can be at any point along the wire (even at the very midpoint creating two equal sections!). In *practice*, some divisions are more interesting than others as they allow the instrument to resonate more fully. In our compositions, Arcomusical employs whole number ratios to refer to a series of carefully selected just intonation tunings. These ratios are clearly indicated in each Arcomusical score (see section 2.4).

1.3. Tuning Systems

Brazilian Capoeira Berimbau Tuning
In Brazil, the berimbau is integral to and synonymous with the body game of capoeira. Historically, capoeira berimbaus were shorter and thinner than they are today. **Mestre Waldemar** (Waldemar Rodrigues da Paixão, 1916-1990), who became known for constructing and selling his colorfully painted berimbaus, cut his instruments to the length of "sete palmos" (seven spans) which, according to **Kay Schaffer**, yielded approximately 118-120cm, or just under four feet. According to **Mestre Cabello** (Eldio Rolim), the ideal cabaça placement is "one palm." If the capoeira notion of a palm/palmo/span is roughly consistent, then we might imagine a general tuning ratio of 6:1 would result.

Today's berimbaus are typically longer than those made in the mid-twentieth century. For example, **Mestre Valmir** (Valmir Dos Santos Damasceno), beloved luthier of some of the finest capoeira berimbaus available, creates staves that are approximately 63 inches (160cm) long. When the same "span's length" is used to position the cabaça, then ratio increases to something closer to 9:1.

In 2015-2016, while training capoeira Angola multiple times weekly with the group Associação de Capoeira Angola Dobrada (ACAD), I posited that an 8:1 tuning on a somewhat looser wire seemed ideal for that group's sound. Yet, frequently my teachers and colleagues would place the gourd at 9:1 or 7:1 (very subtle distinctions of less than an inch in either direction). The resulting pitches, however, are quite different (see fig. 1.3.1.).

Ratio	Long Section	Short Section
6:1	G2	D5
7:1	F#2	E5
8:1	F2	F5
9:1	E2	F#5

Figure 1.3.1. Common berimbau tunings in capoeira practice

Still, the three-octave 8:1 interval creates a very attractive overall instrument sound due to sympathetic resonance, and we aim for the 8:1 tuning when we perform capoeira music.

All this said, *capoeiristas* do not place gourds mathematically. Rather, they find what "sounds good" via a combination of tradition and intuition. In capoeira, the short section of the wire is not played as part of any basic *toque* (pattern). It is only rarely utilized as a touch/timing stroke. Its tuning, therefore, is of secondary concern.

There are three principal styles of capoeira in practice today: Angola, Regional, and Contemporânea. In Regional, the style developed by **Mestre Bimba** (Manoel dos Reis Machado Mestre, 1900-1974), only one berimbau is played. But in Angola and the Contemporary style, three instruments are standard, and the inter-relationship of their tunings is definitely important to capoeiristas. The three instruments are named, from low to high, as **gunga, medio,** and **viola**. Tunings vary from school to school and from teacher to teacher, but there are historical models that have influenced these tuning schemes.

Mestre Bimba's 1962 release, *Curso de Capoeira Regional*, features the Mestre playing a solo berimbau, tuned to F#2. This recording is a principal reference for the Regional school.

In 1963, **Mestre Traíra**, (José Ramos do Nascimento, 1916-1970) who was a disciple of Mestre Waldemar, released *Mestre Traíra, Capoeira da Bahia*. This recording offers incredible examples of complex, tightly woven counterpoint of three berimbaus led by **Mestre Gato Preto** (José Gabriel Góes, 1929-2002) along with **Chumba** (Reginaldo Paiva) and **De Guiné** (Vivaldo Sacramento), accompanying the unforgettable singing of Mestres Traíra and **Cobrinha Verde** (Rafael Alves França, 1917-1983). This album captured a group of capoeiristas in their prime, performing with a vigorous richness that to this day continues as a model for excellent capoeira music making. To this day, this recording remains a principal reference for both the Angola and Contemporary schools. The berimbau tunings

hover around F2, G2, and B2. Importantly, when the gunga plays its open F2 while the medio and viola coin a note up approximately one half-step, an F-minor triad sounds. Not surprisingly, the singing on the first track begins in F minor and later modulates to Ab, its relative major.

African Musical Bow Tunings

On the African continent, the Angolan *hungu* is the closest relative to the Brazilian berimbau and, like the berimbau, its gourd is placed toward the bottom of the berimbau. However, in other southern African traditions, players of musical bows such as the Mozambican *xitende* or Zulu *umakhweyana* locate the gourd toward the middle of the instrument, yielding a completely different sound. Common intervals for these instruments are a major second (9:8) and a minor third (6:5). These instrumentalists do not typically use a coin to note the instrument at all. While the Swazi artist **Baba Bhemani Magagula** played only open tones on his *makhoyane*, the virtuosic Zulu artist **Mama Bavikile Ngema** (1951-2021) used her knuckles to stop the wire at one or two heights, achieving as many as four different notes in her fiery, linear ostinati.

The field recordings of Mozambican ethnomusicologist **Luka Mukavele** that captured a blind street musician named **Antonio Maquina** storytelling while playing his *xitende* musical bow tuning deeply inspired Arcomusical to imagine further possibilities.

Arcomusical Ensemble Tuning

As the gourd moves toward the center of the bow, the low notes ascend and the high notes descend, diminishing the interval between the wire segments. In the Arcomusical ensemble, we use a series of ascending/descending tunings resulting in a wedge or hairpin shape. a concept we refer to as **wedge tuning**. The wedge tuning concept is the principal area of investigation that has allowed the music of Arcomusical to take shape. A collection of multiple instruments with different gourd placements allows a composer to assemble a set of pitches that can span two octaves and beyond, easily facilitating harmonically/melodically driven ensemble playing.

While in *theory* the ensemble has the capability of spanning a range of three octaves (8:1), in *practice,* for timbral reasons, much of our repertoire utilizes only two octaves or less. For example, Gregory Beyer's *Berimbau Sextet No. 1 "Kora"* utilizes a two-octave span, as shown in figure 1.3.2.

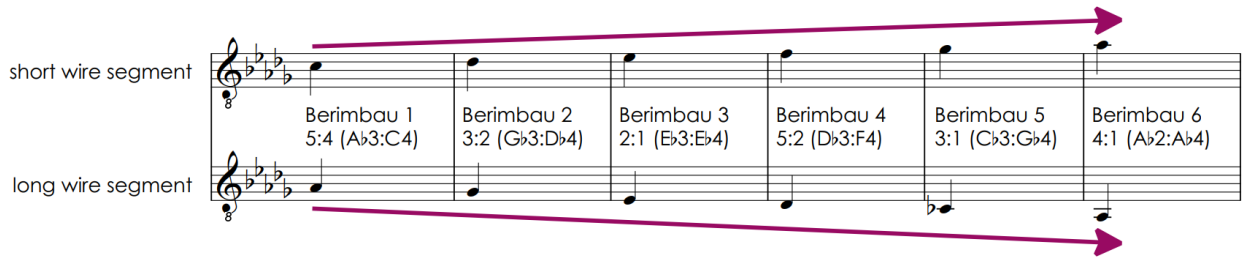


Figure 1.3.2. Wedge tuning scheme for Berimbau Sextet no. 1, "Kora"

The red arrows moving in opposite directions illustrate wedge tuning. Berimbau 1 has a narrow major third (5:4) interval, and the intervals progressively expand for each subsequent berimbau. This produces a series of twelve open notes that span the two-octave interval of berimbau 6, who plays both the lowest and highest note in the ensemble.

A chart of common intervals and tunings can be found in figure 1.3.3. A suggested ideal median tuning for a given interval is shown, from which we can raise or lower by approximately a major second in either direction. It is important to understand that the timbre changes as the tuning moves further away from the median. Higher tunings require more tension on the wire and on the instrument itself, resulting in a brighter tone, and each instrument has a physical limit beyond which it cannot hold more tension. Conversely, lower tunings run the risk of becoming muddy and dull.

Voicing and Timbre

As you are configuring your tuning system, keep in mind the following:

The low and high notes of instruments with tunings under a minor 6th (8:5) (shaded blue) sound homogenous. The timbre of the notes on both sides of the wire can easily be connected into a "single voice," facilitating the creation of clear melodic lines incorporating both sides of the wire.

The low and high notes of instruments with tunings from a minor 6th (8:5) to an octave and one fifth (3:1) (shaded yellow/cream) begin to feature distinct timbral differences. A single instrument will begin to speak with two separate "voices."

On instruments tuned 4:1 and wider (shaded red), the short wire segment will project much less than short wire segments on narrower tunings. To that end, coining on these short wires is still possible but the resulting note's timbre becomes thinner and its resonance significantly shorter. Anything past 4:1 should not be coined.

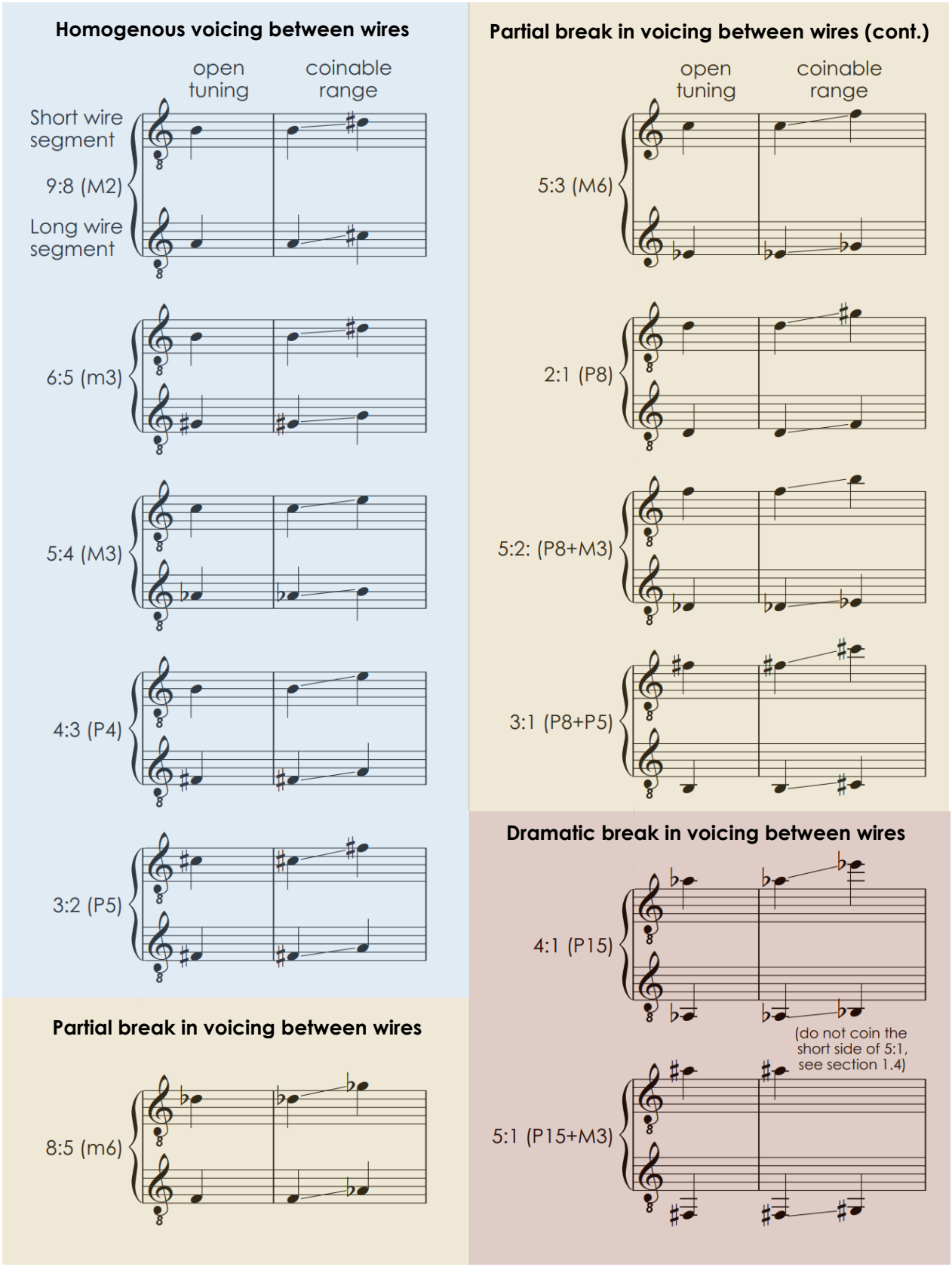


Figure 1.3.3. Tuning and coining range chart

Each of our instruments is handcrafted, and thus each sounds best at a particular tuning. Arcomusical has cultivated a set of instruments that work "in consort." To achieve the best possible sound, we typically allocate instruments in our inventory to be used for particular tunings and intervals. To that end, the wedge tuning system works quite well for this as it utilizes a range of tunings. Therefore, a tuning scheme for an ensemble of identical or similar tunings (e.g. four berimbaus tuned to 4:1) is impractical and should be avoided as we likely do not possess the necessary instruments for that sort of configuration.

While the chart in figure 1.3.3. is not exhaustive, it is reflective of what has been the most successful in our repertoire. Other tunings can be used, and 7:4, 9:4, and 6:1 are some other standard Western intervals that have on occasion been included in our repertoire. Additionally, microtonal and non-Western tunings can and have been utilized.

Creating a successful ensemble tuning scheme is one of the most challenging and important aspects of the composition process. When creating a tuning scheme, particularly one that may deviate from the wedge concept and standard tunings in the chart, consider writing us at **info@arcomusical.com** to review the efficacy of your proposed tuning scheme. While we know that the wedge tuning concept and standard tunings will be successful and recommend you follow that route, we are always excited to try out new ideas!

1.4. Raised Pitches and Flipping the Berimbau

In capoeira, three sounds form the essential vocabulary for most capoeira toques (rhythmic ostinati): DOM, DIN, and TCH.

DOM is the sound that results when a performer strikes the berimbau "openly," (i.e. without obstructing the wire).

DIN is the sound made when players use the coin to obtain a raised pitch (typically something between a major and minor second above the open note) by pressing firmly on the wire segment above the bridge.

TCH is the buzzing, snare-drum like sound resulting from the coin being held loosely against the wire.

In Arcomusical, this vocabulary is expanded by **coin angle**. While in capoeira DIN is a singular tone above the DOM, in Arcomusical players deliberately calibrate the angle of the coin against the wire to produce multiple pitches above the open note. On either wire segment, each performer can only coin up to a certain interval. Two factors determine that limit: the length of the wire segment and the

size of the individual player's hand. Generally speaking, the shorter the wire segment, the wider the range of possible pitches that can be achieved. **Please refer to the tuning range chart (figure 1.3.3) for safely playable coining ranges**.

As mentioned earlier, in the same way that shorter open wire segments begin to lose resonance, pitches at the upper end of the coining range for the shorter wire segments of instrument tunings of 3:1 and beyond also become progressively weaker and less resonant. Instruments tuned to a 5:1 interval and larger should not be coined.

It takes time for a performer to move the coin to different angles. Therefore, rapid motion to and from different coined pitches can be impractical if not impossible. When writing coined passages on a wire segment capable of multiple coined notes, **please avoid quick successions of notes on the same wire segment that are more than a major second apart.**

And a word of caution…the use of the coin takes extraordinary endurance for very small muscles in the hand. Coining the instrument consistently for a long period of time can be exhausting and potentially even painful to the performers.

Flipping the Berimbau

While in capoeira the longer segment of the wire is always on top and therefore coined exclusively, in Arcomusical, ensemble players are capable of playing and coining on either side of the bridge by **flipping the instrument**. Importantly, while we can play the open notes on both sides of the wire from the same playing position, **we can only coin on one side at a time**.

Therefore, at the beginning of your score, indicate which of the two segments should be on top (e.g. "long wire on top"). Additionally, if the performer needs to flip the instrument during the piece, please indicate to do so at the first available rest as performers need time to physically flip the instrument. As a general suggestion, **allow for at least five seconds to flip the berimbau** before resuming play (see fig. 2.6.1).

1.5. Melody

Berimbau melodies can be created in a variety of ways. As just discussed in section 1.4, depending on the tuning ratio, some instruments will have more available pitches than others. For example, nearly all of the solos in our repertoire are tuned to smaller ratios (e.g. 9:8 or 3:2) such that the notes coined on one side of the wire serve as a stepwise bridge between the two open tones on either wire segment.

In an ensemble, melodies can be created by passing a line around from instrument to instrument in a hocketed fashion. Three examples of hocketed melodies in different-sized ensembles are shown below.

In *Berimbau Duo no. 5, "Alexis"* an ostinato pattern between instruments acts as a skeleton for melodic development using an additive process in the third section of the work.

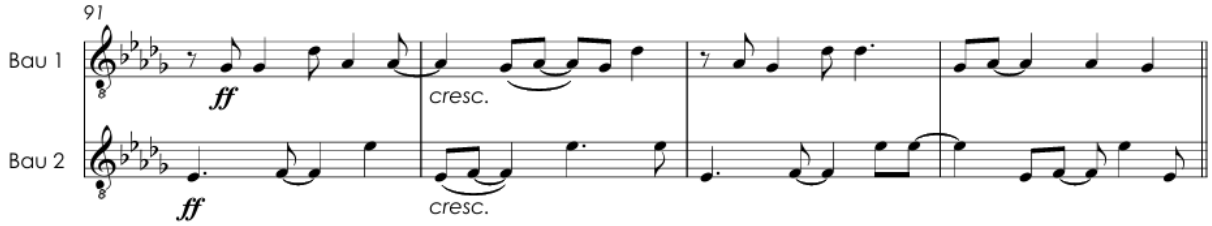


Figure 1.5.1. Hocketed melody in Gregory Beyer's Berimbau Duo no. 5, "Alexis"

In *Berimbau Sextet no. 1, "Kora"* a single melodic line is shared between all members of the ensemble. In this manner, a berimbau sextet functions not unlike a handbell choir.

