Appendix

History of Music Theory: Global Approaches and Perspectives

Entries from *Thinking Music: Global Sources for the History of Music Theory*

Arranged according to their order of appearance in the syllabus

Prakĕmpa

Early 19th century: An introduction to Balinese tunings, modes, tones, and their religious and philosophical significance

Source and Glosses

[1] O God, may we face no obstacles and always find success.

[2] Grant me forgiveness, O great God, for you are the cause of goodness for all creatures. Free me from all evil. You should protect me at all costs.

[3] O God, I ask for the grace of all Bhaṭāra (gods). May we not be cursed by You, O God, and may we not be struck by misery or disease. Grant this blessing not only to us but also to our descendants and all our relatives. May everyone live long lives, strong and healthy; may we all find a clear path and salvation.

[4] Salutations to Lord Śiwa, may we succeed and have peace be upon us.

[5] This is the origin of the sound of the earth, called "Prakĕmpa." The earth and its initial sounds originated from the yoga of Sang Hyang Tri Wiśeṣa, who created Sang Hyang Sandhi Reka. It appeared like a ball that had been kicked: lightless, still and silent. From His body emerged three characters. The one at the top, in the form of Wisah, looks like this: ᳵ. The one in the middle, Taleng, looks like this: 5. The one at the bottom, Cĕcĕk, looks like this: 1.
…

[9] The sounds were formed into ten distinct notes: Pañca Swara for Pelog and Pañca Swara for Slendro. The Pañca Swara for **Pelog** is named Pañca Tīrtha, and the Pañca Swara for **Slendro** is named Pañca Gĕni. Pañca Tīrtha represents Smara, while Pañca Gĕni represents Ratih. Consequently, Smara Ratih comprises seven essential sounds, which are a mixture of the Ten Sounds: Ding, Dong, Deng, Ndeung, Dung, Dang, Ndaing.

Pelog: a seven-tone tuning system featuring largely non-equidistant intervals

Slendro: a five-tone tuning system consisting of largely equidistant intervals

These sounds originate from the true essence of creation by Sang Hyang Bhuwana, known as Swara Gĕṇṭha Pinara Pitu. These sounds, as described above, are explained in the context of the compass points with their respective characters, including the central point. Additionally, the

sounds of Aghoṣa, Anughoṣa, Udaṇṭya, Anudaṇṭya, and Anunaśikha are derived from these primary sounds. This is how they are explained and understood.

…

[18] These are the sounds that surround the world and their corresponding characters:
I = dong = Śiwa.
Sa = dang = Īśwara.
Ba = ding = Brahmā.
Ta = deng = Mahādewa.
A = dung = Wiṣṇu.
Na = ndang = Maheśora.
Ma = nding = Śangkara.
Śi = ndeng = Rudra.
Wa = ndung = Śambhu.
Ya = ndong = Budha.

[19] This is the sound of the cardinal points, derived from Swara Gĕṇṭha Pinara Pitu. It includes Pañca Swara (Five Sounds) for Pelog and Pañca Swara (Five Sounds) for Slendro, which are used in gamelan and produce a sound of seven notes. Because Swapiaki has been taught by the Kawi (wise man), there are Daśa Swara (Ten Sounds) located in the cardinal points. This is how it originated.

[20] These sounds are divided into three categories. The first is Pañca Swara (Five Sounds) for Pelog, known as Pañca Tīrtha. Pañca Tīrtha represents Sang Hyang Swara, symbolized as white sperm, embodying the essence of a father, and is governed by Sang Hyang Wiṣṇu, who is the ruler of all nature.

The second is the sound of seven notes, which originates from Bhaṭāra Pinara Pitu and was created by Bhagawān Wiśwakarma. These sounds, inspired by Sang Hyang Raras Ati, were brought by Sang Hyang Īśwara and are still used today.

The third is Slendro's sound, known as Pañca Brahmā. Pañca Brahmā embodies Sang Hyang Ratih in the form of a beetle. **Smara Ratih** represents the true form of Sang Hyang Pradhāna Puruṣa, with Smara invoking passionate love and Ratih causing confusion in the mind due to love. That's how it is.

Smara Ratih: Smara represents male energy (symbolized by the lingga), and Ratih represents female energy (symbolized by the yoni). Together, Smara Ratih is conceived of as the gods of love, wellspring of life and creativity. The balance of energy embodied by Smara Ratih is mirrored in the *ombak* (paired tuning) of Balinese gamelan, without which it is considered dead.

[21] The sound of patutan tiga exists above Pelog’s sound, in the middle of the seven sounds, and below Slendro’s sound. These three sounds are

used in all gamelan and in all Wirama, including Pupuh and Kidung. This is the essence of their significance.

[31] These are the four tuning systems, which are taken from Sapta Swara Gĕṇṭha Pinara Pitu. This is what is used in Angklung, because these seven voices have the power to produce all modes. That's why there are three modes within Pelog: Dĕmung, Salisir, and Sundari. If Slendro is the tuning system, the modes are: Pudak Satĕgal, Sĕkar Kamoning, and Asĕp Cina. This tuning system is used in Gĕnder Pawayangan, in Pajogedan, and in all Pupuhs.

Full Source Citation

Anonymous, Prakĕmpa. From the private collection of Ida Pedanda Gede Putra Bun, Gria Jukut Paku, Singakerta, Ubud, Bali. Translation from Javanese Kawi by the authors.

Commentary

Prakempa is a *lontar* (palm leaf manuscript) that encompasses four main aspects: philosophy, ethics, aesthetics, and playing technique of Balinese traditional musics, primarily *gamelan*. The text is music theory in a poetic form; it is written in the archaic Javanese Kawi language using Balinese script called *aksara*. It is one of only a handful of Balinese lontar that discuss music. Though its origins are contested, the language usage, contents, and archival acquisition record of *Prakempa* suggest it was likely codified in the early 20th century. Following the publication of an Indonesian-language translation and commentary of the text by scholar and former head of Bali's collegiate performing arts conservatory I Made Bandem in 1986, Prakempa's principles have become widely influential on Balinese music education, artistic preservation and revitalization efforts, and new composition.

The excerpt presented here includes Prakempa's opening invocation (*manggala*) and an introduction to the pitches, scales, and modes used throughout Balinese music, both in vocal genres such as *kidung* and in *gamelan* (traditional orchestras). The introductory invocation draws on Sanskrit phrases common to both Indian and Indonesian manuscripts. The opening word "Om" contains the sacred syllables *a*, *u*, and *m*, which represent the entirety of the universe through its creation, sustenance, and rebirth. The formulaic text that follows humbles the writer before the divine and expresses hope for the work to begin auspiciously and be completed successfully, without obstacles. This section closes with praise to Shiva, a deity central to Balinese Hinduism, and the Hindu mantra "Om, shanti, shanti, shanti": "om, peace, peace, peace." Interestingly, Bandem's translation of this text into Indonesian removed these specific Hindu references, perhaps to achieve broader acceptance of the text across Indonesia.

The following section identifies the Earth as originating from sound, which then was formed into three characters and subsequently ten sounds. Each sound is associated with a specific cardinal direction, color, and symbol. The sounds, or tones, are organized into pelog and slendro tuning systems. Whereas pelog has male associations via the god Smara, slendro has

female associations via the goddess Ratih. Together, the two systems represent a balance of male and female energy, an important dichotomy in the practice of Balinese Hinduism.

In contemporary conceptions of the two tuning systems, pelog consists of seven tones and slendro consists of five, which can further be classified into modes. While the pelog modes *salisir* (*selisir*), *demung, and sundari* are commonly used by contemporary musicians, the slendro modes are not widely known. The final section lists several ensemble types that are associated with the slendro tuning. Each type of Balinese gamelan is customarily tuned in either pelog or slendro.