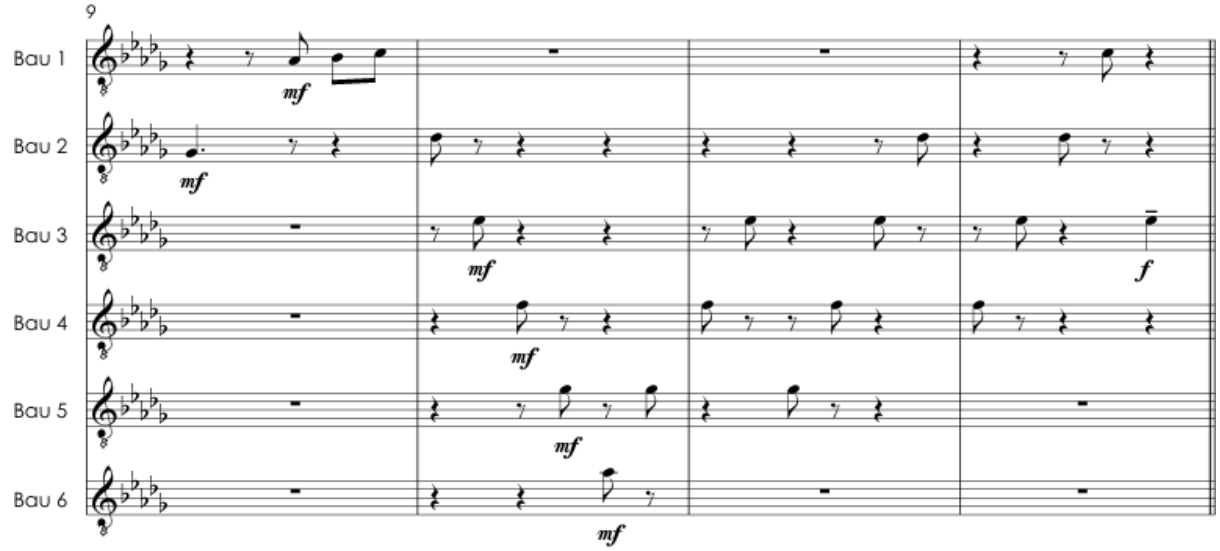


Figure 1.5.2. Isolated Melody in Gregory Beyer's Berimbau Sextet no. 1, "Kora"

Later in the same sextet, the instruments create a rapid-fire melody set over a bass ostinato of open wire pitches (also shared across multiple instruments). Three voices are shared between multiple instruments simultaneously (the melody is accented).

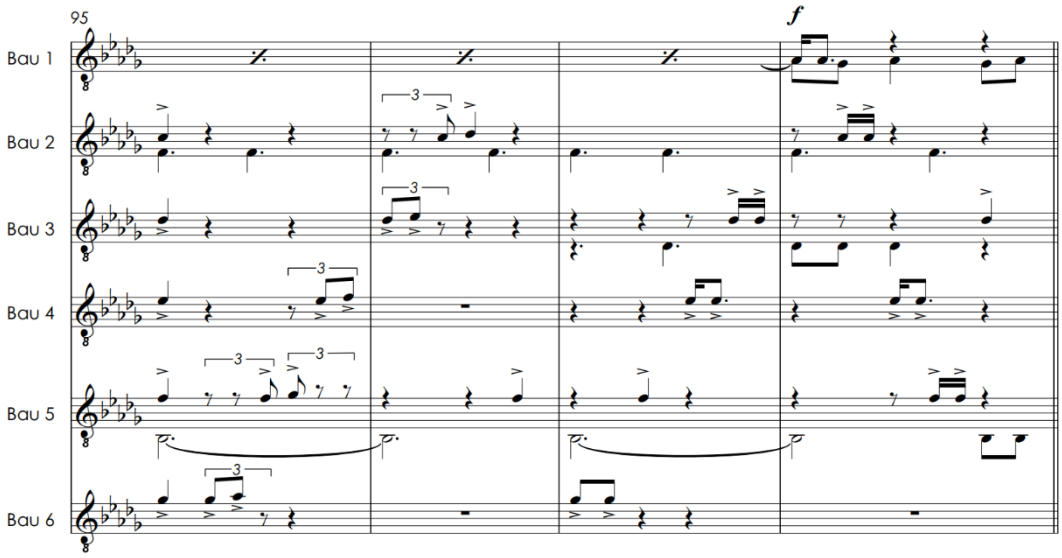


Figure 1.5.3. Melody over bass ostinato in Gregory Beyer's Berimbau Sextet no. 1, "Kora"

1.6. Harmony

When multiple instruments of various tuning ratios and pitches perform together, the ensemble can take on the role of a meta-harp or guitar. Harmony can be achieved either when the instruments strike pitches at the same time, or when they emerge via rhythmic arpeggios or ostinati and the resulting resonance connects to form harmony.

In *Berimbau Trio no. 1 "Harmonia,"* a twelve-bar harmonic progression is arpeggiated between the three instruments.

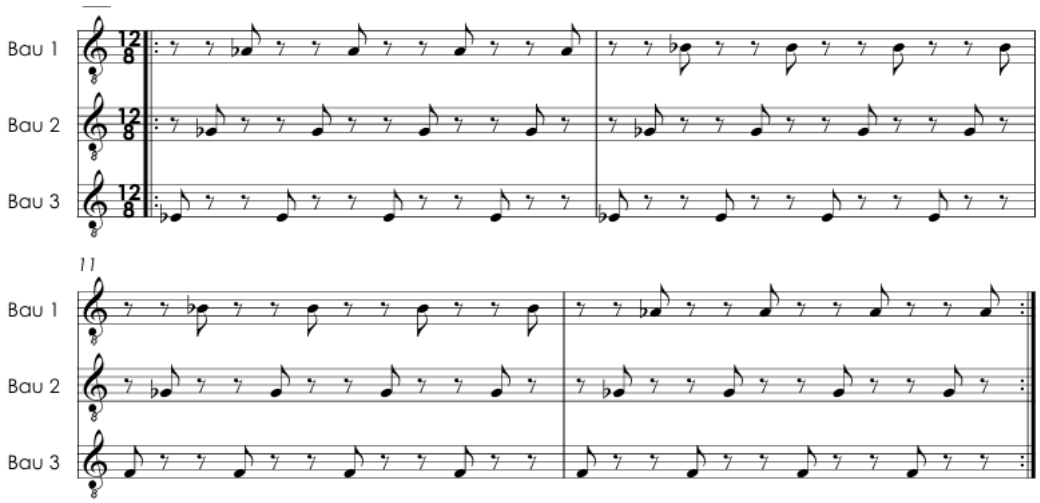


Figure 1.6.1. Harmonic progression in Gregory Beyer's Berimbau Trio no. 1, "Harmonia"

In Alexis C Lamb's *Mudança de onda,* a groove in 5/8 establishes a simple chord progression where the instruments strike their pitches in the same rhythmic pattern but with different groupings of instruments.

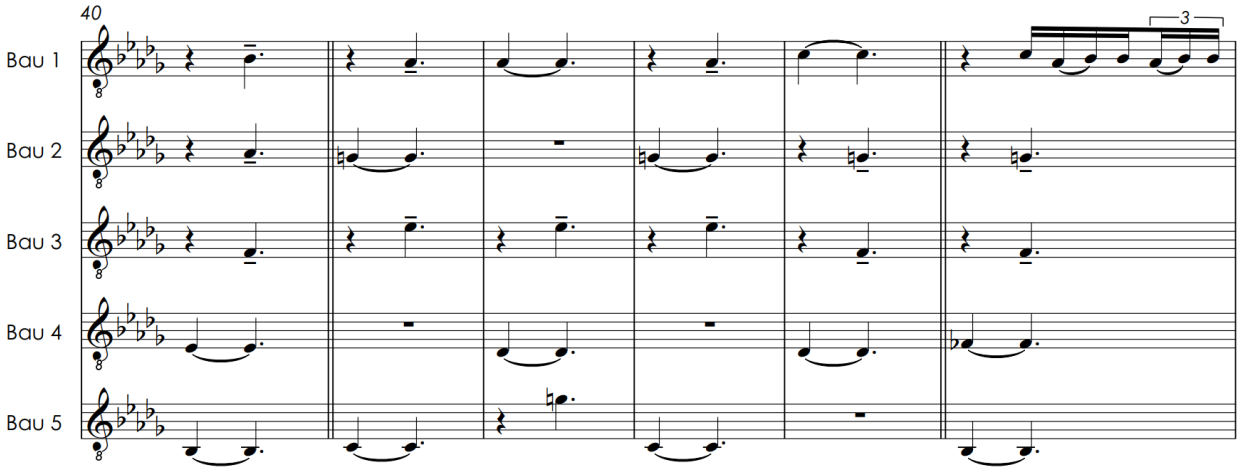


Figure 1.6.2. Harmonic progression in Alexis C. Lamb's Mudança de onda

1.7. Glissandi

Although not a feature in capoeira, the glissando has become an inherent part of Arcomusical performance practice. Similar to a violinist sliding between notes, glissandi naturally occur when a player slides the coin between successive pitches rather than releasing to an open wire. We can accentuate this as in the following examples.

The most basic form of glissandi involves simply sliding from one struck pitch to another. This is used in Gregory Beyer's *Berimbau Solo no. 2, "Tomek & Kasia"* to create playful variations on the primary melodic material.

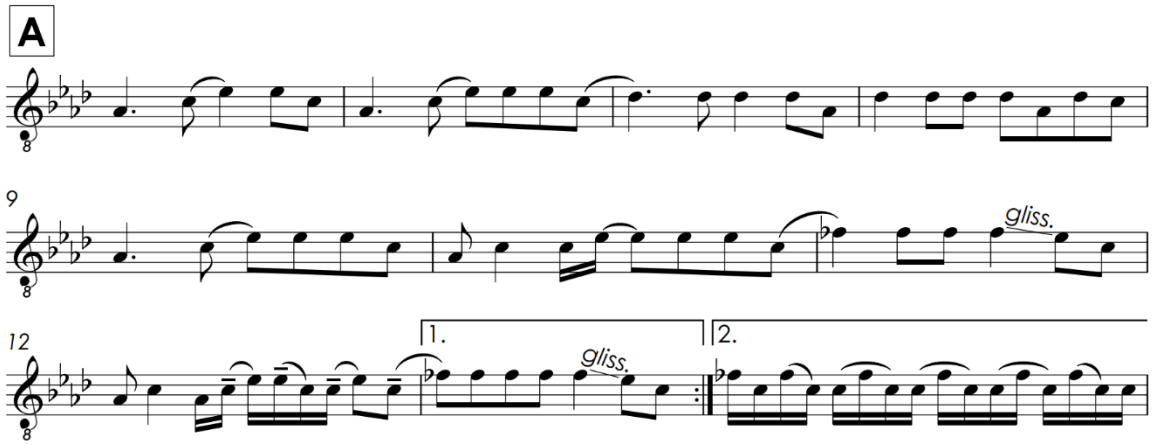


Figure 1.7.1. Glissando in Gregory Beyer's Berimbau Solo no. 2, "Tomek & Kasia"

More interesting effects can be created by utilizing a larger ensemble. In *Mudança de onda*, an incredible smearing texture is created by overlapping multiple glissandi.

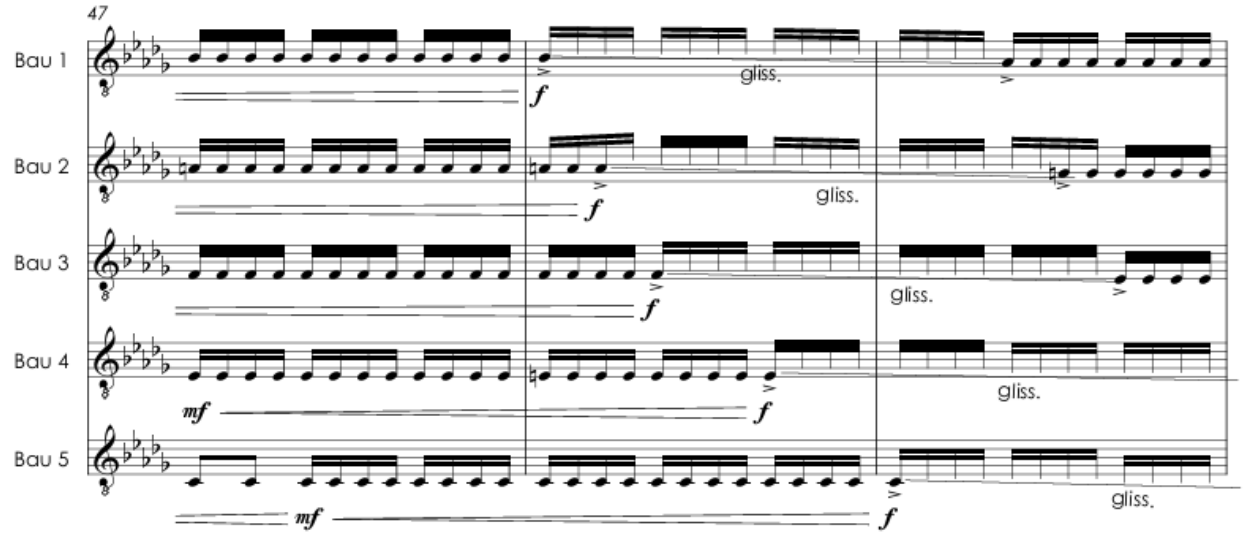


Figure 1.7.2. Smearing glissandi effect in Alexis C. Lamb's Mudança de onda

Glissandi can also be done in much shorter durations. For example, they can create expressive scoops and falls, something commonly associated with jazz melodic embellishment, and notated in a similar manner. In the following passage from his sextet *Singularity*, composer Jeremy Muller makes copious use of this playful effect.

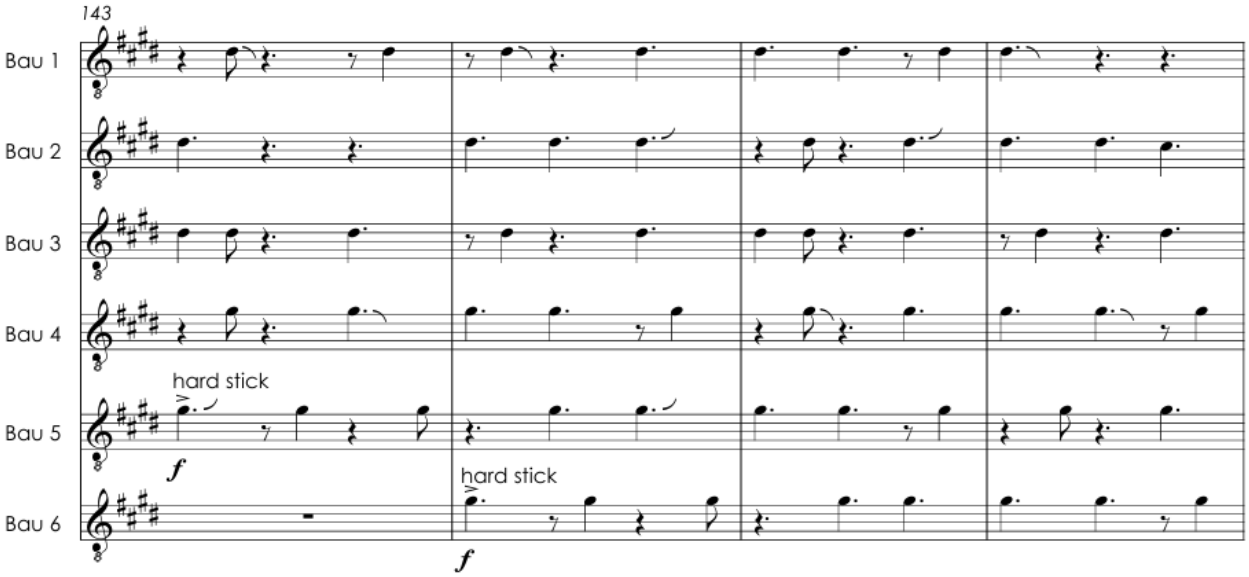


Figure 1.7.3. Short glissandi in Jeremy Muller's Singularity

1.8. *Jeté*

Like the *glissando,* the *jeté* is another effect reminiscent of classical string playing. It is achieved by striking the wire while holding the stick loosely and letting it rebound off of the wire. *Jeté* can be notated with feathered beaming to show the rebound effect, as shown in figure 1.8.1.

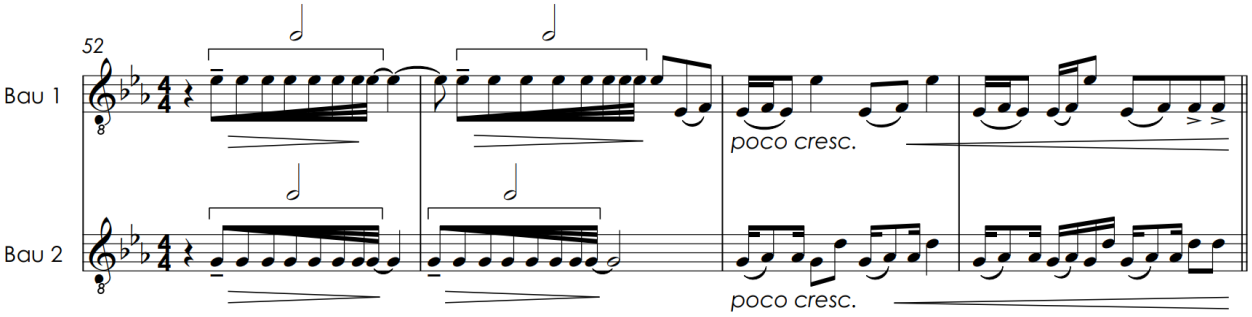


Figure 1.8.1. Jeté in Alexis C. Lamb's Descobertas por pau e pedrapedra

For shorter, more compressed *jeté* (i.e. "buzzes"), a "**z**" on the stem is preferred. Arcomusical Brasil member Natália Mitre compellingly employed this effect in her quartet, *Canção da semente*, imitating the *caixa* (snare drum) pattern of the northeastern Brazilian style of *maracatu*.

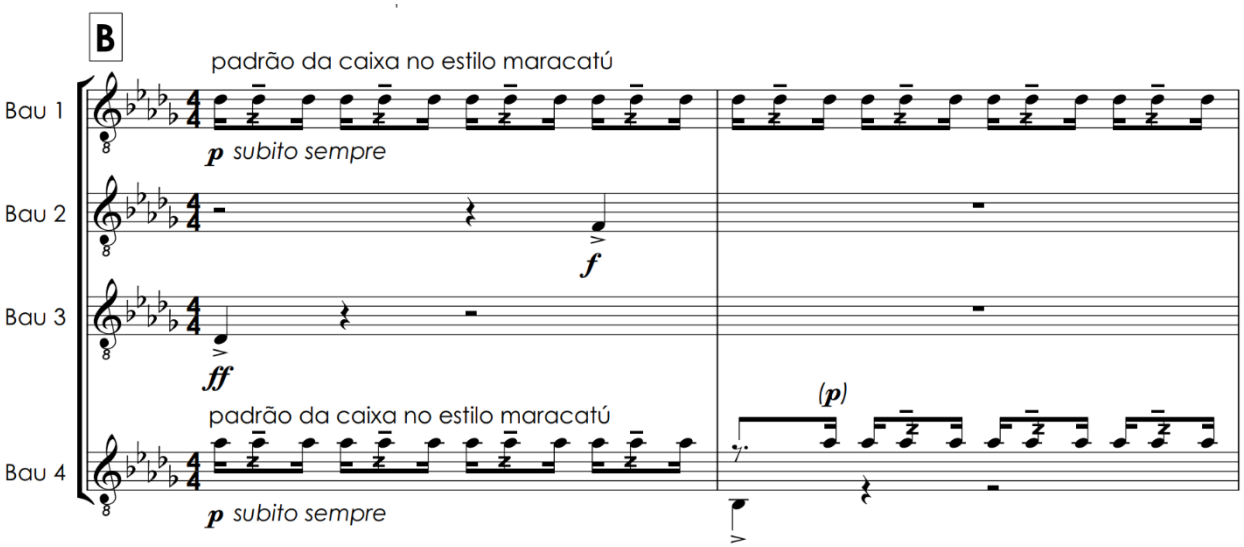


Figure 1.8.2. Buzzes in Natalia Mitre's Canção da semente

1.9. Gourd Resonance

The "soul" of the berimbau, the aspect of its voice wherein its magic and charm reside, is in controlled gourd resonance. When the baqueta strikes the arame the player immediately sets the instrument in motion and the gourd moves to and from the player's chest, opening and closing the "mouth" of the gourd. This effect is often referred to as "wah-wah," and it is very similar to the effect created by the fans in a vibraphone motor, only its "human" control allows for infinitely nuanced expression.

Its technical process is simple. The closer the gourd is to the stomach, the more muted the sound. This technique is an ingrained aspect of standard musical bow performance and is part of most technical development exercises. It is so common, in fact, that in capoeira when an open tone is played with the gourd's mouth fully closed on the player's stomach, the sound is referred to as "DUN," a fourth tone complementary to the basic vocabulary of "DOM, DIN, and TCH."

In most of Arcomusical's published scores, the performance notes begin, "All vibrato with the cabaça for this piece is left to the musical discretion of the performer. It should be used tastefully throughout." However, sometimes composers write specific rhythms to control the speed of the cabaça vibrato. This is notated as "+" (closed gourd) and "o" (open gourd). To end "Mother Harp," the fifth movement of his sextet masterwork *Emigre and Exile*, Matt Ulery asks the ensemble to deliberately move their instruments in unison, reinforcing and "giving breath" to the unchanging bass drum pulse which has been in the background throughout this movement. The effect is musically, and visually, striking.

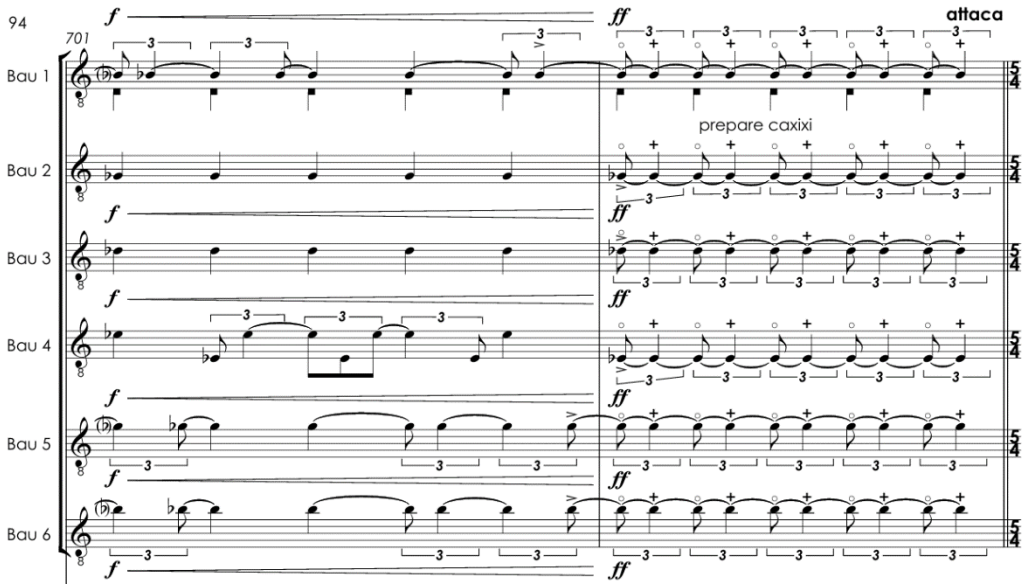


Figure 1.9.1. Rhythmic Vibrato in Matt Ulery's Emigre and Exile, *mvt. V.* "Mother Harp"

If a composer wants even more control, an additional staff can be created to notate the desired rhythm of the vibrato. In his "Jigsaw Zither," composer David Gordon employs this approach.

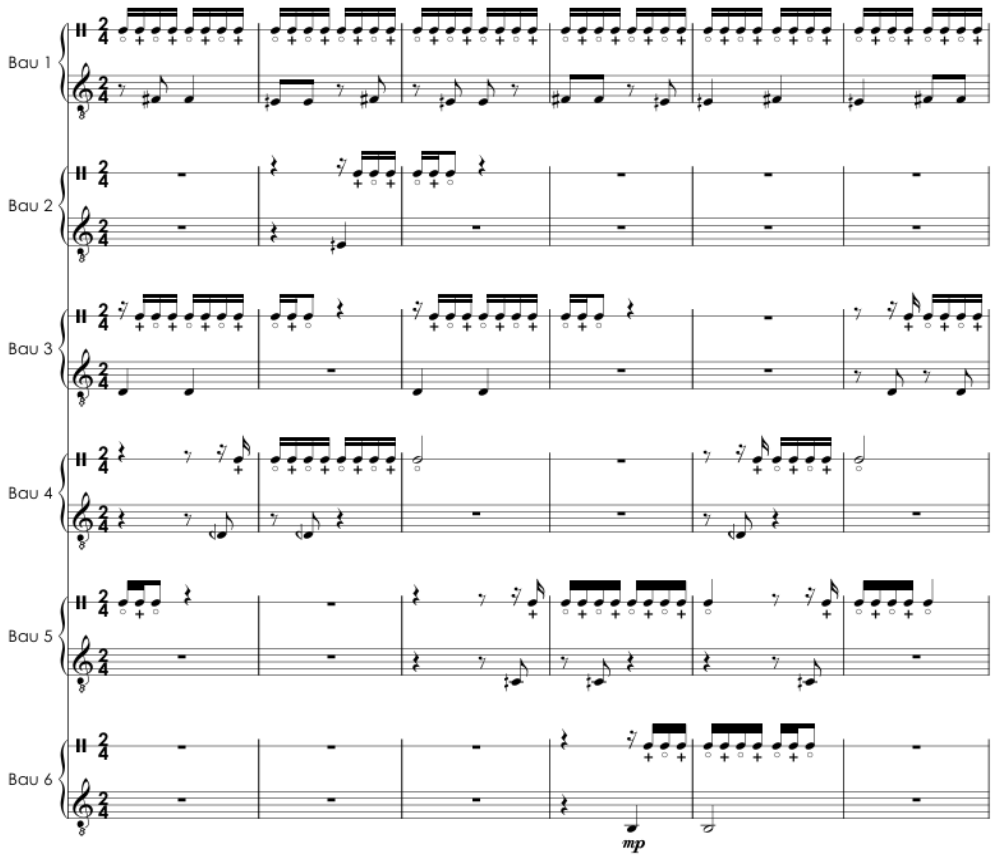


Figure 1.9.2. Rhythmic vibrato in David M. Gordon's Jigsaw Zither

Gourd resonance can also be used to emphasize dynamics. Arcomusical Brasil member Mateus Oliveira employed this effect in his trio, "Caminhos," notating an arrow indicating the move from closed to open or open to closed.

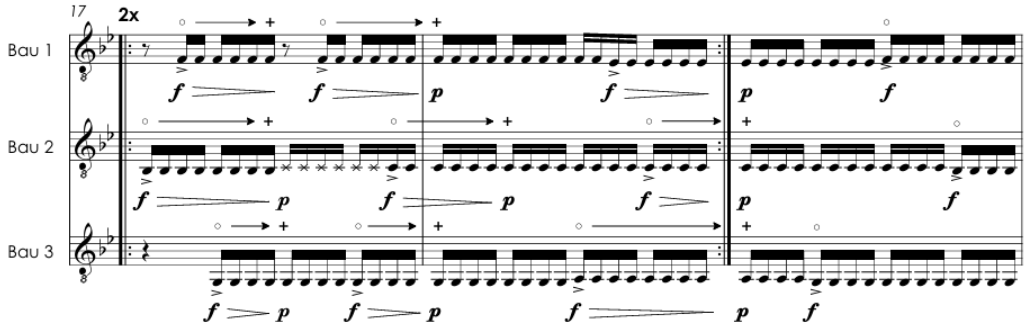


Figure 1.9.3. Gourd-enhanced decrescendi in Mateus Olikveira's Caminhos

1.10. *Chiado or Chepa* ("TCH")

As first referenced in section 1.4, the *chiado* or *chepa* "TCH" is the buzzing tone found ubiquitously in capoeira *toques*.[1] *Chiado* is accomplished by loosely holding the coin against the wire and its desired timbre is a buzzing effect. If the player presses too firmly, the "TCH" can quickly become "DIN." Therefore, chiado is notated using an x-shaped notehead on the "DIN" pitch.

In his trio "Caminhos," Mateus Oliveira passes the *chiado* around the ensemble to maintain a constant sixteenth-note pulse, as if a snare drum were being actively "panned" around the acoustic space.

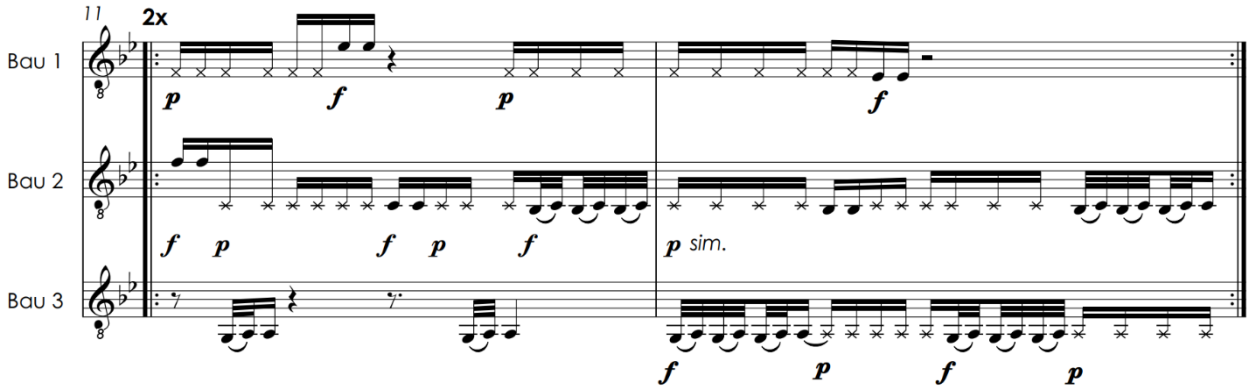


Figure 1.10.1. Chiado in Mateus Oliveira's Caminhos

In rare instances there may be notational overlap between *chiado* and other unpitched material (see section 1.11). If such overlap occurs in your piece, to avoid confusion please instead use the partially hollow note head "⊙" (referred to as "ping" in some notation software), as can be seen in this passage of Natália Mitre's *Canção da semente*. The part for berimbau 4 is shown as it contains the aforementioned overlap with unpitched material.

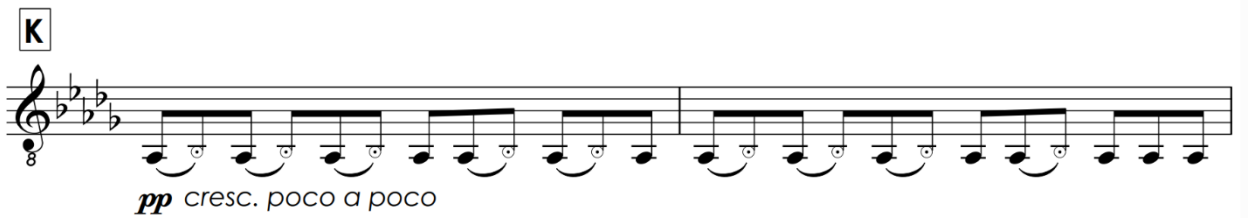


Figure 1.10.2 Chiado (alternate notation) in Natália Mitre's Canção de semente *(berimbau 4)*

[1] The chepa in capoeira is a constant part of standard toques (ostinati). As much of capoeira philosophy revolves around resistance to oppression and a have/have not dialectic, the "chepa" is sometimes referred to as the sonic "neutral" between the DOM (open string) and DIN (coined pitch) that define the topography of a specific toque.

1.11. Unpitched Material

Naná Vasconcelos (1944-2016)
As mentioned in the introduction, the pioneering musical voice of Naná Vasconcelos has had a profound influence on Arcomusical's development. His unprecedentedly virtuosic and sonic exploration of the berimbau created a wealth of timbre and texture not commonly heard in the context of capoeira. Several videos of his playing are now readily available online. Yet his 1980 ECM solo release, *Saudades,* captured the pinnacle of his creativity with the instrument. And on the first track, "O Berimbau," a sort of three-movement concerto for berimbau and string orchestra, one can find examples of nearly all of the following unpitched sounds.

Types of Unpitched Material
Perhaps obviously, the *arame* (wire) is not the only part of the berimbau that can be struck with the *baqueta* (stick). Several unpitched, percussive sounds are also readily available on the berimbau's *vara* (staff) and *cabaça* (gourd). As illustrated in this sample notation key, these sounds usually take x-shaped noteheads and occupy three or more adjacent lines/spaces below the staff.

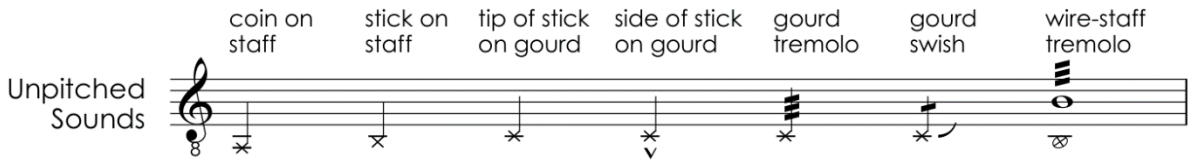


Figure 1.11.1 extract from an Arcomusical notation guide (see section 2.6)

Produced by quickly moving the coin backwards, the **coin on staff** offers a low, resonant knocking that activates vibration of the entire body of the instrument. As a result, the pitch of the open wire is subtly heard underneath the woodblock-like tone that this technique creates.

The **stick on staff** is a woody, percussive tick whose timbre can be shaded brighter or darker depending on where the stick crosses the staff. Its "pitch" is perceived as higher than the coin on staff effect. Almost never too loud, this is a good "middle" option for passages featuring softer dynamics.

By contrast, the **stick on gourd** is an attention grabbing "thwack" that is the highest pitch and potentially loudest of these first three sounds. It is commonly played by striking the side of the stick against the side of the gourd. That said, if a composer intends a balanced blend of this effect with its two relatives (coin on staff and stick on staff), the player should use the tip of the stick.

Although it is not necessary to specify which version of **stick on gourd** to use (our interpretive decisions are always context driven), if you wish to differentiate between the tip and the side of the stick, please use a marcato articulation to indicate the latter. No marcato articulation indicates that the tip of the stick will be used. (See figure 1.11.1.)

Notated with three tremolo slashes, a **gourd tremolo** creates a brushing, wind-like white noise when the stick is scrubbed rapidly back and forth on the side of the gourd. An additional up or down motion will create a rich, filtered series of harmonics. This effect can also be played on the staff (**staff-tremolo**), producing a similar but less intense effect.

A variation of this tremolo is the **gourd swish**, which involves a single swipe of the stick against the gourd. This can be done either upwards or downwards (indicated with a scoop up or down) and at different speeds, creating a variety of related "breathy" or "wind-like" effects.

The **wire-staff tremolo** is created by rapidly moving the stick back and forth "inside" the berimbau between the wire and the staff. This creates a uniquely expressive texture that combines both pitched and unpitched timbres.

Musical Examples of Unpitched Material

The musical function of unpitched sounds can vary widely, as seen in the following notable examples.

In the middle section of *Berimbau Duo no. 5, "Alexis"* Gregory Beyer presents quasi-melodic writing for unpitched sounds. The result is not unlike a linear, funky drumset groove hocketed between the two berimbaus. The accented **coin on staff** sound serves as the "kick drum," bringing out the full resonance of both instruments. Its foregrounding relative to the **stick on staff** and **stick on gourd** sounds underpins the groove. Note that the performers would use the tip of the stick for the stick on gourd here to balance with the other unpitched sounds.

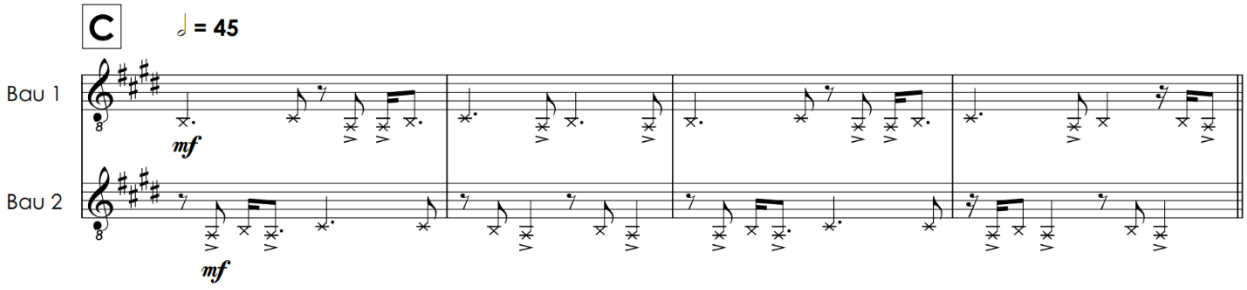


Figure 1.11.2. Three unpitched sounds in Gregory Beyer's Berimbau Duo no. 5, Alexis

In her quartet *Queda de quatro*, (figure 1.11.3) Alexis C. Lamb employs the **stick on staff** as a constant eighth note pulse in counterpoint with melodic material shared by the four players. The music effectively takes on a layered quality. Note that, taken together, players 1, 2, and 4 double the constant stream of player 3's eighth notes.