The oldest verified copy of Prakempa was collected by Gedong Kirtya library in Buleleng in 1932. However, it is difficult to determine the true age of the ideas expressed in the text. While some ideas expressed here may have originated in the 18th or 19th centuries, as per Bandem's initial evaluation of this source, the manuscript's contents may be written later and purposefully archaized to establish its credibility as a source. In either case, the initial influence of this precise collection of ideas was limited. While some principles expressed in the text were likely circulated through oral tradition, there is no indication that there was widespread knowledge of Prakempa's full contents among Balinese performance circles in the early 20th century. Regardless, by inscribing music theory in the poetic language of lontar, Prakempa made a remarkable claim: that musical knowledge is as sacred and essential as that of more common lontar subjects, including history, literature, religious practice, medicine, and magic.

Bandem's translation and commentary on Prakempa in the 1980s as a watershed moment in how Balinese musicians approached and represented their own artistic history and theory. In the past, study of *lontar* required the assistance of a knowledgeable teacher (*guru*) to guide students in selecting, reading, and interpreting texts. Bandem fulfils this role by contextualizing Prakempa within the scope of Balinese history and literature; elaborating on principles of *keseimbangan* (I: balance) found throughout the text; and providing philosophical and practical extrapolations on subjects such as the roles of musical instruments and the form of *tabuh* (B: classic compositional structures). Whereas Prakempa embodies philosophical and musical ideals derived from the pre-colonial and early colonial eras, Bandem's interpretation made the text accessible and relevant to post-independence Balinese.

In the 21st century, oral tradition and mass media remain more influential than manuscripts on musical practices outside of the conservatory system. However, the impact of the Indonesian translation of Prakempa on musicians within the conservatory orbit was immense and nearly instantaneous. The text was used to spur on preservation efforts for historic gamelan that had fallen out of fashion, as well as provide points of inspiration for creating new music. Whether they embrace or reject its philosophical and artistic principles, contemporary Balinese composers regularly refer to Prakempa as a cultural, historic, and artistic starting point from which to engage with Balinese musical tradition.

I Gde Made Indra Sadguna and Elizabeth A. Clendinning

Works Cited and Further Reading

Bandem I. Made. *Prakempa: Sebuah Lontar Gambelan Bali*. Denpasar: Akademi Seni Tari Indonesia, 1986.

Eiseman, Fred B. *Bali, Sekala and Niskala*. North Clarendon, VT: Tuttle, 2011.

Gold, Lisa. *Music in Bali: Experiencing Music, Expressing Culture.* New York: Oxford University Press, 2005.

Heimarck, Brita. "STSI and Scholarship: Written Discourses on Music and the Shadow Play." In *Balinese Discourses on Music and Modernization: Village Voices and Urban Views*, 185-220. New York: Routledge, 2003.

Hood, Made Mantle. *Triguna : A Hindu-Balinese Philosophy for Gamelan Gong Gede Music*. Berlin: Lit Verlag Dr. W. Hopf, 2010.

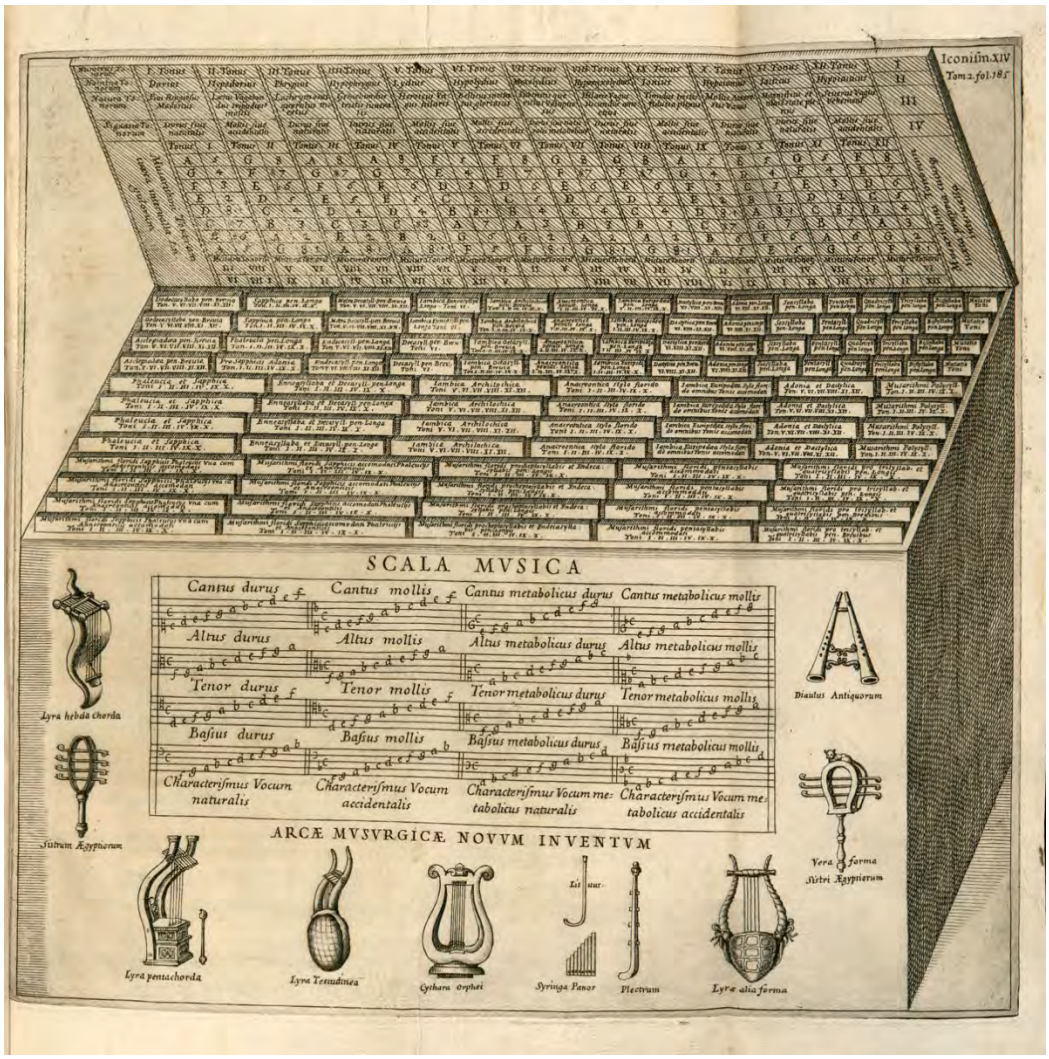
McGraw, Andrew Clay. "*Téori* and the *Komposer*." In *Radical Traditions: Reimagining Culture in Balinese Contemporary Music*, 109-137. Oxford: Oxford University Press, 2013.

McPhee, Colin. *Music in Bali: A Study in Form and Instrumental Organization in Balinese Orchestral Music*, 1966.

Sudirana, I Wayan. "Prakempa and Aji Gurnita as the Source of Creation of Neo-Classical Composition." Virtual lecture given for ResearchIN lecture series at Universiti Sains Malaysia, June 14, 2022. https://fb.watch/tDBAPt6OHS/

Tenzer, Michael. *Balinese Gamelan Music*. North Clarendon, Vermont: Tuttle Publishing, 2011.

1650: Athanasius Kircher presents the *Arca musarithmica* in book viii vol. 2 of *Musurgia universalis*



Kircher's Arca musarithmica, *Musurgia universalis* (II), facing p. 185

COMMENTARY: The *Arca musarithmica* or box of music-numbers is a computation device invented by Athanasius Kircher. Kircher (1602–1680) was a German-born Jesuit priest and polymath in Rome who also wrote books about optics, magnetism, geology, and Egyptian hieroglyphics and corresponded with a global network of scientists, scholars, and missionaries. In book VIII of his treatise *Musurgia universalis* (Rome, 1650), Kircher promised that the device could automatically generate musical settings for four-voice chorus of any given text, in any language. The Arca could generate music in several styles, from a simple homophonic texture like a hymn to a complex fugal texture, all by combining preset permutations of musical patterns. Though the Arca did not have an automatic mechanism, a user could produce coherent output solely by following Kircher's rules, without knowing anything about music.