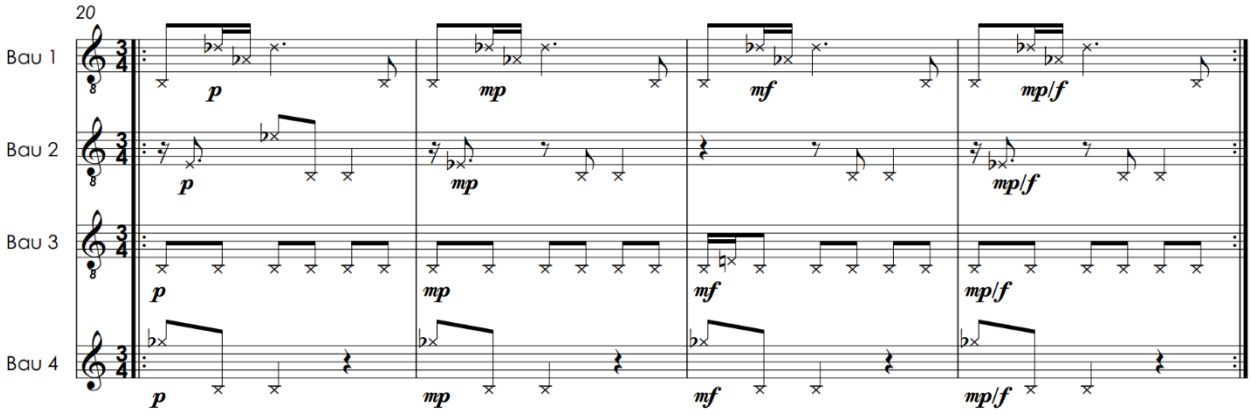


Figure 1.11.3. Stick on staff in Alexis C. Lamb's Queda de quatro

Later in the same work, all four players play a **staff tremolo** and work in consort to intone a melodic phrase using the **coin on staff** technique. Once again, this melody emerges because the coin on staff technique activates the wire's open tone.

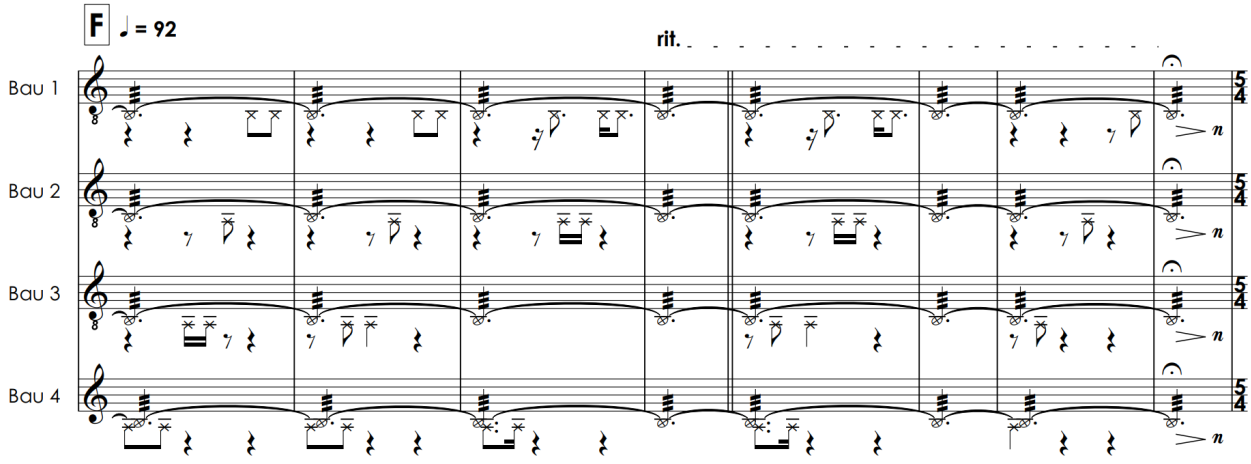


Figure 1.11.4. Staff tremolo under coin on staff melody in Alexis C. Lamb's Queda de quatro

In Gregory Beyer's *Berimbau Quintet no. 1, "Solkattu,"* note how the simple, powerful unison **stick on gourd** "thwack" serves as a sudden pivot, setting the music off into a completely different texture and meter. **Stick on gourd** can punctuate the texture of the ensemble much like an orchestral cymbal crash.

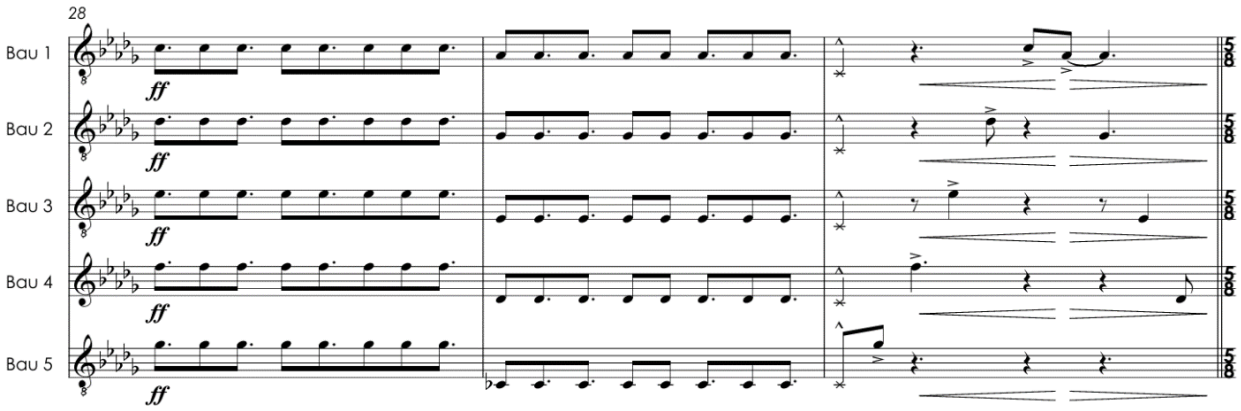


Figure 1.11.5. Side of stick on gourd in Gregory Beyer's Berimbau Quintet no. 1, Solkattu

The **gourd swish** can be used in combination with other sounds for a subtle timbral emphasis. In his *Emigre and Exile*, Matt Ulery uses a quick upward swish (after the lower **coin on staff** for berimbaus 1, 5, and 6) to accentuate the harmony of berimbaus 2, 3, and 4 at peak of the rhythmic figure at rehearsal K.

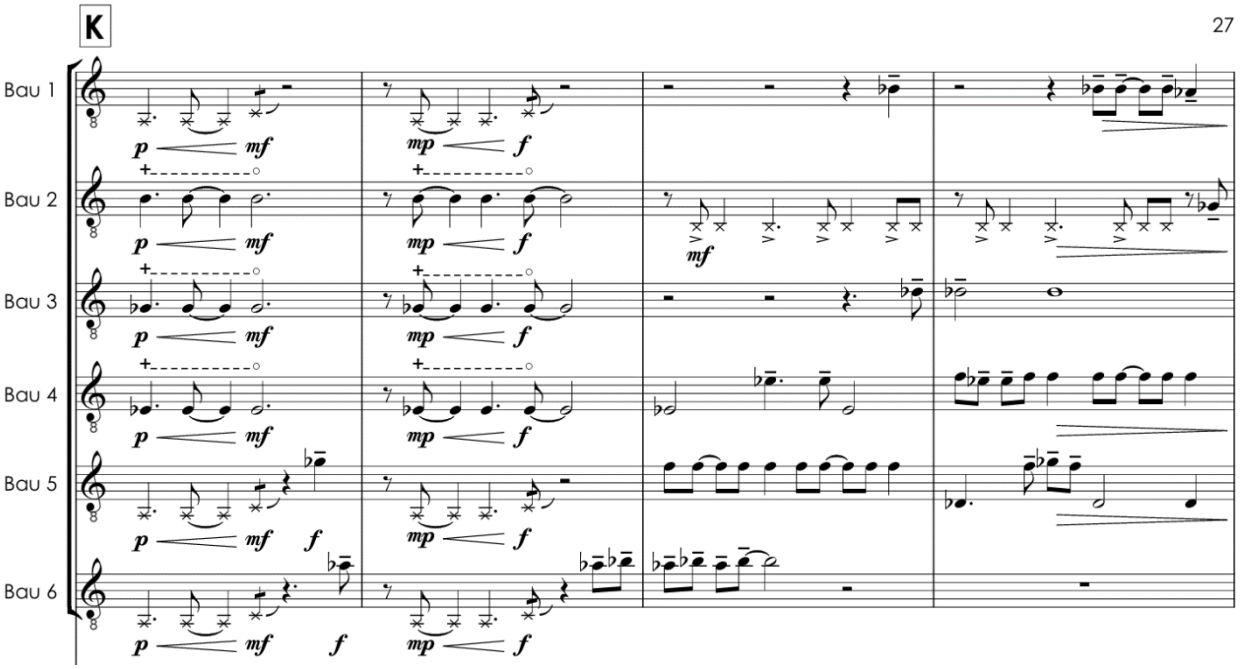


Figure 1.11.6. Quick gourd swish in Matt Ulery's Emigre and Exile, *mvt. I* "Mother Harp"

At the end of Alexis Lamb's *Ondulação*, she uses a slower downward **gourd swish** to create a distinct, percussive conclusion.

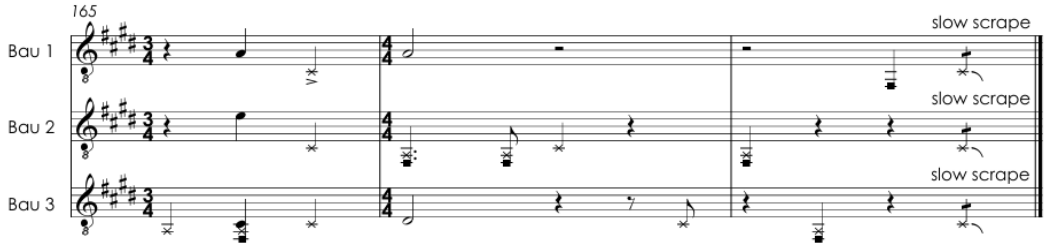


Figure 1.11.7. Slow gourd swish in Alexis Lamb's Ondulaçao

In the opening passage of composer Alexandre Lunsqui's *Repercussio*, unpitched material forms a series of cloud-like masses of sound. The **staff tremolo** is first introduced as each consecutive player makes overlapping entrances in a cascade-like crescendo. Before this cloud completely subsides, a second cloud, this time a **wire-staff tremolo**, fades in**.** The texture of the score itself serves to aid the imagination of the sonic result.

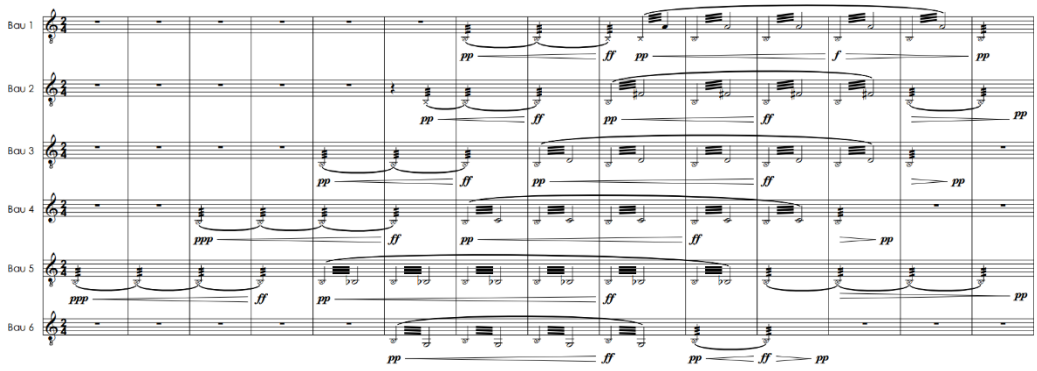


Figure 1.11.8. Gourd tremolo and wire-staff tremolo in Alexandre Lunsqui's Repercussio

In his trio "Caminhos," Arcomusical Brasil member Mateus Oliveira offers some specific and innovative variations. In the following example, berimbau 1 rhythmically scrapes the staff, alternating both up and down, which produces a shifting and breathy, almost slide whistle-like effect.

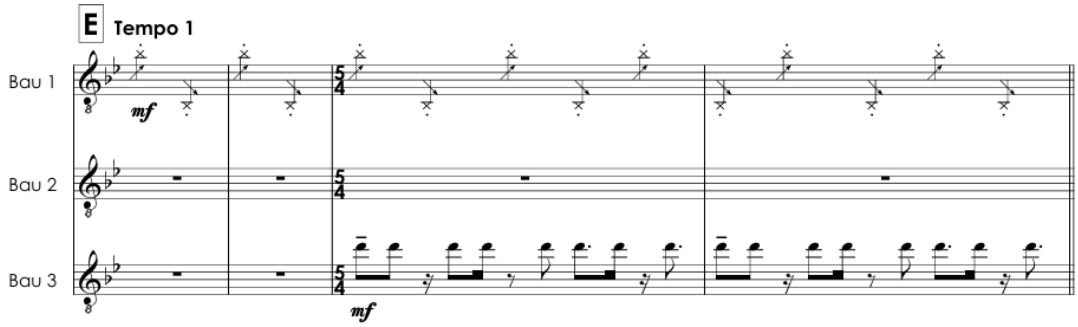


Figure 1.11.9. Staff scrape in Mateus Oliveira's Caminhos

Later on, Oliveira asks players 1 and 2 to strike the staff in descending/ascending motion to create a quasi-melodic gesture.

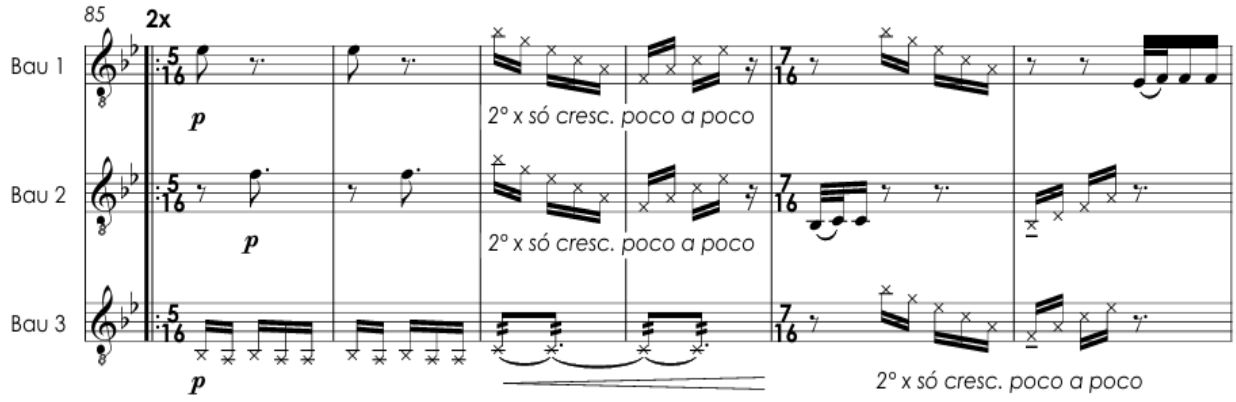


Figure 1.11.10. Multi-pitch stick on staff in Mateus Oliveira's Caminhos

In sum, there is truly no end to the creative possibilities these unpitched sounds can produce. If there is a specific sound you are trying to achieve or you are unsure of how to notate your desired effect, please send an email to: info@arcomusical.com.

1.12. Berimbau with Caxixi

When a caxixi rattle is held in the same hand as the stick, its percussive timbres can either reinforce notes played on the berimbau, or it can be operated on its own without striking the berimbau at all.

Based on the recorded performances of musical pioneer Naná Vasconcelos, Arcomusical has always considered the use of caxixi a musical option rather than an obligation. However, it is important to note that in the game of *capoeira* the berimbau is *never* played without caxixi accompaniment. Ethnomusicologist Gerhard Kubik observes this as strikingly different than African musical bow traditions and posits capoeira's noisy environment as one logical driver for the caxixi's unique inclusion in Brazil.[2] However, similar to other African percussion instruments, including the Mozambican *xitende* musical bow, often a bottle-cap or other metallic buzzing device is included on the body of the instrument to create a rattle or buzzing sound that is said to represent the voices of a communities ancestral spirits. In the practice of capoeira, communities place enormous importance on teacher-student lineage and in that sense, consciously

[2] Kubik, Gerhard. *Angolan Traits in Black Music, Games and Dances of Brazil.* Lisbon, Portugal, Centro de estudos de antropologia cultural, 1979, p. 35.

paying homage to one's ancestors is a critically important community building practice.

In sum, the caxixi's "magic" can add a powerful additional layer of musical information to a berimbau performance.

Caxixi should be notated with a triangular note-head on the top line of the staff. When the caxixi is played as an independent voice, as if it were a drum set ride cymbal, it should be notated stems up, as in the following passage from Alexis C. Lamb's *um só*.

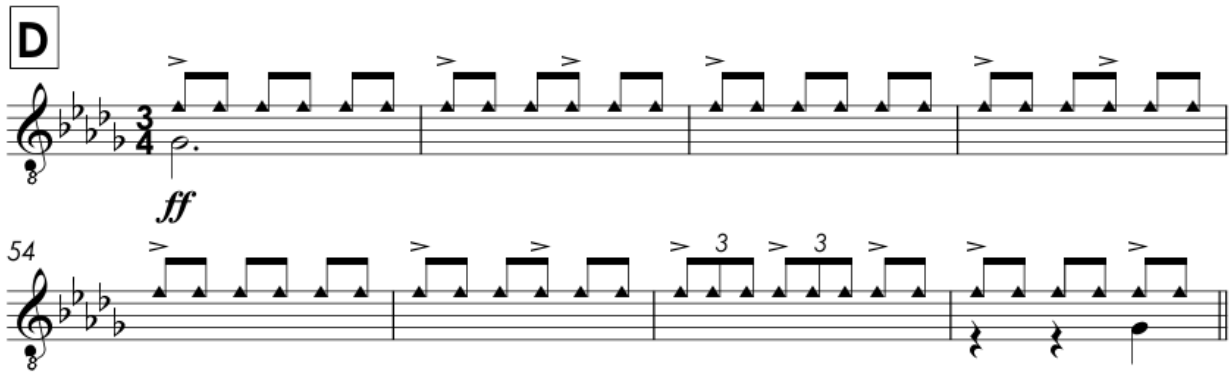


Figure 1.12.1. Solo caxixi in Alexis C. Lamb's um só

Later on, Lamb continues the caxixi layer and adds both pitched and unpitched berimbau materials to create a colorful and polyphonic texture.

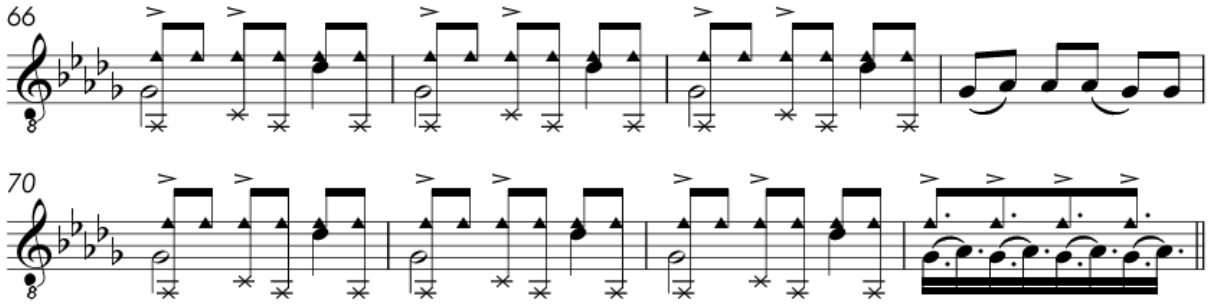


Figure 1.12.2. Textural caxixi in Alexis C. Lamb's um só

In Gregory Beyer's *Berimbau Sextet no. 2 "Traíra,"* each player's caxixi is gradually layered in to accentuate the shared melodic line. In the following example, berimbau 3 begins this process in the 3rd measure, followed by berimbau 4, 5, 6, then 1, and 2, one at a time in each consecutive measure.

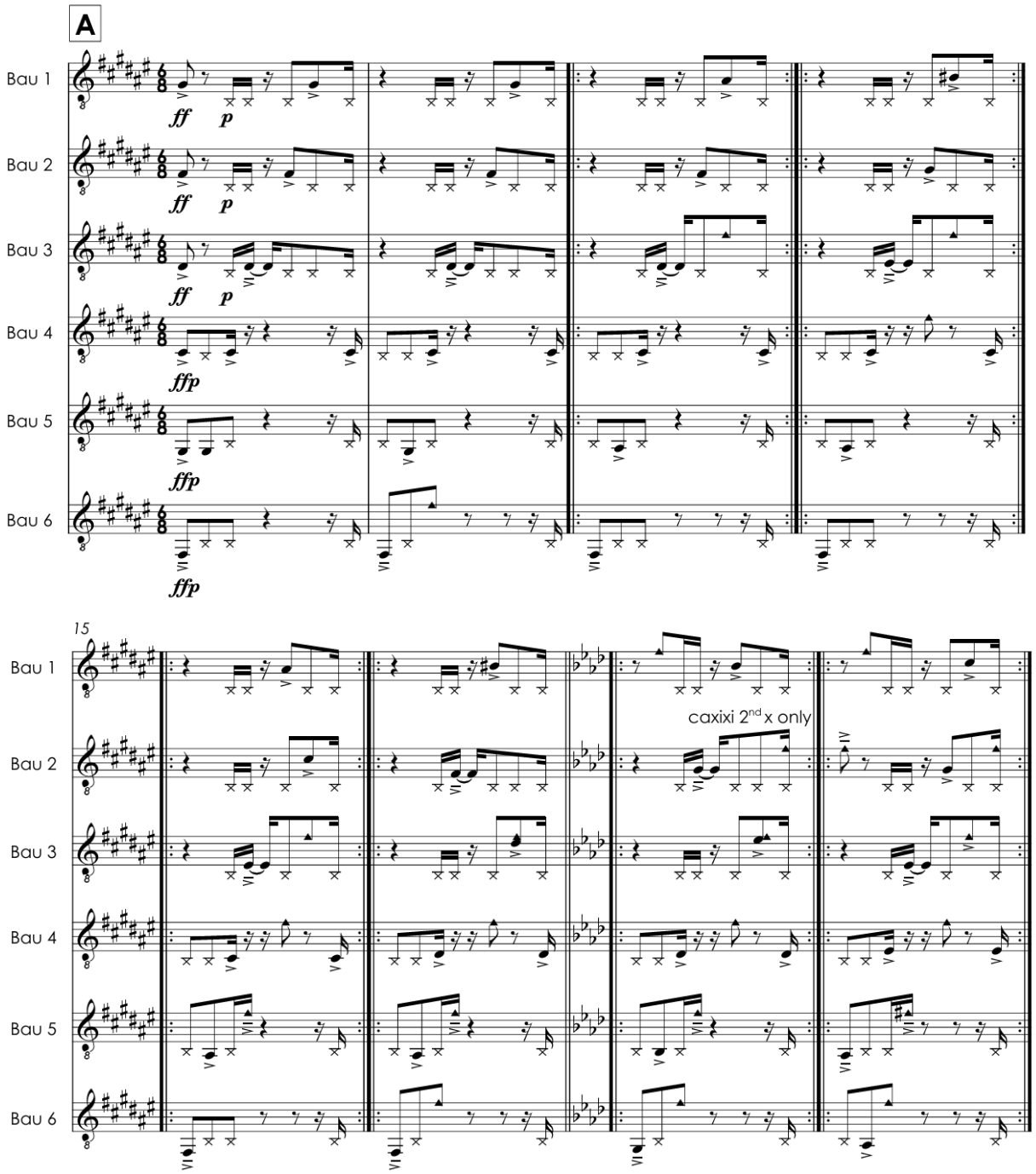


Figure 1.12.3. Melodic caxixi in Gregory Beyer's Berimbau Sextet no. 2 "Traíra"

It is important to note that, rather than an all-or-nothing proposition, a caxixi can be added or removed in the middle of piece, too. **When adding or removing the caxixi, please include an indication to do so at the first available rest, keeping in mind that it takes approximately four to five seconds to either prepare or remove the caxixi** (e.g. fig. 1.9.1.).

1.13. More than One Instrument per Player

Just as a caxixi and be added or removed mid-composition, a performer can make a switch to a different berimbau altogether. Shifting the gamut of available pitches, such a switch can offer more harmonic and melodic variation within a piece. Within reason, multiple instruments can be assigned to each player. For example, in Arcomusical's *Berimbatá* project, eight berimbaus are used between four musicians. The process of switching berimbaus *takes even longer* than picking up or removing a caxixi.

Once again, **a note to switch instruments is imperative at the first available rest and we advise offering plenty of time (a minimum of seven to eight seconds**) to make these switches. In the following passage from *Berimbatá* illustrating the unusual 7/4 meter that defines the final "road" (rhythmic pattern) of the orixá Inlé, the caxixi player is given three full measures to set down the caxixi and move to the 6:5 (tuning ratio, see section 1.3) berimbau, and the "iyá" player is given not quite two measures to move from the 2:1 instrument (tuned D3:D4) to the 12:5 instrument (C#3:E4) and play the call to begin the toque for the orixá Babalú-Ayé.

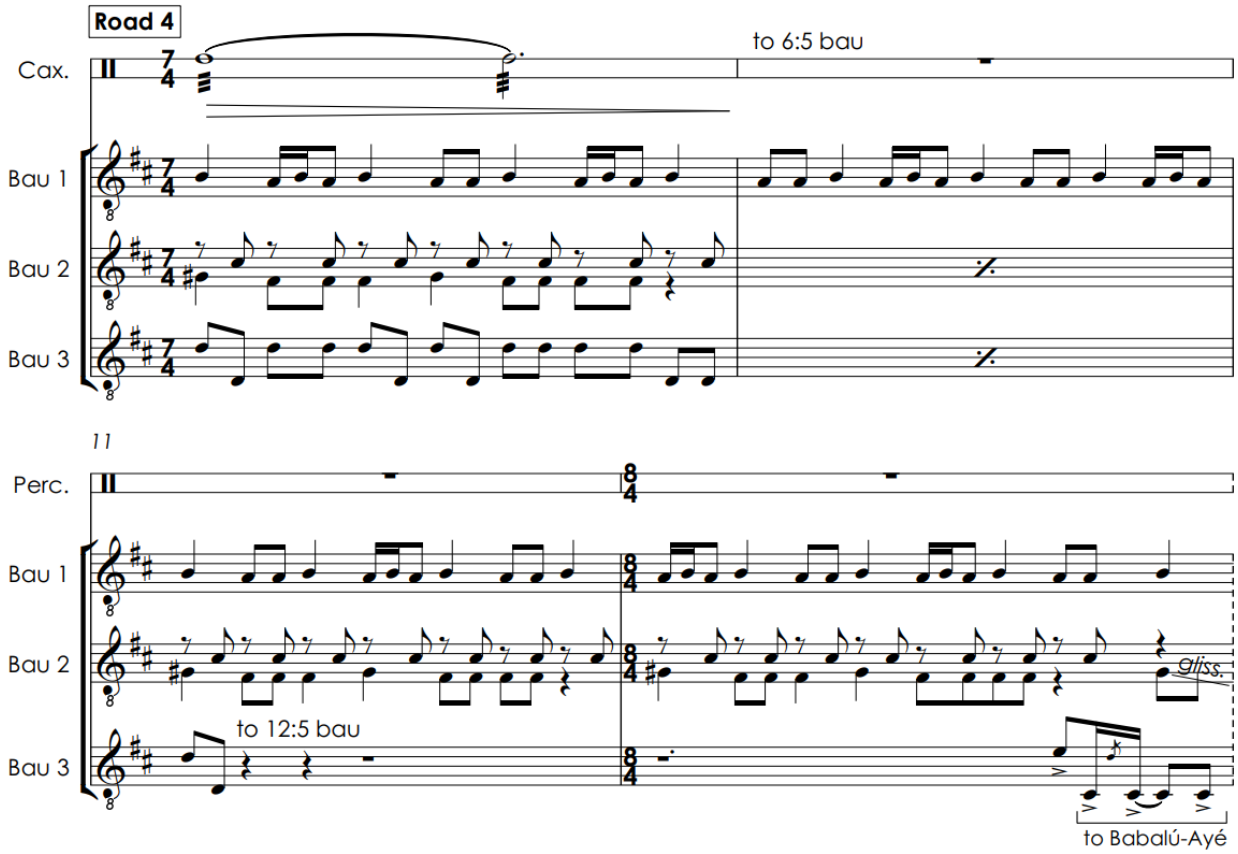


Figure 1.13.1. Instrument switches in Arcomusical's Berimbatá *project.*

1.14. Berimbau with Other Instruments

The berimbau can be used alongside other instruments and there are numerous examples throughout Arcomusical's repertoire.

Gregory Beyer's *Fios e Linhas* features the berimbau as a solo instrument accompanied by a mallet percussion quartet. The ensemble doubles, reinforces, and responds to the berimbau's melodic material. Later in the work, the berimbau player switches to caxixi to provide rhythmic accompaniment in two different sections that feature the ensemble.

Another example is Arcomusical Brasil member José Henrique Soares's *Sopa de Lentilhas*, scored for *mbira* soloist accompanied by three berimbaus. The berimbaus accentuate the mbira part with shifting dynamics and similar repeated material. The subtle timbral combination of mbira with berimbaus creates a delightfully intimate soundscape.

An example in which the berimbau functions as an equal with another instrument is Alexandre Lunsqui's *GLAES*, a delightfully frenetic duo for percussion and piano. In this unique work, the percussionist's berimbau functions as a slide guitar, using a small glass jar (or guitar slide) as a substitute beater to simultaneously stop and percuss the wire (see section 1.17). Furthermore, GLAES asks both pianist and percussionist to play on the strings inside the piano. In this manner, the berimbau functions as an extension of this tactile approach to piano writing.

1.15. Pressure Strokes

By firmly pressing the stick against the wire, a muted tone results. Using this technique up and down the length of the wire produces pitches beyond the reach of the coin. While this effect facilitates an extended range, the notes are not resonant nor are they particularly clear. Therefore, this technique should be considered a special effect.

Due to the constant pressure required to create this effect, prolonged use of this technique is, like prolonged use of the coin, physically taxing to performers and should be used in brief passages, rather than throughout a work.

As in the following example, please use diamond note-heads to notate approximate pitches. In his quintet *Isto é muito natural*, composer Orkun Akyol employed pressure strokes achieved with various implements such as a threaded rod and a soft stick.

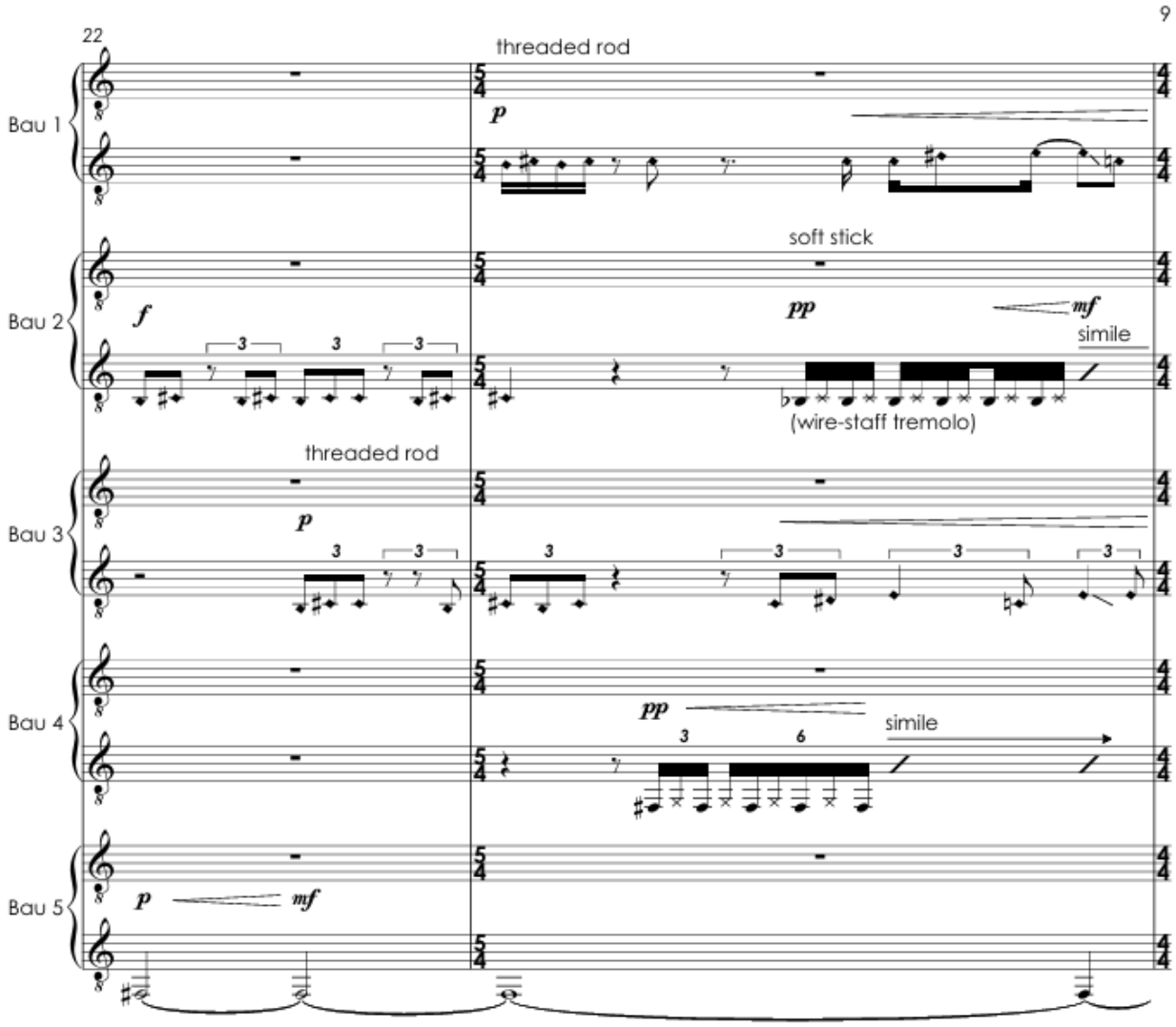


Figure 1.15.1. Pressure strokes in Orkun Akyol's isto é muito e natural

1.16. Other Implements

Aside from the traditional hardwood stick, many other implements have been used to produce a wide variety of timbres. A few examples of these are indicated below:

Soft Stick

Arcomusical wraps one or more layers of moleskin around the end of our *baquetas* to produce a softer attack and warmer, more focused tone than that of striking the wire directly with the wooden stick. The result is something akin to the sounds produced by a hammered dulcimer stick or a timpani mallet, and similar to each, more moleskin wraps yield varying degrees of attack and tone quality.

Arcomusical uses two versions of soft stick. The first involves a few inches of moleskin on just one end of the stick, resulting in a double-ended stick that the performer can flip in either direction to move between "soft stick" and "hard stick." This flip takes 2-3 seconds and should be clearly indicated and accommodated in your composition.

The following example from Gregory Beyer's *Berimbau Duo no. 2, "Alexis"* makes use of the first type of soft stick, as adequate time is allotted for the flip to and from "soft" and "hard" sticks.

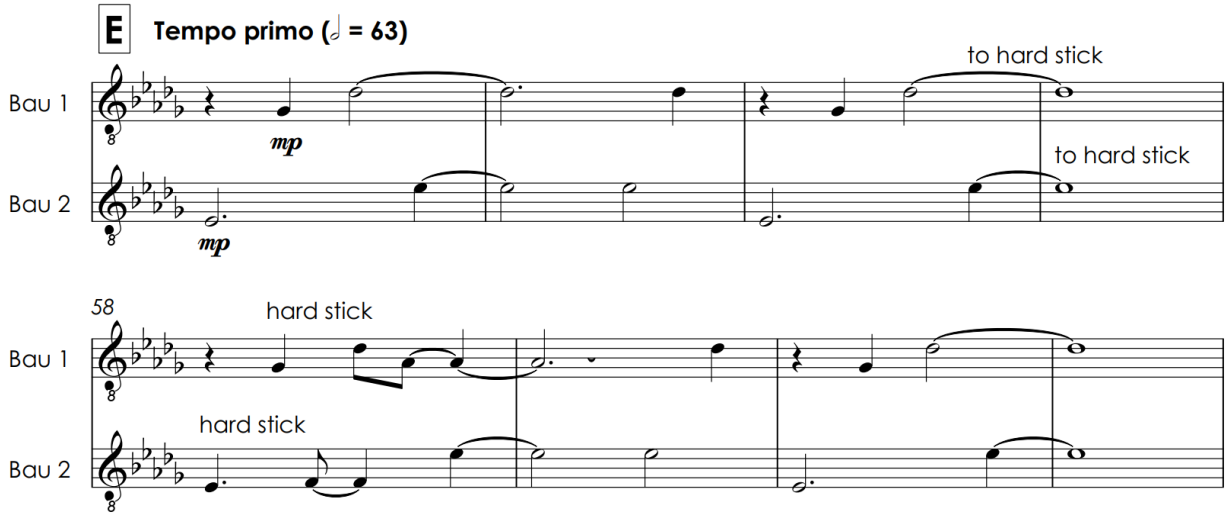


Figure 1.16.1. Soft stick in Gregory Beyer's Berimbau Duo no. 5, "Alexis"

The second version of the soft stick locates the moleskin wrapping approximately two inches from the stick's end leaving some "hard" stick exposed, thereby allowing the performer to move between "soft" and "hard" sounds immediately. While this instantaneous shifting might seem ideal, there is a tradeoff. Since the moleskin is not at the end of the stick, there is less weight behind each stroke, yielding a sound somewhat less full than the first soft stick method can produce.