The ark holds a set of data tables, which together with a list of rules for how to use the tables, amounts to a computation device for composing music. Given input in the form of a marked text in Latin and a small set of simple choices about the musical setting, a user who knows

nothing about music can use the ark to generate unique, never-before-heard musical settings of that text for four-voice (SATB) chorus.

Kircher presented this as an embodiment of mathematical permutations. Like many of his seventeenth-century contemporaries, he understood music as sounding number, an embodiment of the mathematical order inherent in God's created universe, and a reflection of the perfection of God himself. Out of the infinite variety of possible combinations of notes and rhythms, the user of the ark selects a specific set of permutations and thus imitates God in his original act of creation. The combination of structured data and completely prescribed algorithms makes Kircher's device a computational system, with some of the characteristics that would later characterize modern computers, though of course Kircher had no way to automate his system and certainly did not theorize it fully.

How Did the Arca Work?

1. Kircher expects you to **prepare a text** in Latin or another language, with words divided into syllables, marked long or short. You can set texts in several Classical meters (like Anacreontic or Sapphic), but you can also set irregular verse and prose texts.
2. Next, Kircher wants you to choose several aspects of the music setting you want the ark to create:
    - The **style** and texture of the music:
        1. you can opt for simple, note-against-note counterpoint (like a hymn),
        2. or florid, melismatic counterpoint (like a motet, anthem, or even fugue).
    - The **mood** or character of the text and its setting, which determines the choice of one of twelve musical tones or church keys (*toni ecclesiastici*). The tones are not the same as modern keys, nor do they match up exactly with the medieval modes used to classify plainchant. They seem to be a hybrid of the polyphonic tones used by keyboardists to introduce and accompany the eight traditional chant psalm tones, with the twelve-mode system introduced by the earlier theorists Glarean and Zarlino.
    - The **musical meter** (technically, mensuration) of the setting.
        1. In the simple style, you can choose
            1. duple meter (cut C),
            2. triple minor (C3, three minims/half notes per metrical unit),
            3. or triple major (cut C3, three semibreves/whole notes per metrical unit).

            Some duple-meter permutations in the ark have a minim pulse (C) and others have a semibreve pulse (cut C).

        2. In florid style, everything is in duple meter (C).
        3. If you are operating the ark by hand, you use these input parameters to select the proper tables.
    - **Syntagma:** There are three *syntagmata* or large divisions in the ark. For simple style, you select from Syntagma I; for florid, use Syntagma II; Syntagma III enables more advanced techniques, like syncopations and fugues.
    - **Pinax:** Each syntagma containes a set of rods or *pinakes* (singular, *pinax*). You select the *pinax* based on the meter of the text.

    - **Column:** Each pinax contain several columns of data. The column is either a free choice, or is based on the order of lines in the poem.
    - **Voice and rhythm permutations:** Each column includes two parts: sets of numbers representing musical pitches (we call these voice permutations or vperms), and sets of musical notes representing rhythmic durations (rhythm permutations or rperms).
        1. In syntagma I (simple counterpoint), the user is supposed to freely choose one set of vperms and one set of rperms. All the musical voices use the same rhythms.
            1. In syntagma I, there are (generally) three sets of rhythm permutation, one for each type of musical meter you can use.
        2. In syntagma II (florid counterpoint), there is a set of rperms that matches up with each vperm, so that there is a specified rhythm for each of the SATB voices. This makes independent contrapuntal voices possible.
        3. In syntagma III the user may optionally select one of six rods to create more complicated effects, useful for evoking recitative and other styles.
3. **Writing the music down:** Next you lay out what Kircher calls the *palimpsest phontacticum*, or what the rest of us call music paper. You draw out four staves and put an appropriate combination of clefs for the four voices. These determine the octave and range of the musical output for each voice. You also add a flat in the key signature if your tone is in *cantus mollis* according to the table, and add the appropriate mensuration sign.
4. **Matching pitches, rhythms, and syllables:** For each phrase of text, you take the pitch numbers and look them up in the table for the given tone in order to get note names. You pair these note names with the rhythmic values, or just put rests when those are given. You write these values on the staff, making certain adjustments as needed.
5. Kircher describes a variety of **adjustments**, some of which are easier to automate (that is, are more completely prescribed) than others:
    - If the notes go out of range for that voice (too far above or below the staff), you may shift them up or down by octave as needed.
    - The tone tables specify that you may add sharps or flats on certain notes according to *musica ficta* rules.
    - You may also do more complicated things like swapping the notes for adjacent voices, which require your own judgment.

Kircher's device does not have an automatic mechanism, and requires a human operator. But the operator does not need to do anything except retrieve data from the tables in the Arca and transform it according to reasonably precise rules. Kircher intended his device for the total musical novice, a Tyro who knew *nothing* about music except the rules he provided. So although the *device* is not automatic, the *system* is automatic in the sense that no additional knowledge or discretion is needed beyond what is built in to the device and the specified algorithm for operating it.

After describing the Arca, Kircher says he not only built one but that he and other musicians had been using it to generate complex music, and gives an example of a composition produced with the Arca. He also says there is a secret, customized version of the Arca with considerably greater capabilities, which he is reserving for the inspection of trusted

associates. No other trace survives of this Arca 2.0, but there is evidence that other people used the Arca as specified in the *Musurgia universalis*.Three physical implementations of the ark are known to have survived in the UK and the rest of Europe—in Cambridge, Wolfenbüttel, and Florence. These look like elaborate recipe boxes filled with slats, each of which is covered with a copy of Kircher's tables of *musarithmi* or music-numbers. No one has yet found a surviving piece of music generated with the ark.

Andrew Cashner (2022) found evidence for a previously unknown copy of the Arca in Puebla, Mexico, which is the first known implementation in the New World. Buried within an obscure manuscript miscellany filled with mathematical calculations, tax records, and experiments in universal chronology and trigonometry, there is a copy of a core selection of Kircher's Arca tables. The parts copied out would be sufficient to operate the device, even if one did not actually build a box to put them in. The author was probably a university mathematics professor in Puebla, writing around 1690, and the array of interests in the manuscript collection show the kind of intellectual climate in which Kircher's work was read. Cashner also found another source, a digest of the Arca system from late eighteenth-century Madrid, that demonstrates the longevity of these interests through the period of the Scientific Revolution and into the Enlightenment—though numerous mistakes also suggest that the author struggled to understand Kircher's system and likely viewed it as merely a curiosity, rather than a link in a chain leading to divine truth.

Andrew A. Cashner

FUTHER READING:

Bohnert, Agnes Cäcilie. 2010. *Die arca musarithmica Athanasius Kirchers*. Dissertation, Technische Universität Berlin. Berlin: Mensch und Buch Verlag.

Bumgardner, Jim. 2009. Kircher's Mechanical Composer: A Software Implementation. Paper presented at the Bridges Conference, Banff.

Cashner, Andrew A. "Kircherizers and Trisectors: Athanasius Kircher's Automatic Composition System in the Spanish Empire." *Anuario Musical* 77 (2022): 51-75.

____. "Athanasius Kircher's Arca musarithmica (1650) as a Computational System." https://www.arca1650.info/computational_system/index.html [accessed 05.31.2023].

Chierotti, Carlo Mario. n.d. [Tesi di laurea sulla *Musurgia Universalis* di Athanasius Kircher]. Laureate thesis, University of Turin.

Chierotti, Carlo Mario. 1992. La musurgia mirifica di Athanasius Kircher: la composizione musicale alla portata di tutti nell'età barocca. *Musica/realtà* 13, no. 37: 107–127.

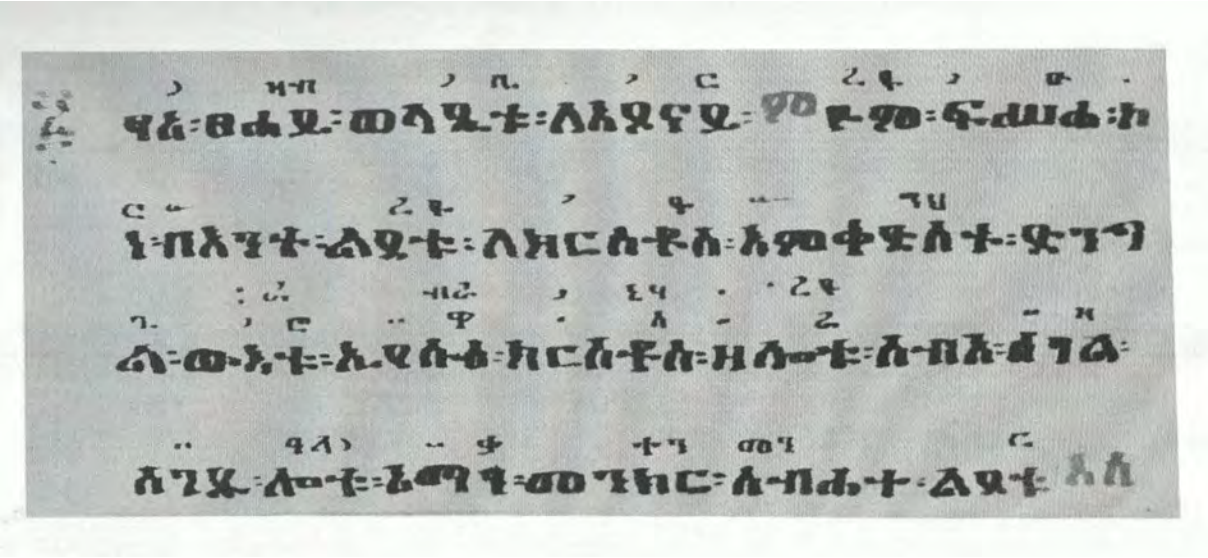
Chierotti, Carlo Mario. 1994. Comporre senza conoscere la musica: Athanasius Kircher e le 'Musica mirifica': un singolare esempio di scienza musicale nell'età barocca. *Nuova rivista musicale italiana* 28, no. 3: 382–410.

Findlen, Paula, ed. 2004. *Athanasius Kircher: The Last Man Who Knew Everything*. New York: Routledge.

Godwin, Joscelyn. 2009. *Athanasius Kircher's Theater of the World: The Life and Work of the Last Man to Search for Universal Knowledge*. Rochester, VT: Inner Traditions.

Kircher, Athanasius. 1650. *Musurgia universalis, sive Ars magna consoni et dissoni in X. libros digesta*. Rome.

Mɔlɔkkɔt: Ethiopian Orthodox Christian Church Notation



Source: Notated Liturgical Portion for the Feast of the Nativity [Christmas], from *Mäs'ɔhafä Dɔggwa* (Book of Ecclesiastical Chant). 1966-1967, Addis Ababa.

Translation of **Gɔ'ɔz text**: There is joy today because of the birth of Christ from the Holy Virgin. He is Jesus the Christ before whom the Magi prostrated themselves [Matthew 2:11]. Truly, the glory of his birth is wonderful. (Translation by Getatchew Haile, in Shelemay and Jeffery vol. 2, 92.)

Commentary:

The portion presented here is taken from the Book of Ecclesiastical Chant, entitled Mäs'ɔhafä Dɔggwa in Gɔ'ɔz, (Ethiopic, a classical Semitic language), the liturgical language of the Ethiopian Orthodox Christian rituals The term *mɔlɔkkɔt* (literally, "sign") in classical Ethiopic (Gɔ'ɔz) refers to the system of notation used by highly trained musicians of the Ethiopian Orthodox Church to reinforce musical transmission. The genesis of the notational system postdates by centuries the Ethiopian Church's founding in 332 C.E., and is credited in Ethiopian oral tradition, iconography and hagiography to the creativity of a sixth-century Ethiopian Christian Church musician known as Saint Yared. Although Saint Yared is said to have composed the entire corpus of Ethiopian chant and hymnody, there also exist oral traditions and manuscript references to two-sixteenth century church musicians who are said to have codified the notational system in an effort to sustain the liturgy following an Islamic invasion (1529-1541) that devastated many Ethiopian churches and monasteries:

> At the time of King Gälawdewos (1540-1549), there appeared *Azzaj* Gera and *Azzaj* Ragu'el, priests trained in *zema* (chant). And they began to make rules for the *mɔlɔkkɔt* of the *Dɔgg^{w}a* (Book of Ecclesiastical Chant, a hymnary in Gɔ'ɔz) …. (Basset 1881,336)

Thus, both oral traditions and written sources suggest that most, if not all, aspects of the modern Ethiopian notation system date primarily from a period of liturgical renewal following the devastation of churches, monasteries, and clergy in the early sixteenth century. A comparative study of eighteen important chants sustained in both twentieth-century Ethiopian liturgical performance and in dated manuscripts indicates that musical notation first appears in the early sixteenth-century manuscripts in an archaic form. (Shelemay and Jeffery, vol. 3, 13). The notation for the Christmas chant reproduced above is from a twentieth-century manuscript and corresponds closely to the notation of the same portion in a seventeenth-century source.

Written and oral transmission have been interdependent in the Ethiopian Christian liturgical tradition since the entry of the *mɔ̂lɔ̂kkɔ̂t,* which are derived from the syllabary of the Gɔ̂ʻɔ̂z language. These can only be deciphered through knowledge of their musical renditions in performance. Each sign consists of one or more members of the Ethiopic syllabary derived from the liturgical text of a well-known section of the *Dɔ̂ggʷa*. The sign is placed immediately above the Gɔ̂ʻɔ̂z words to which its associated melody should be sung.

The manuscript shown above reads from left to right, and the notation for the Christmas portion begins about two-thirds of the way across the top line. A small character (which looks like eyeglasses) marks the start of the chant text; it indicates that the portion is a *mɔ̂ltan* in the *gɔ̂ʻɔ̂z* mode, one of three modes in the church musical system. The *mɔ̂lɔ̂kkɔ̂t* are the small characters between the larger lines of text. Above the third line in the manuscript, a double line of *mɔ̂lɔ̂kkɔ̂t* begins, indicating that the words from that point ("He is Jesus," in the English translation) to the end should be repeated. Although the additional line of notation provides a new melody for the repetition, this melody is not often sung; most singers simply repeat the text with its original melody. Individual Ethiopian chants belong to two different categories of melodic families; the second category of melodic families is known *bet,* with the melody for this chant indicated by the *bet* sign (a guide to standard opening melodies) alongside in the left-hand margin. Among the *mɔ̂lɔ̂kkɔ̂t* derived from the syllabary, one can see also a sub-category of signs, known as *yafidel qɔ̂rs*, conventional signs that resemble dots, dashes, and apostrophes. These signs prescribe aspects of articulation, continuity, placement of melismas, motion, and vocal style. The short melody associated with each mɔ̂lɔ̂kkɔ̂t constitutes the minimal melodic unit in this musical system.