Arcomusical will default to the first version of the stick unless the transitions are too fast and necessitate the second. A passage from Jeremy Muller's *Singularity* provides an example of when the second version becomes necessary. The sudden unison move from soft to hard stick adds an immediate shift of both weight and articulation.

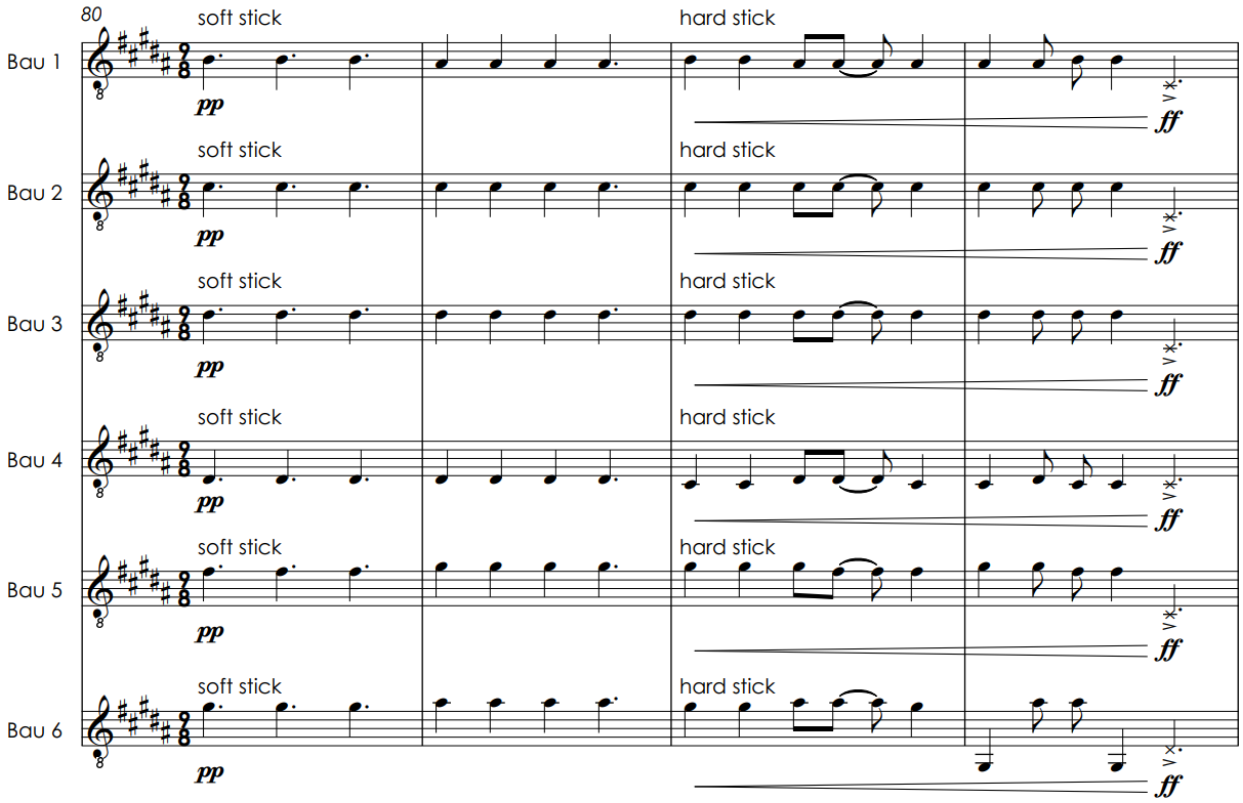


Figure 1.16.2. change from soft stick to hard stick in Jeremy Muller's Singularity

Guitar Slide Glissandi

An example from "GLAES" demonstrates the playful use of glissandi paired with another instrument. Here the pianist uses a large marble to apply pressure to piano wires while the percussionist uses a small drinking glass to do the same on the berimbau wire.

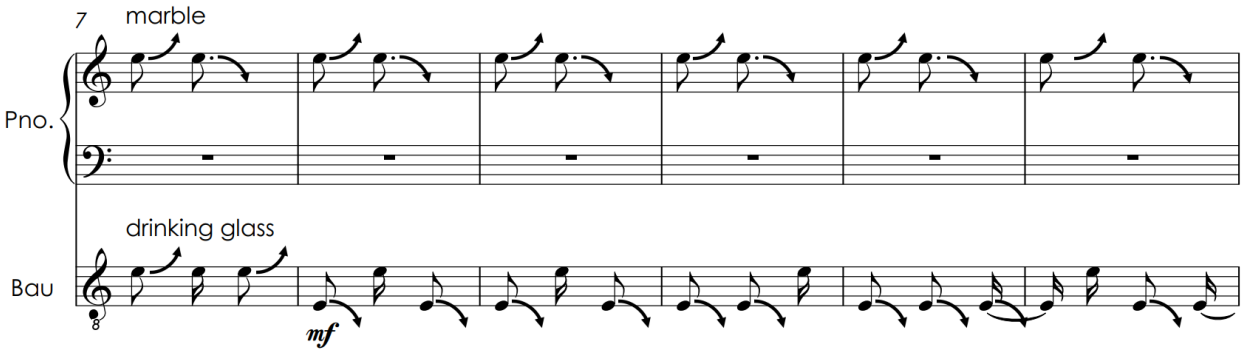


Figure 1.16.3. Drinking glass glissandi in Alexandre Lunsqui's GLAES

Threaded Metal Rod
When scraped across the wire, this is an incredibly powerful and colorful sound. However, do not use the threaded rod to scrape the side of the gourd or staff. It will cause damage to both.

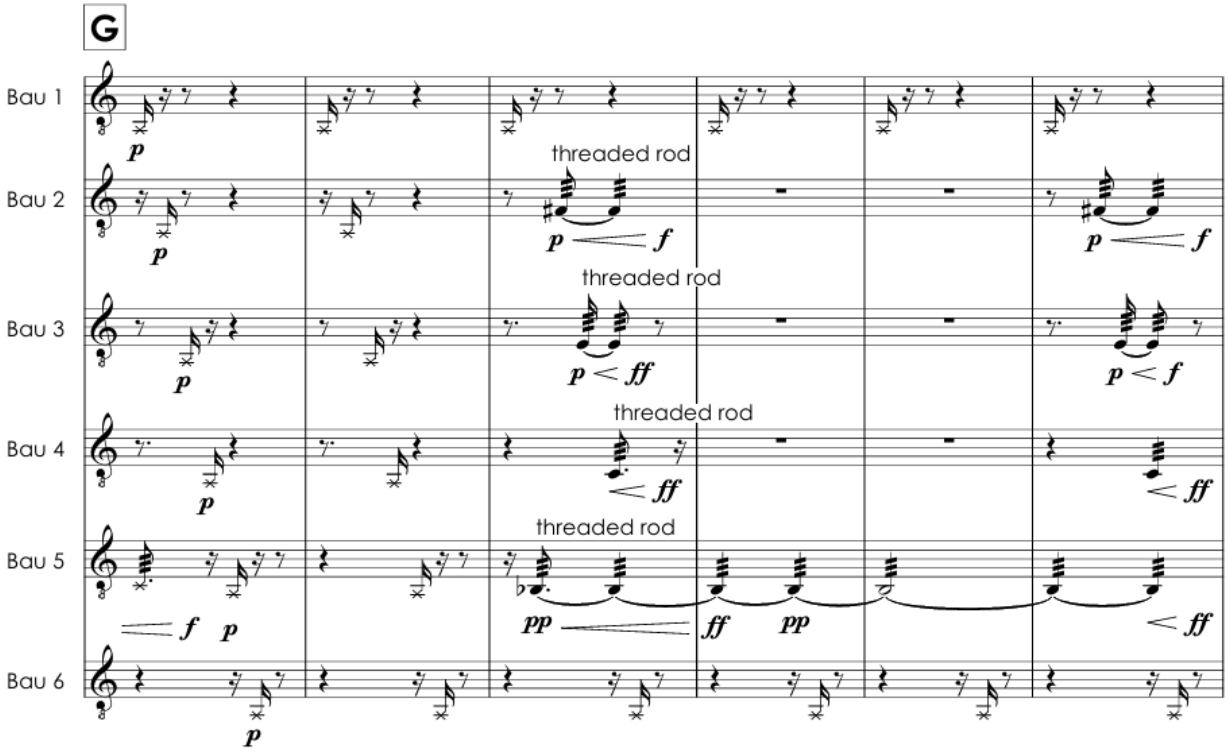


Figure 1.16.4. Threaaed rod in Alexandre Lunsqui's Repercussio

Arcomusical will default to using hard stick if no indication is given. However, if an implement other than hard stick is used later in the piece, hard stick should be included at the beginning as a courtesy (see fig. 1.17.2). If there is a change in implement during a piece, please indicate it at the first available rest.

1.17. Pizzicati

Arcomusical performers use the same approach to pizzicati as double-bassists, utilizing the side of the finger (knuckle) to produce a deep, resonant pluck. This effect works with both open and coined notes, but, as with other string instruments, open notes are much more resonant.

As with classical strings, indicate this technique with "pizz." and cancel it with "ord."

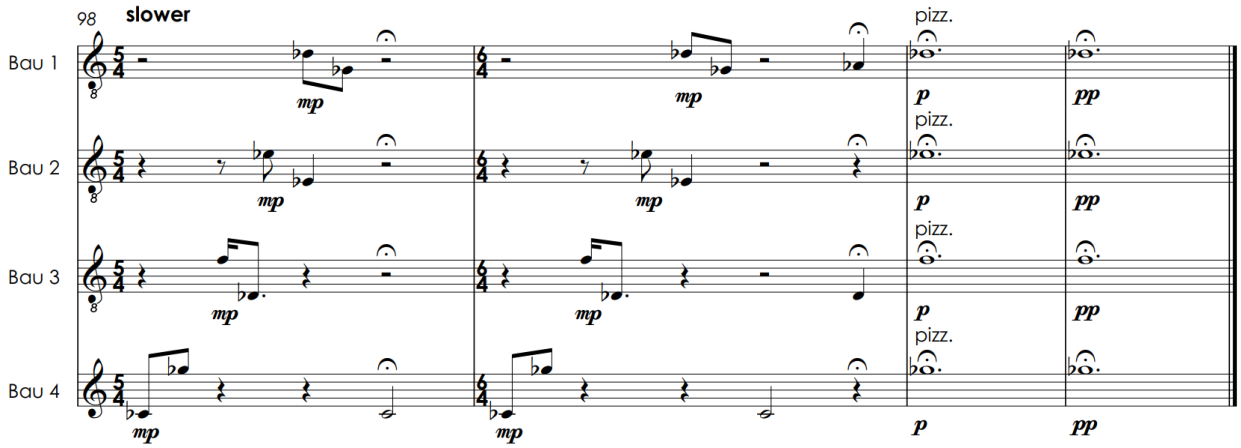


Figure 1.17.1. Pizzicati in Alexis C. Lamb's Queda de quatro

In the rare instance when pizzicati and ordinary playing frequently alternate, it may be helpful to indicate pizzicati with the symbol "⊕," thus avoiding excessive textual instructions in your score and parts.

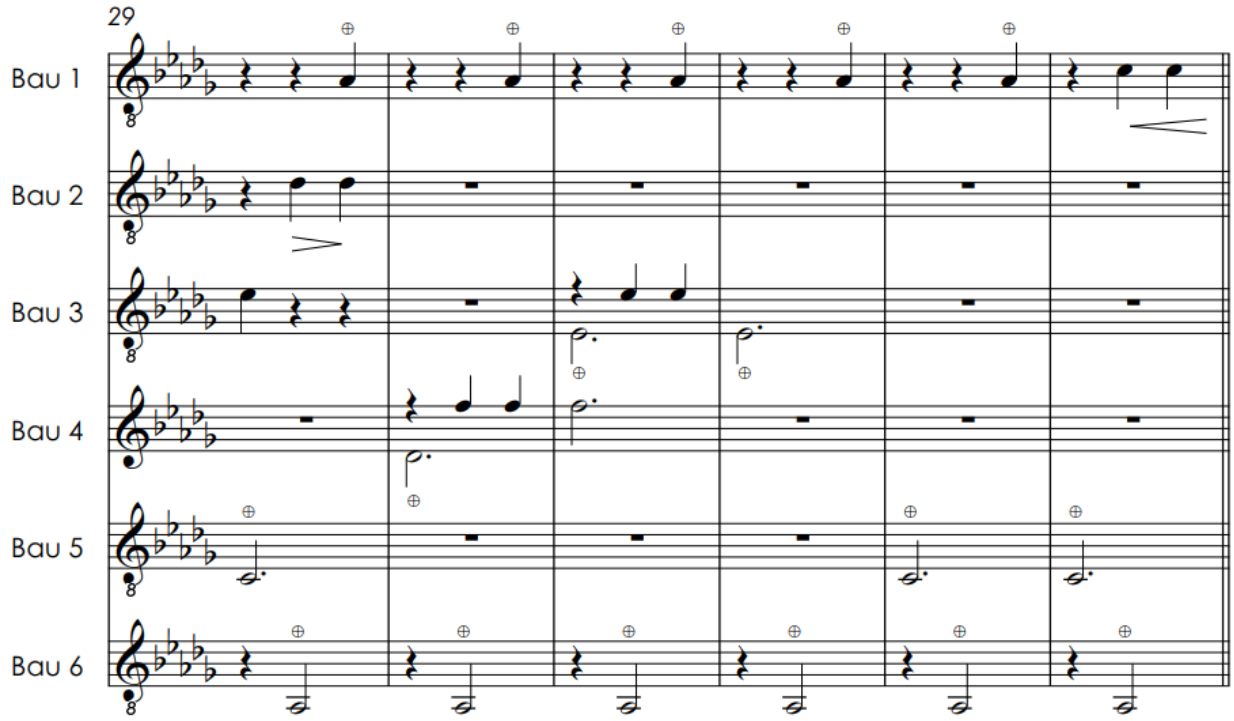


Figure 1.17.2 Pizzicati in Elliot Cole's Roda, mvt. II, "Dreaming"

Harmonics

The pizzicato technique also allows performers to achieve harmonics by using thumb and finger to pluck the wire at whole number ratio points on the wire, similarly to other stringed instruments. This can be done on an open string or above a coined note but as always, open notes are more resonant. Our preferred notation involves notating the fundamental of the string to played (open or coined) with a normal notehead; then the sounding note is indicated above with a diamond note head with a circle (as used in string harmonic notation). This notation clarifies on which wire the harmonic is to be played. As harmonics are never loud, effort dynamics (e.g. "***f***") can be an additional helpful detail for performers, as Orkun Akyol has done in his *isto é muito natural.*

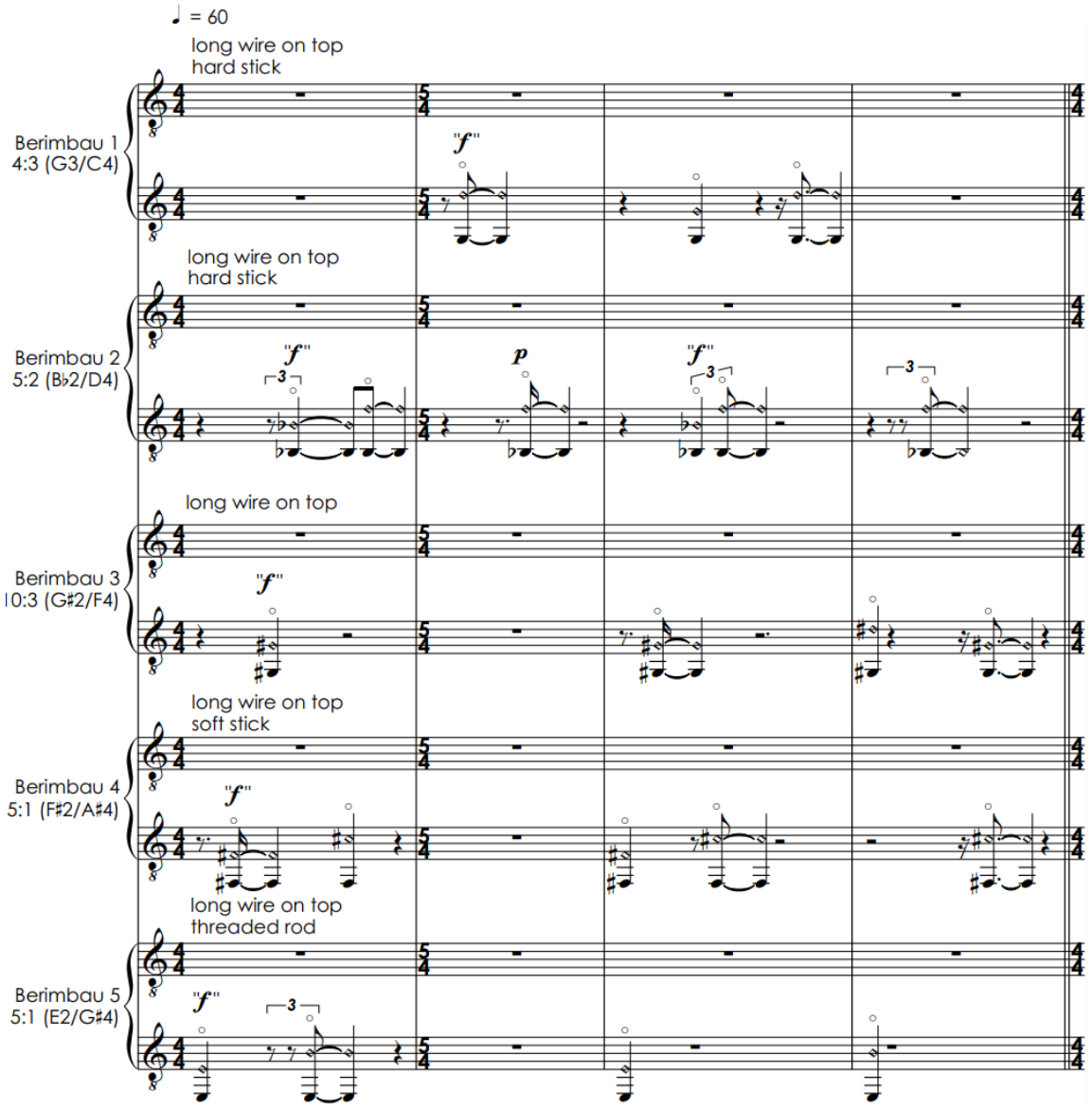


Figure 1.17.3. Orkun Akyol. isto é muito e natural

1.18. Muting and Damping

In typical performance, Arcomusical strikes the wires and allows the instrument to decay naturally, regardless of notated rhythmic length. Therefore, an "l.v." (let vibrate) indication is superfluous. That said, performers can easily dampen wires when needed.

If a specific duration of resonance is desired, Arcomusical prefers a caesura to indicate when performers should dampen. Perhaps idiosyncratically, Arcomusical interprets caesurae *without* a break in metric time. If a break in time is also desired, please use either a breath mark or fermata.

Damping for a single performer is useful to remove potential harmonic dissonance when a chord change occurs. Ensemble damping produces the rather dramatic effect of taking a unison breath. The following two examples from "Roda" illustrate each approach.

Here, a single berimbau dampens for harmonic and melodic clarity.

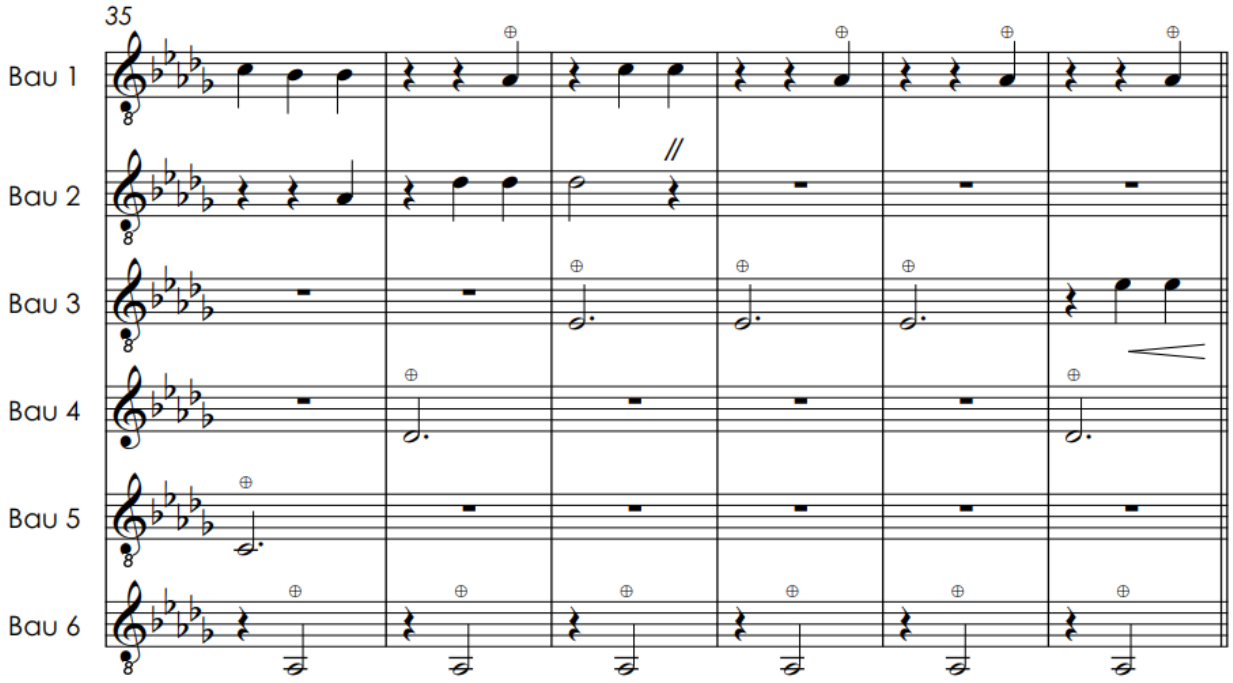


Figure 1.18.1. Individual dampening in Elliot Cole's Roda, *mvt. 2,* "Dreaming"

Later, the entire sextet dampens for a brief but stark moment of silence.

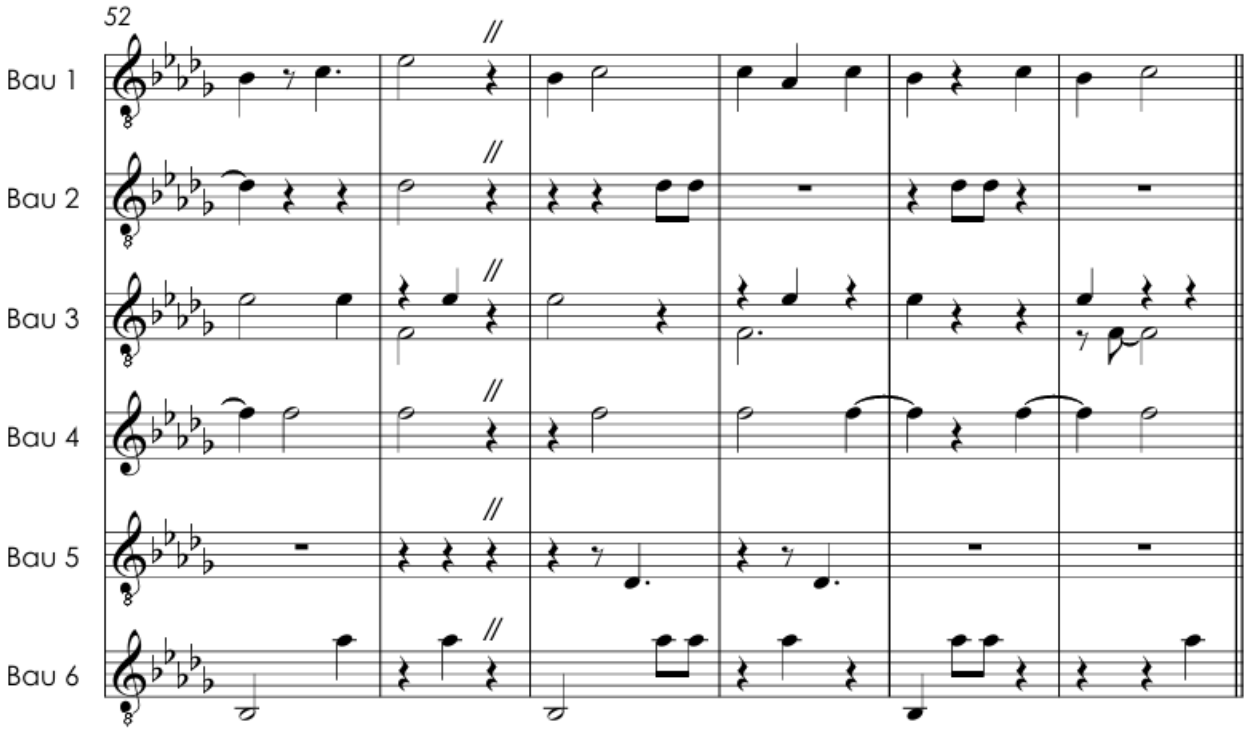


Figure 1.18.2. Ensemble dampening in Elliot Cole's Roda, *mvt. 2,* "Dreaming"

In addition to simply stopping the resonance of the wire(s), a muted effect *while playing* can create a really exciting texture that emphasizes rhythm and pulse and downplays resonance. This is somewhat similar to the palm-muting effect that guitarists often use to control unwanted resonance. On the berimbau it is done with the thumb and/or fingers of the hand holding the berimbau (typically the left hand). This muted playing is strikingly reminiscent of the now rarely played Zulu royal musical bow known as the *ugubhu*, whose twined horsehair (in place of a metal wire) string created a dark and haunting tone.[3]

Arcomusical alumnus and composer Kyle Flens's wonderful trio, *Echoes*, features gradual shifts from normal playing to muted playing (notated with staccati).

[3] Rhodes University in Grahamstown, South Africa, houses the International Library of African Music (ILAM), which keeps ethnomusicologist Hugh Tracey's collection of recordings made throughout the southern African region. Volume 37 of the Music of Africa series features Tracey's 1972 recordings of musician, poet, and cultural authority Princess Constance Magogo KaDinuzulu (1900-1984) playing her *ugubhu* while singing. https://www.ru.ac.za/ilam/products/cds/musicofafricaseries/

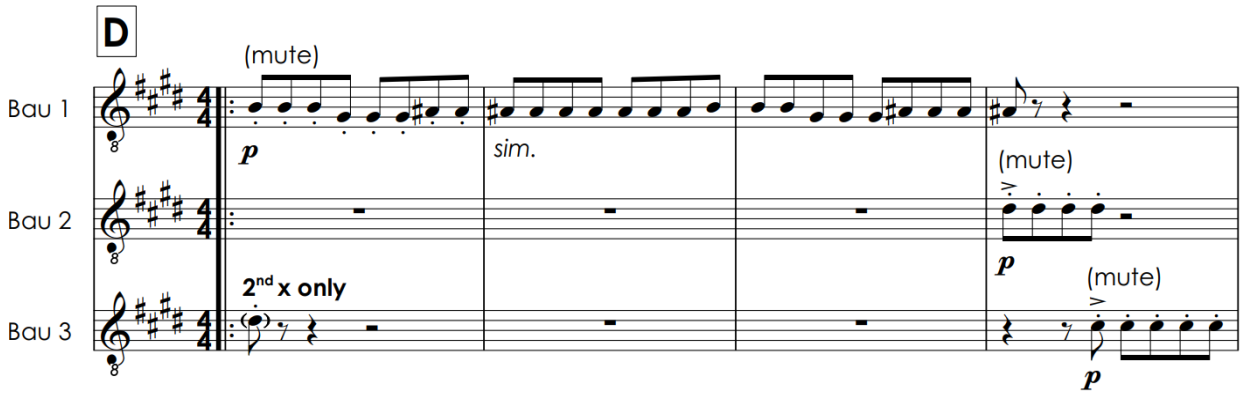


Figure 1.18.3. Dampening while playing in Kyle Flens's Echoes

Style and Engraving Guide

2.1. Colors

Graphic Designer Noel Childs (www.noelchilds.com), assembled the following chart to codify Arcomusical's original set of branding colors.

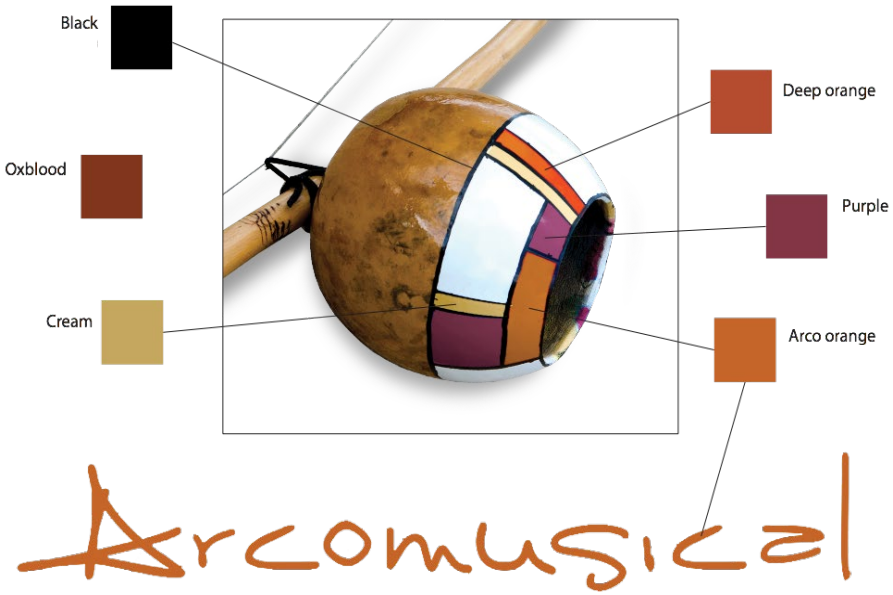


Figure 2.1.1 Original Arcomusical color palette

Since the release of MeiaMeia, we have added two further colors: **sky blue** and **olive green.** A color chart with hex code information is below:

Color	Hex Code	Uses (Website/Newsletter/Size of Ensemble)
Black	#000000	Text
Sky Blue	#9dbddc	Web and Newsletter: Education | SOLOS
Olive Green	#97986c	Web and Newsletter: Performance | DUOS
Oxblood	#82351c	Web and Newsletter: Research | TRIOS
Purple	#823544	Web & Newsletter: Community | QUARTETS
Cream	#C5A75F	Web and Newsletter: Composition | QUINTETS
Arco Orange	#C56528	Web and Newsletter: Publication | SEXTETS

Figure 2.1.2 Arcomusical Color Chart

As a marketing tool, Arcomusical uses these colors in a myriad ways, from concert clothes to poster and album cover designs, and, for example, our published score covers that use a different color for each size ensemble, solos through sextets.

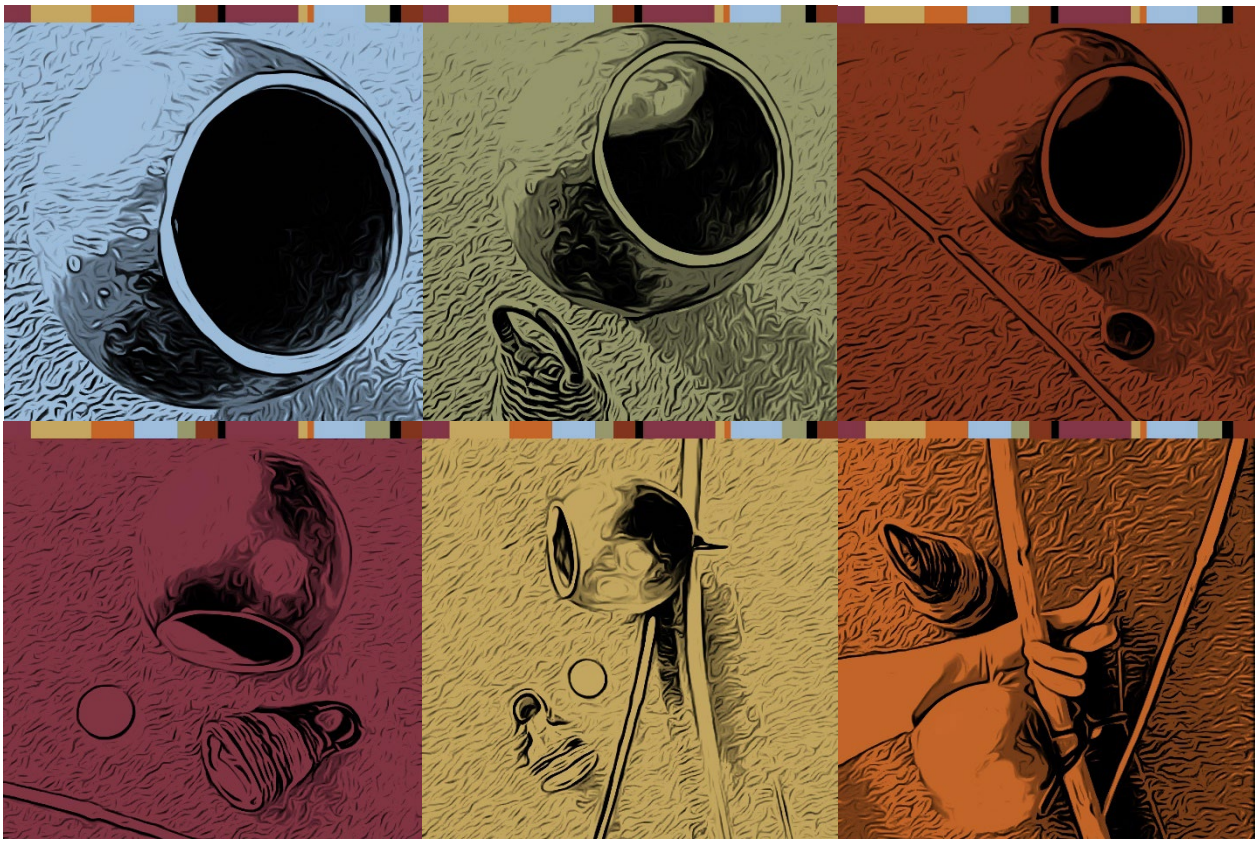


Figure 2.1.3 Arcomusical Score Covers (Top Left through Lower Right, Solo through Sextet)

2.2. Typography

Arcomusical selected **Luna Bar** as the typeface for our signature trademark as well as for score title and subtitles. Luna Bar is a shareware font available at dafont.com.

Figure 2.2.1. Arcomusical Signature Trademark in 36-point Luna Bar Typeface

Arcomusical selected **Century Gothic** as the typeface for all other text. It is, in fact, the typeface of the text of this guide. And, as can be seen in the multiple musical examples herein, nearly every non-titular element in our scores uses this typeface, including meters, measure numbers, expressions, page numbers, etc.

2.3. Performance and Program Notes

Performance notes
Include any helpful advice concerning specific sounds, phrasing, or rehearsal techniques that that you imagine will or already have proven effective for performers as they work on an interpretation. You may wish to consult Arcomusical for input in this category.

Typically, Arcomusical stands in a semi-circle based on the order of tuning ratios from longest to shortest wire, as can be seen in the following figure.

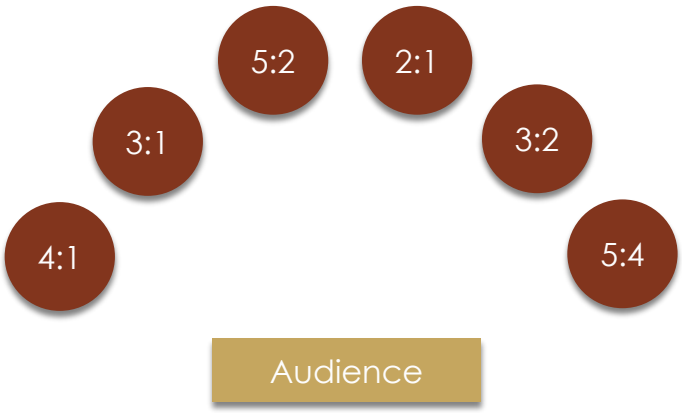


Figure 2.3.1. Typical Arcomusical sextet stage diagram

As the ensemble plays trios, quartets, etc., the ensemble makes the semicircle smaller. Duos are played with players facing each other such that an audience sees a profile view of both players. If for musical reasons you would like your composition performed in a different presentation, please explain in the performance notes and provide a **stage diagram**.

Program notes
Include any background you wish potential audiences to know about your piece: e.g. the inspiration(s) for its creation, the compositional method employed, interesting formal considerations or other musical parameters that characterize this particular work, etc.

Figure 2.3.2 offers an example of the final graphic layout for a typical set of Arcomusical performance and program notes.

Berimbau Sextet no. 1

"Kora"

Gregory Beyer (2015)

Performance Notes:

All cabaça vibrato is left to the musical discretion of the performers. It should be used tastefully throughout.

Player two begins with the shorter wire on top, while all others begin with the longer wire on top. Indications to flip the instrument are strategic and essential. For players five and six, these come very quickly and must be choreographed and practiced in time in order to play the part accurately and confidently.