In the case of Ethiopian Christian chant, these indigenous, minimal units also provide the critical link between oral and written aspects of the tradition: a *mɔ̂lɔ̂kkɔ̂t* is at once an oral melody and a written sign. Musicians learn the notational system at monasteries in a context known as the *zema bet* (house of chant); they also attend all church rituals, study religious texts in formal sessions during the day, and continue with nighttime chant memorization classes (termed "night studies"). Virtually all the Ethiopian Christian Hymnary is sung, and the musicians perform the liturgy as an oral tradition without using any written sources. Through observation and study, a student learns how to select Hymnary portions of a required type and mode to be performed on a given day. Each student is also required to copy his own *Dɔ̂ggʷa*, complete with *mɔ̂lɔ̂kkɔ̂t*.

A note on this commentary: The description of the Ethiopian musician's perception of the *mɔ̂lɔ̂kkɔ̂t*, and the interaction of oral and written traditions in the Ethiopian chant tradition, derives from Shelemay's fieldwork with Ethiopian church musicians during 1975 in the

Ethiopian capital, Addis Ababa. The lead research associate for this study was Liqa Berhanu Mekonnen (d .2008), an accomplished Church musician then in charge of all church musical activity, including the accreditation of musicians, at the Ethiopian Patriarch's office. With unusual dual credentials as an ordained priest (*qes*) and a leader of the musicians (*marigeta*), Mekonnen had been trained at and served as head teacher for the important Bethlehem monastery in the Ethiopian highlands, and was also an expert in the most representative vocal style of the church known as the Bethlehem vocal style. He taught at the Theological College in Addis Ababa, and had an encyclopedic knowledge of Ethiopian Christian liturgy. During fifty-one multi-hour sessions, Mekonnen performed important portions for the complete liturgical cycle, and provided a handwritten list of the more than 650 *mɔ̂lɔ̂kkɔ̂t*, which he sang from memory, that he had prepared for his own students. Mekonnen's recording of all the notational signs, subdivided according to the three Ethiopian church modes, sets forth a master musician's cognitive map of a complex musical/theoretical system and its notation.

Kay Kaufman Shelemay

Recommended Readings

Basset, René. 1881. "Études sur l'histoire d'Éthiopie." *Journal asiatique*, 7th ser., 17-323-424.

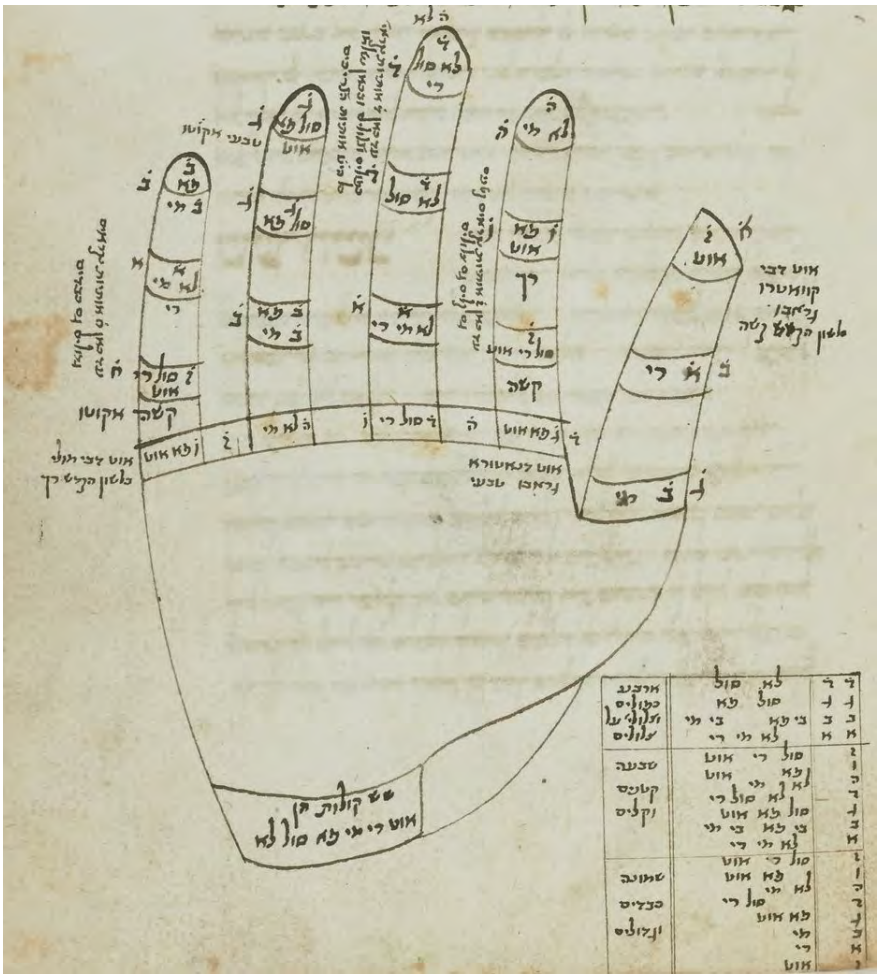
Heldman, Marilyn E. and Kay Kaufman Shelemay. 2017. "Concerning Saint Yared." *Studies in Ethiopian Languages, Literature, and History.* Adam Carter McCollum, ed. Wiesbaden: Harrassowitz Verlag, 65-93.

Shelemay, Kay Kaufman. 2007. "*Mɔ̂lɔ̂kkɔ̂t*." *Encyclopaedia Aethiopica* vol. 3. Siegbert Uhlig, sed. Wiesbaden: Harrassowitz Verlag, 916-917.

Shelemay, Kay Kaufman and Peter Jeffery, editors. 1993, 1994, 1997. *Ethiopian Christian Liturgical Chant: An Anthology*, 3 vols, with CD. Madison, Wisconsin: A-R Editions, Inc.

Shelemay, Kay Kaufman, Peter Jeffery, and Ingrid Monson. 1993. "Oral and Written Transmission in Ethiopian Christian Chant," *Early Music History* 12: 55-117.

Transcription of the Guidonian hand in a sixteenth-century Hebrew manuscript of music theory



SOURCE:
Paris, Bibliothèque nationale de France, ms. hébreu 1037, f. 23*r*

COMMENTARY:

This Guidonian hand (crossref to Liu and Mengozzi entries), together with a condensed tabular presentation of the seven hexachords of the solmization method, appears in a Hebrew introductory text to *ars musica* attributed to a certain Judah ben Isaac. The theoretical content of this text predates the fourteenth century and much of it has been linked to the treatise *De musica plana* sometimes attributed to Johannes de Garlandia. It is copied in a manuscript kept in Paris, dated from the sixteenth century, together with two other medieval Hebrew texts, one on Arabic theory, derived from al-Farabi's *Kitāb al-mūsīqī al-kabīr*, the other on Latin theory, derived from the teaching of Marchetto da Padua.

The image shows a rare case of a right hand (most Guidonian hands are typically left hands) that also adapts the system of *claves* (keys)—the Hebrew letters from *alef* to *ḥet*—and *voces* (voices)—*ut ut*, *re*, *mi*, *fa*, *sol* and *la*, transliterated. This hand symbolizes the way in which Western music theory was cultivated in some Jewish scholarly circles in the south of France from the second half of the twelfth century to the first years of the fifteenth century. Music, along with mathematics, was one of the propaedeutic sciences taught to develop the philosophical mind of young people. They were part of the scientific baggage that Arabic-

speaking Jewish scholars brought with them when they fled persecution in Iberia and settled in Provence. There they met Jews who knew little or nothing of the non-Jewish sciences and who then developed a taste for secular studies. Hebrew texts on music show the influence of Latin texts from the fourteenth century onwards. The contemporary Dutch musicologist Smits Van Waesberghe has suggested a connection between Judah ben Isaac's text and scholars working at the University of Toulouse.

The Hebrew texts on *ars musica* raise the question of the contribution of medieval Jewish scholars to western music theory, or of any new theoretical elements they might contain—such as the case of Levi ben Gershom's collaboration with Philippe de Vitry (1291–1361) in developing the theory of *ars nova*. But these texts contribute little to our knowledge of *ars musica*, except for a few details: for example, a treatise that testifies to the teaching of Jehan Vaillant (14th century) provides some unfamiliar information about the coloration used in mensural notation. In addition, their theoretical content is often outdated when compared to the theory circulating in the local environment.

In order to appreciate their contribution, these texts should instead be read from the perspective of medieval Jewish scholarship. Although based on texts with a practical purpose, it is unclear whether Jewish scholars in medieval Europe actually applied the musical principles they contained. However, the rudiments of *ars musica*, solmization, mensuration, and the vocabulary and technical concepts (often entirely new in Hebrew) enabled Jewish students and scholars to acquire a substantial theoretical background in order to understand the relationship between music and other disciplines, such as the principles common to music and the other mathematical sciences. Above all, the aim was to understand the place of the science of music in the field of knowledge, which constituted a further step towards philosophy.

Alexandre Cerveux

FURTHER READING:

Adler, Israël. "Le traité anonyme du manuscrit hébreu 1037 de la Bibliothèque nationale de Paris." *Yuval* 1 (1968): 1–47.

_____. "Les mensurations des tuyaux d'orgue dans le ms. Héb 1037 de la Bibliothèque nationale de Paris." *Acta musicologia* 40, no. 1 (1968) : 43–53.

_____. "Fragment hébraïque d'un traité attribué à Marchetto de Padoue." *Yuval* 2 (1971): 1-10.

_____. *Hebrew Writings Concerning Music in Manuscripts and Printed Books from Geonic Times up to 1800.* Munich: G. Henle, 1975.

_____. 'Collectanea Concerning Music in the Hebrew Manuscript London, British Library, Or. 10878' (in Hebrew). *Yuval* 4 (1982): 9–32 (Hebrew section).

Avenary, Hanoch. "The Hebrew Version of Abu l-Ṣalt's Treatise on Music." *Yuval* 3 (1974): 7–82.

Cerveux, Alexandre. " Rudiments d'Ars musica formulés en hébreu, suivant l'enseignement de Jehan Vaillant (XIVe siècle)." In Giacomo Corazzol and Sarah Fargeon (eds.), *Fragments, manuscrits et livres dans le monde juif*. Droz: Paris 2024 (forthcoming).

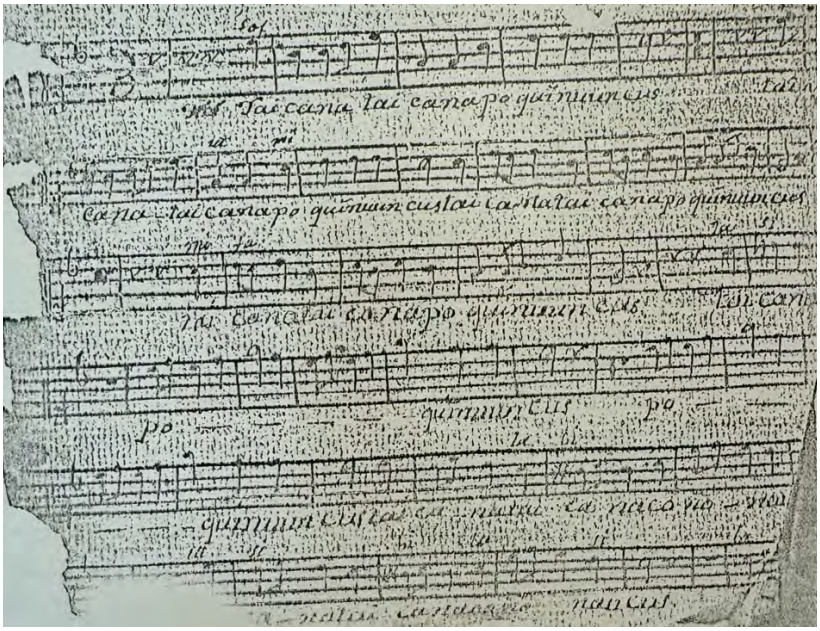
Chemla, Karine and Pahaut, Serge. "Remarques sur les ouvrages mathématiques de Gersonide." In Gad Freudenthal (ed.), *Studies on Gersonides. A Fourteenth-Century Jewish Philosopher-Scientifist*. Leiden: Brill, 1992, pp. 149–191.

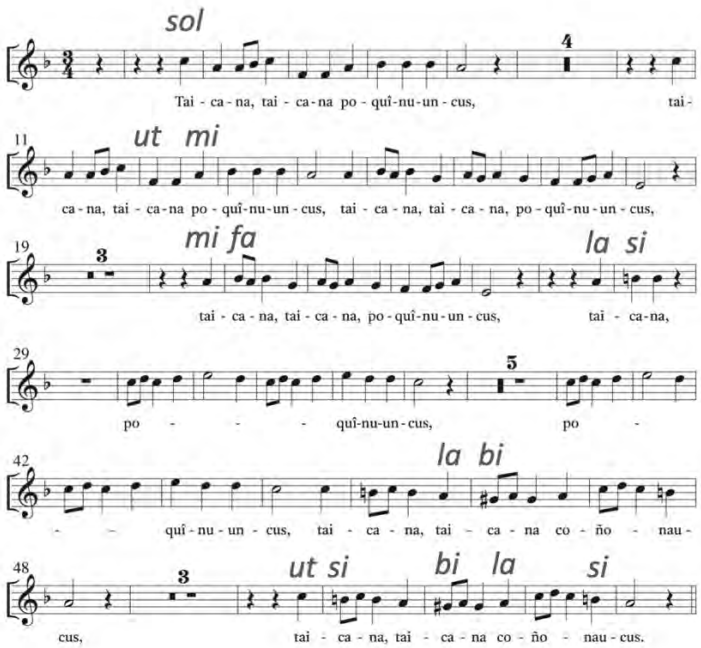
Freudenthal, Gad. *Science in Medieval Jewish Cultures*. Cambridge: Cambridge University Press, 2011.

Smits van Waesberghe, Joseph. "The treatise on music translated into Hebrew by Juda ben Isaac." *Yuval* 2 (1971): 129–161.

Stone, Anne. "The 'Ars Subtilior' in Paris." *Musica e storia* 2 (2002): 373–404.

c. 1720–1767: solfège syllables used in music notation by Indigenous musicians in Chiquitania [Bolivia], South America





Source: Anonymous, *San Francisco Xavier* (AMCh 063 CH 15), "Fiestas moma," pt. 2, soprano (Xavier); transcription of Anonymous, *San Francisco Xavier*, "Fiestas moma," pt. 2, soprano, mm. 1–56.

COMMENTARY

The Chiquitano are a heterogenous group of people who are Indigenous to a lush, lowland area of what is today Eastern Bolivia. During the middle decades of the eighteenth century, colonists named this area and its inhabitants "Chiquitos" after the small doors on the Indigenous dwellings they encountered. Between the 1690s and 1767, under conditions of Spanish coloniality, Chiquitano individuals were coerced to leave those dwellings and reside in Jesuit missions. Jesuits mounted spiritual "hunts" in order to conscript Indigenous individuals into participation in their mission settlements. The Jesuit missions in this broader region were called *reducciones*, or "reductions," because the colonial goal was to centralize and shrink the Indigenous populations into specific, definable locations.