The ideas throughout this piece are inspired by Malian *kora* playing, specifically that of Toumani Diabate. It is highly recommended that performers become familiar with that sound world in order to best understand and realize this sextet's musical intention. Melodic material is hocketed between nearly all players throughout. The best results come from rehearsing the melodic motives separately at first, then adding the secondary accompaniment layer which is deliberately repetitive.

Program Notes:

Circa 2005, an old friend presented me with *New Ancient Strings,* a recording by the master Malian musicians Toumani Diabate and Ballake Sissoko. This recording is an exemplar of music for *kora* (a harp-like Malian classical instrument). When I first heard the music, I became completely entranced and imagined that someday I would be able to provide the berimbau with such music. The experience was similar to the sensation I had when I first heard Pat Metheny playing Steve Reich's "Electric Counterpoint." I could literally hear the berimbau inside of that sound world. The central ideas throughout *Berimbau Sextet no. 1* are undeniably inspired by the sound of *New Ancient Strings*, which has been a constant musical companion during the period I composed this work. Toward the end of the work I make a recognizable reference to Reich's *Electric Counterpoint,* as a way of "summing up" my writing for the *MeiaMeia* cycle.

About Arcomusical:

Arcomusical is a multi-faceted resource for the Afro-Brazilian *berimbau* dedicated to performance, publication, research, and community building.

Arcomusical has developed a vibrant culture for creative *berimbau* performance. Through composition, collaboration, and commission of new works, Arcomusical places the *berimbau* in diverse performance contexts.

As a publishing entity, Arcomusical offers scores ranging from solos to sextets, from concerti to mixed ensembles, and from acoustic to multi-media environments.

Arcomusical

arcomusical.com

Figure 2.3.2. Arcomusical standard Performance and Program note page

When you are ready, please supply Arcomusical with both performance and program notes for inclusion in your score.

2.4. General Engraving

In general, Arcomusical follows standard engraving practices for most aspects of our music. However, over time Arcomusical has developed the following preferred stylistic practices:

- Use rehearsal marks and double bar lines copiously to demonstrate phrase construction and musical form. Endeavor to keep these at the beginning of a system where possible, without sacrificing consistent note spacing.
- On the first system of the score and the first system of any subsequent movement, the full instrument name (also used in the notation key (see section 2.8)) should include the just intonation tuning ratio and the respective pitches.
- After the initial full name, abbreviated instrument names should be used. These are simply "Bau 1," "Bau 2," etc.
- Arcomusical uses the octave transposing treble clef (8^{vb}) for all berimbau material (refer to the notation in 2.6 to see the specific clef).

Arcomusical templates for Finale and Sibelius can be downloaded from the Arcomusical website's Composition page!

2.5. Group Dynamic Shapes

When there is a passage split amongst the ensemble that requires a hairpin, the hairpin should be included in its entirety in all parts that play in that passage, even if the hairpin should start on and/or continue through a rest. When a starting dynamic is needed for a part that does not play at the beginning of such a passage, the dynamic should be included at the beginning of the hairpin with parentheses. In the same way, a destination dynamic should be included in parentheses if the part does not play immediately following the hairpin. The following example from "Tongues," the second movement of Matt Ulery's masterwork for sextet, *Emigre and Exile,* demonstrates this approach.

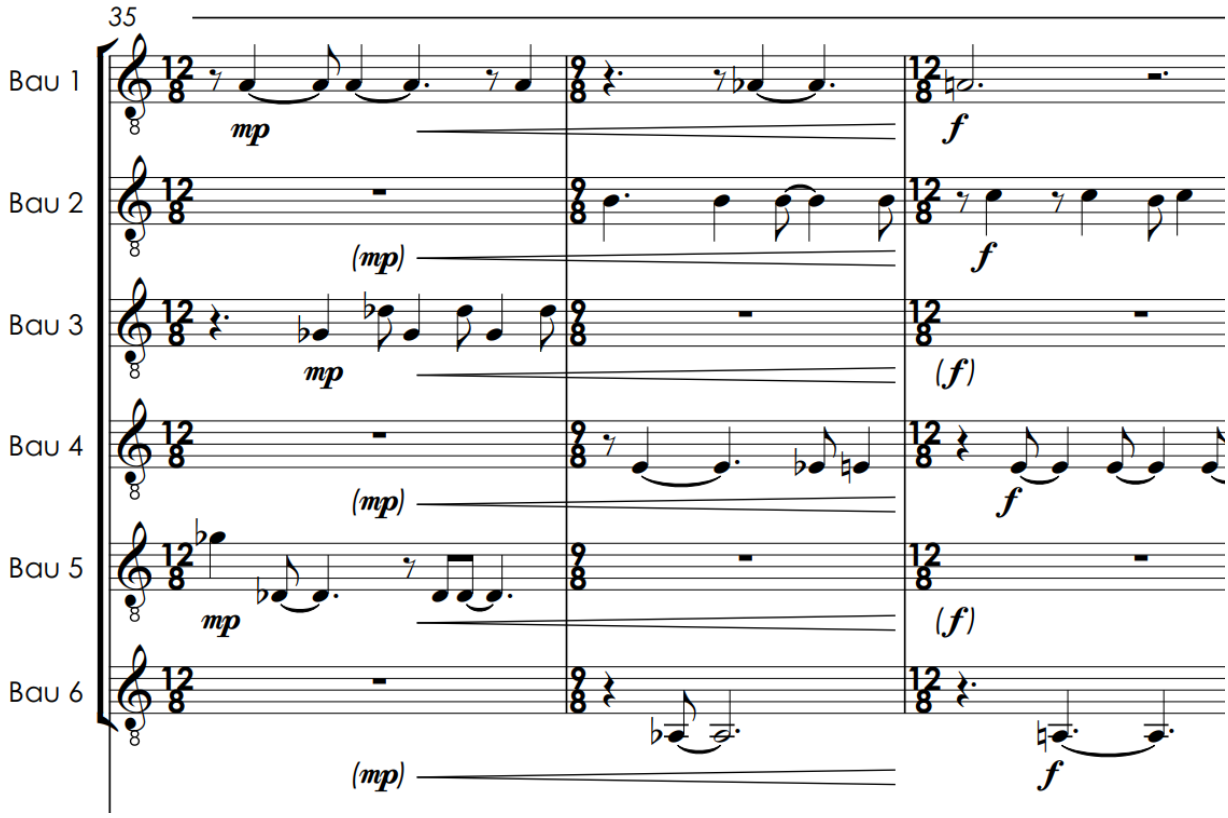


Figure 2.5.1. Ensemble dynamics in Matt Ulery's Emigre and Exile, *mvt. 2 "Tongues"*

2.6. Voice Clarification

Since Arcomusical is capable of both homophonic and polyphonic textures, melodic lines and accompanying ostinati are often split amongst multiple instruments. At first glance, therefore, it can be challenging for a performer to quickly ascertain which notes belong to which line. To help players quickly decipher this detail, there are two systems that can be employed to demarcate multiple voices, each with its pros and cons.

First, different stem directions can be used for the different voices (often resulting in stems up for the shorter wire segments and stems down for longer wire segments) The middle section of *Berimbau Sextet no. 1, "Kora"* utilizes this idea method (fig. 1.5.3). This provides immediate clarity for two-voice textures. However, it occupies a lot of vertical space and it only allows for two voices. Additionally, this can make rhythmically complex material somewhat more challenging to read.

Second, different articulations can be used to mark different voices. One system we often employ is to use accents for the melody, tenuti for bass lines (or countermelodies), and no articulation for everything else, as Matthew Schneider employed in the following passage from his holiday arrangement of Tchaikovsky's "Danse trepak" from the Nutcracker ballet. This use of articulations immediately communicates to the players which notes belong to each musical layer.

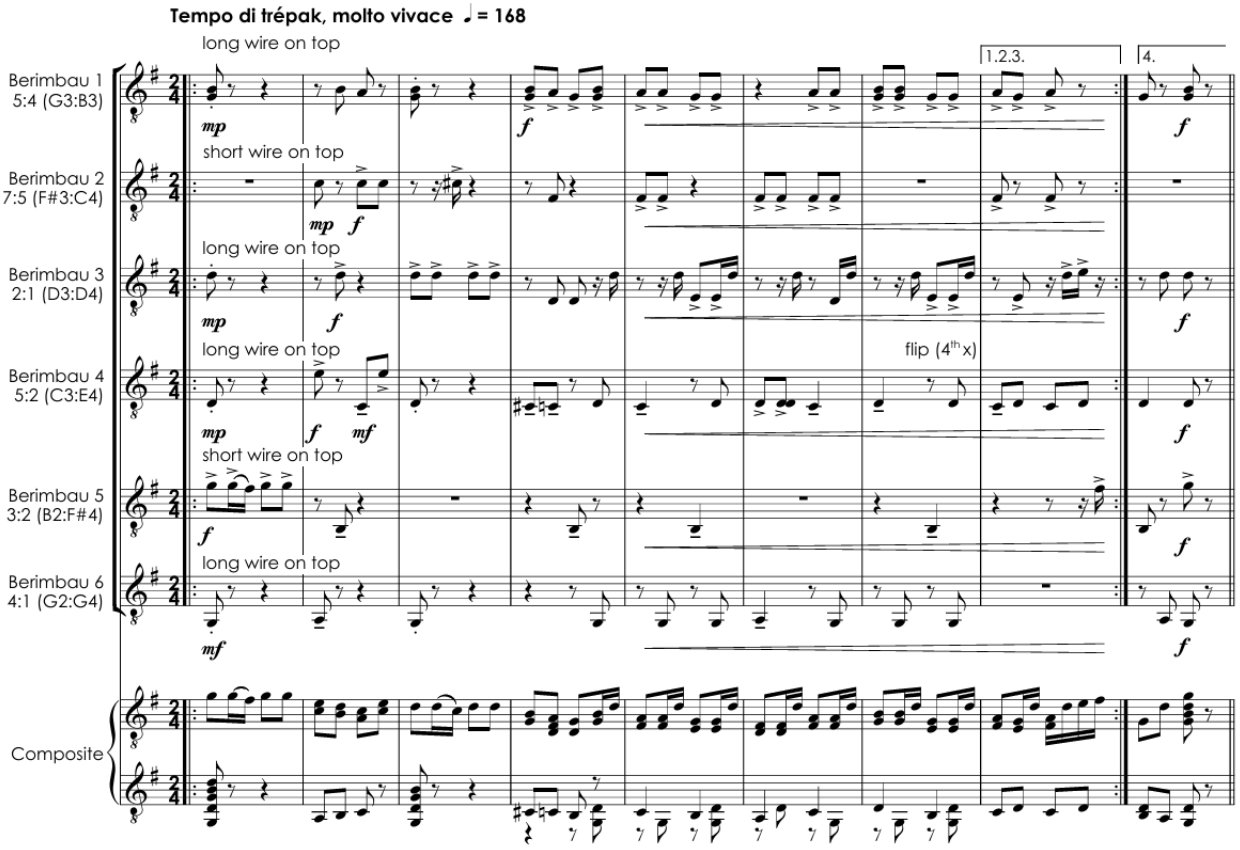


Figure 2.6.1. P. Tchaikovsky, arr. Matt Schneider, Danse Trepak

While this solves the issues with the first method, keep in mind that articulations are no longer available for their typical function. Ultimately, when writing music that may benefit from this type of clarification, please choose the method best suited to your piece.

It may be helpful to add a "composite" staff (or grand staff) to show the different voices, as shown in figure 2.6.1. This is particularly helpful when rhythmic durations have been altered in the parts for clarity. Feel free to use more than two staffs if necessary.

2.7. Single vs. Two-Staff

For nearly all of our repertoire, Arcomusical uses a single five-line staff for each berimbau. However, on occasion musical material merits the use of two staffs (joined with a curly brace), with the upper staff referring to the shorter wire segment and the lower staff referring to the longer wire segment. Both staffs still use the transposing treble clef, eliminating the need for multiple clefs in scores which use both one and two-staff instruments.

As an example, two staffs may be useful in the following instance:

Some narrow intervals (e.g. 9:8 or 6:5) allow the long wire to coin at or above the open note of the short wire. SInce the same note can be played on both sides of the instrument, a single staff creates ambiguity as to which side of the wire that note should be played. Allocating a staff for each wire segment eliminates this ambiguity. This passage from Gregory Beyer's *Berimbau Solo no. 1 "Home-ing"* demonstrates the incredible timbral and microtonal resources available with on a 9:8 berimbau. Both a bisbigliando effect and a slight microtonal rub are possible when the "same" note is played rapidly back and forth on both sides of the wire.

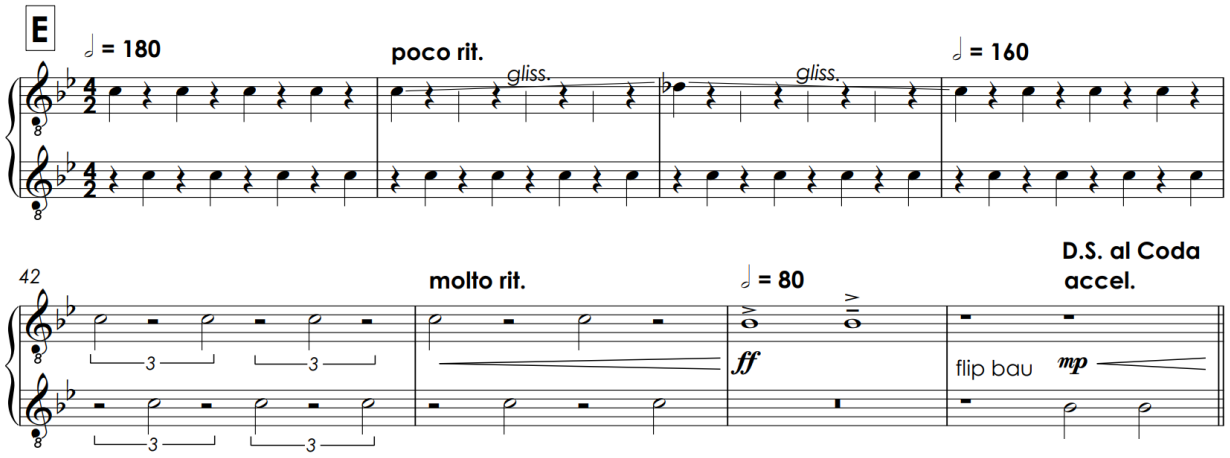
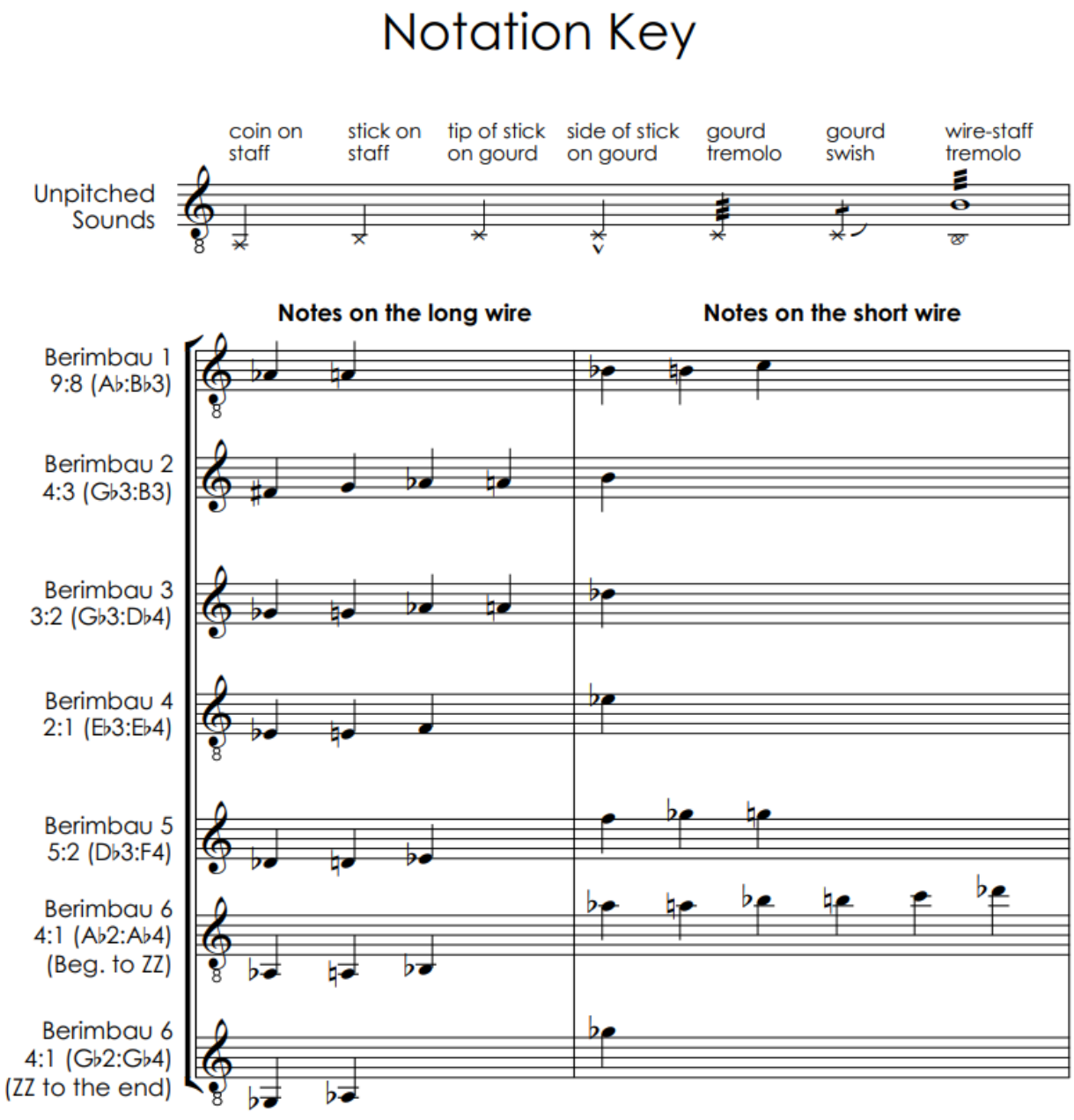


Figure 2.7.1. Unison pitches in Gregory Beyer's Berimbau Solo no. 1 'Home-ing"

If you would like to discuss whether or not your music necessitates two-staff notation, reach out to us at **info@arcomusical.com.**

2.8. Notation Key

Arcomusical uses a notation key for each piece so performers know what unpitched material to expect as well as the tuning scheme and which coined notes will be required. This specific pitch information is useful for players because any stopped or coined note has to be tuned and marked on the wire to aid consistency of intonation.



2.8.1. Notation key from Matt Ulery's Emigre and Exile