Once collected in the *reducciones*, the Chiquitano people were introduced to the styles, patterns, and techniques of galant musical composition. Music making and learning was one portion of regularized labor that was built into the tightly controlled structure of a typical day in the mission communities. Chiquitano individuals practiced trades such as animal husbandry, leather tanning, wood working, clock making, residential construction, musical instrument building, and so forth. In addition to Jesuit musical leadership, each mission appointed one Indigenous *maestro di capilla*. By some accounts, each mission's *maestro* assembled a group of young male pupils twice a day for music: once in the morning for solfège and music theory instruction, and once in the afternoon for choir rehearsal (Nawrot, "Vespers Music," 72–73). Each mission's choir and orchestra performed galant musical compositions for the celebration of the mass and for feast days or holidays. These compositions, many of them original to the missions, were the work of teams of Indigenous collaborators under conditions of Jesuit colonization. The discipline and community that help to instill this behavior may have been linked to various male confraternities that were also in place in these colonies. The music making among the Chiquitano was part of a larger musical scene that linked them with the musical activities of the Jesuit missions further north in the Moxos region and further south along the Rio de la Plata.

The excerpt presented here is drawn from the number opera *San Francisco Xavier* (AMCh 063 CH 15), which was possibly intended for the feast day of its titular character. The manuscript fragment shown above contains Francis Xavier's vocal line from the second portion of the duet "Fiestas moma." In this spirited, imitative duet, Ignatius Loyola and Francis Xavier trade melodies about the joys of salvation.

We can observe, in the vocal manuscript shown above, a characteristic use of the distinctive solmization system used in eighteenth-century Chiquitania. Singers employed a practice that represents a combination of the early modern, mutable hexachordal solmization system and a newer heptachordal, or seven-pitch system. The result was not very different from what is today called "moveable do" solfège, in which the seven solfège syllables are consistently coordinated with tonal scale degrees in the diatonic heptachord.

The Chiquitano system was based on the older, mutable syllables *ut*, *re*, *mi*, *fa*, *sol*, and *la*. In the very first measure, the singer has identified the starting pitch C as *sol* in the key of F major, and later in m. 12, the singer prepares for a melodic descent by identifying the low note F as *ut* and the next new pitch A as *mi*. Chiquitano musicians extended this traditional system in two ways: first, they added the seventh syllable *si* for the seventh scale degree in the major mode; they also added the syllable *bi* for the seventh scale degree in the minor mode based on *la*.

To understand how this worked, let's follow our singer into a modulation. At mm. 22–23, the singer has marked the half step between A and B-flat with the syllables *mi* and *fa*. But as the music moves to C major, the singer switches syllables. At mm. 27–28, the whole step between A and B-natural is marked with the syllables *la* and *si*, indicating the shift to the new tonal center. This distinction, between the half-step *mi-fa* and the whole step *la-si*, would have served as a tool for tonal orientation and a reinforcement of the idea of a pitch center. But this is not the full extent of the innovation in this system. Further on in this excerpt, the musical material heads toward the key of A minor. At mm. 45–46, the singer marks the half-step between A and G-sharp with the syllables *la* and *bi*. The syllable *bi* is an especially distinctive addition to moveable-*ut* solfège system. It solves the problem of representing the special half-step relationship between the minor tonic, *la*, and the raised seventh scale degree in the minor mode, here indicated with the novel syllable *bi*. No other documented system uses mutable heaxhordal solmization in quite this way.

The Chiquitano system has resonances with various European developments in solfège during the same period, notably the "Method du Si" of Gabriel Nivers (1666) and its further elaboration in the early eighteenth century by Étienne Loulié (*Éléments ou principes de musique*, 1696). Beyond the innovations of these French predecessors, the Chiquitano use of *bi* may have been influenced by earlier Italian models, such as Antonio Banchieri (*Cartella, overo regole utilissime*, 1614). Further complicating matters, the single Spanish music theory text that is known to have been used in Chiquitania does not contain any information on heptachordal solfège but instead presents a fairly traditional version of hexachordal solmization (Romero de Ávila, *Arte de canto-llano*, 1761) without any mention of either *si* or *bi*. All of this suggests that Chiquitano musicians creatively appropriated and combined various traditions of music theory pedagogy in their practice, fostering a highly distinctive eighteenth-century musical culture.

Roger Mathew Grant

WORKS CITED:

Banchieri, *Cartella, overo regole utilissime à quelli che desiderano imparare il canto figurato*. Venice: Giacomo Vincenti, 1614.

Loulié, Étienne. *Éléments ou principes de musique.* Paris: Ballard, 1696.

Nawrot, Piotr. "Vespers Music in the Paraguay Reductions." DMA diss., Catholic University of America, 1993.

Nivers, Guillaume Gabriel. *La gamme du Si* (1646); revised as *Méthode facile pour apprendre à chanter la musique, par un maistre célèbre de Paris*. Paris: Ballard, 1666.

Romero de Ávila, Gerónimo. *Arte de canto-llano, y organo, ò, Promptuario musico*. Madrid: J. Ibarra, 1761.

FURTHER READING:

Baragwanath, Nicholas. *The Solfeggio Tradition: A Forgotten Art of Melody in the Long Eighteenth Century*. Oxford: Oxford University Press, 2020.

Grant, Roger Mathew. "Colonial Galant: Three Analytical Perspectives from the Chiquitano Missions." *Journal of the American Musicological Society* 75/1 (2022): 129–162.

Illari, Bernardo. "El sonido de la misión: Práctica de Ejecución e identidad en las reducciones de la Provincia Del Paraguay." In *Música colonial iberoamericana*: *interpretaciones en*

torno a la práctica de ejecución y ejecución de la práctica: *actas del V Encuentro Simposio Internacional de Musicología*, ed. Victor Rondón, 7–25. Santa Cruz de la Sierra, Bolivia: Asociación Pro Arte y Cultura, 2004.

Kennedy, T. Frank. "Colonial Music from the Episcopal Archive of Concepción, Bolivia." *Latin American Music Review* 9, no. 1 (1988): 1–17.

Mendoza de Arce, Daniel. *Music in Ibero-America to 1850: A Historical Survey*. Lanham, MD: Scarecrow Press, 2001.

Nawrot, Piotr. *Indígenas y cultura musical de las reducciones Jesuíticas*. Cochabamba, Bolivia: Editorial Verbo Divino, 2000.

Radding, Cynthia. *Landscapes of Power and Identity: Comparative Histories in the Sonoran Desert and the Forests of Amazonia from Colony to Republic*. Durham, NC: Duke University Press, 2006.

Waisman, Leonardo, ed. *Un ciclo musical para la vida en la misión Jesuítica: Los cuadernos de ofertorios de San Rafael, Chiquitos (S. XVIII)*. Córdoba, Argentina: Editorial Brujas, 2015.

Waisman, Leonardo. *Una historia de la música colonial hispanoamericana*. Buenos Aires: Gourmet Musical Ediciones, 2019.

Krishnadhan Bandyopadhyay's insights and confusions from European scholarship

In the late nineteenth century, a new generation of scholars engaged with music theory by trying to find a middle ground between European scholarship and historical South Asian sources. They questioned what was universal about music, what was unique to Indian art music, and what aspects of older modes of musicology were no longer relevant.

Gītasūtrasār ('Quintessence of Music', 1885), pp. ii, xi-xii.

> From this it is known that music is the natural religion of living things. Accordingly, the famous zoologist, the most respected Darwin, has said that through sexual selection [*maithunik nirbbācan*] (sekśuýyāl silekśan) the sounds of living creatures slowly changed by means of reproductive development [*jananbikāś*] (ibholyusan) and, propelled by necessity, this resulted in the physiological voice. In fact, living creatures attract females through vocal sounds, and there is a particular need for the voice to be appealing. This voice excelled most in the practice of humankind. It resulted in the various disciplines of vocal-music, instrumental-music, and so on.
> …
>
> Marco Polo, the well-known European traveler, spent quite some time traveling in Africa, and he had a friend with him who brought an instrument and went very far. Having played that instrument, Marco Polo wrote a missal on that subject, and sent it through a trusted friend to give it to one African. Simply by reading from the missal, the friend demonstrated that instrument and the African was immediately astonished and left speechless; and after that all the African villagers called Marco Polo and his friend gods and honored and worshiped them. The Africans did not know how to read or write, and were therefore uninformed about such advantages; it should come as no surprise that when they suddenly witnessed such an astonishing spectacle they would consider these learned people to be endowed with divine powers. The very same situation exists surrounding music in present-day India. Recently one or two individuals have become accomplished and learn and practice music with the aid of notation: when people watch these masters (*ustād*) sing completely new songs just from glancing at a notation, they are also amazed. Although the conversation about notation has diffused throughout the country, it is the duty of every individual who wants the best for his country to give it a try. There is no need to wait for the elucidation of those who find notation straightforward and excellent. Whoever can understand such an inscription should start practicing it right now. In this way, if gentlemen (*bhadra lok*) who are adept at music should advance even a little the applied knowledge of notation, gradually cultivating varied approaches, and find notation simple and exceedingly useful, they would be able to understand it by themselves. Making this argument now is futile; because in general one cannot fully appreciate its significance. In my opinion European symbolic (*sāṅketik*) notation is by far the most elevated type, on which see the preface of my book entitled "Instruction in Sitar".[1]

[1] *Sitār Śikṣā* (1866)

SOURCE: Bandyopadhyay, Krishnadhan (1885). *Gītasūtrasār*. Koch Bihar: Rajakiya Press. Translation by Richard David Williams

COMMENTARY:

Krishnadhan Bandyopadhyay's (1846-1904) *Gītasūtrasāra* ('Quintessence of Music', 1885) was a path-breaking work of scholarship in the Bangla language that ambitiously aimed to transform the way Indian musicologists wrote about and conceptualized music. Bandyopadhyay was part of a new generation of Bengali writers who engaged with north Indian art music, both in terms of performance practice and the study of older scholastic treatises on music theory. While these writers were part of a small social circle, primarily based in Calcutta, their approaches and ideologies were quite varied. Bandyopadhyay himself was not from a distinguished family and grew up as an actor-singer in the theaters of north Calcutta. He was extremely well-read, and initially published a history of China, followed by two musical manuals (1866 and 1868) that focused primarily on the *sitār*, as he mentioned in the extract above. Initially he collaborated closely with two leading figures in Calcutta's musicology scene: Kshetramohan Goswami (1813-1893) and Sourindro Mohan Tagore (1840-1914), who set up the Bengal Music School over the 1870s. All three scholars were interested in applying the techniques of European music scholarship to north Indian art music. However, Krishnadhan parted ways with Goswami and Tagore over their stance on notation, since he argued in favor of adopting Western staff notation while they preferred to develop an indigenous system of their own invention.

Gītasūtrasār is a technically precise and engagingly written work of scholarship. Bandyopadhyay selectively examined music theory as transmitted through Sanskrit *śāstra* (canonical knowledge) literature, pointing out redundancies, inadequacies, and archaic modes of analysis. He then presented an account of music as heard and performed in his own time, developing his discussion through references to European studies and his own analyses.

Gītasūtrasār comes in two parts. In Part 1, following an introductory essay which outlined his theoretical framing, Bandyopadhyay examined music over seventeen chapters: (1) clarifying the voice (*kaṇṭhamārjjanā*); (2) techniques and practice of notes (*svara*); (3) scales and systems of notes; (4) sharp and flat notes; (5) notation systems; (6) ornament; (7) the generation of *rāga* and *rāgiṇī*; (8) further elaboration of *rāga*; (9) considerations of time and *ṭhāṭ* scales in *rāga*; (10) conventions of singing, including *ālāp* (prelude); (11) musical affect; (12)

the historical treatises of Hindu music; (13) on the combination of vocal and instrumental music; (14) rhythm, meter, and tempo; (15) explication of *tāla* rhythms; (16) *rāga* and scale; (17) on shifting the tonic. Part 2 is an anthology of compositions notated in Bandyopadhyay's own system, derived from Western staff notation (see Figure 1).

Following Dilipkumar Mukhopadhyay, several twentieth-century authors have noted the influence of the *Gītasūtrasār*, especially in the writings of the leading reformer of Hindustani music, V.N. Bhatkhande, who claimed to have learned Bangla precisely so that he could read it. However, in his own *Hindustānī Saṅgīta-paddhati* ('Commentary on Hindustani Music', 1910-1935) Bhatkhande was dismissive of Krishnadhan, and scornful of Bengali musicians and musicologists in general, including Tagore. *Gītasūtrasār* has not been translated into English but has featured in various studies of Bengali musicology in this period (Capwell 1991, Williams 2016, Atarthi 2017, Bhattacharyya 2024).

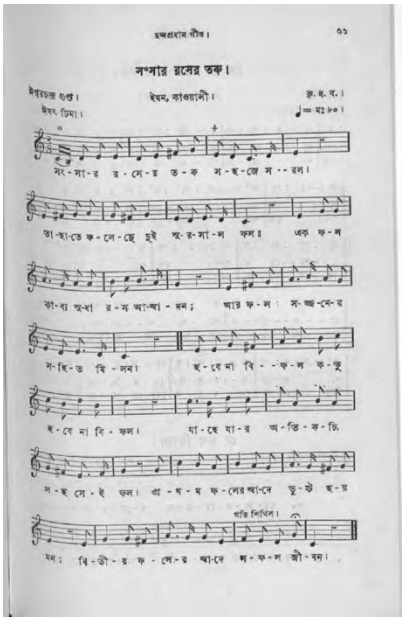


Figure 1: An example of Bandyopadhyay's notations (1885: ii: 31): "*Saṅsār raser taru*" ("The Tree of Worldly Feeling") by Iśvarcandra Guptu, in *rāga* Yaman and Qawwali *tāla*.

Global music studies in Bengali

Like his contemporary, S. M. Tagore, Krishnadhan Bandyopadhyay was excited by the ideas he encountered in European scholarship and the possibilities they posed for research on Indian music. In his introduction, he first acknowledged the religious and cosmological explanations for the nature of music, as presented and re-presented over the centuries in Sanskrit music treatises, but then dismissed these as archaic and mythological. As an alternative, he turned to Darwin, evolution, the biology of the throat, and theories of how human sound, speech, and communication developed over time. This set the tone for his entire approach to music theory: ideas from ancient sources could no longer be reproduced uncritically, and Indian music needed to be brought into conversation with modern, predominantly Western science. His scholarship therefore reflects a distinctive entanglement of the longer history of music scholarship in South Asian languages, on the one hand, and colonial epistemologies, on the other.

Although Bandyopadhyay read widely and critically, he was also working with relatively limited resources: sometimes when he cited a thinker or their works, he had in fact read their work indirectly, often relying on the mediation of their ideas through popular journals. This sometimes led to misunderstandings or misrepresentations (Williams 2024). As such, although they carry a rhetorical punch, the concluding remarks to his introductory essay are based on an apocryphal anecdote: Marco Polo never went to Africa. It is unclear where Bandyopadhyay encountered this particular story, but the way he deployed it is nonetheless striking. His appealing to the (imagined) encounter between anonymous Africans and Marco Polo invoked the longer history of European "discovery" literature and ethnography: likewise, S. M. Tagore would later refer extensively to colonial accounts of communities and cultures around the world when he assembled his *Universal History of Music* (1896). Bandyopadhyay eulogized the "gift" of European music and notation to illiterate Africans, which speaks to his larger theme of the opportunities to be found in Western music studies: the imagined Africans (*kāfri* in Bangla) pay homage to Marco Polo as a god. At the same time, he did not deride them for this and suggested that this was a reasonable response to encountering written knowledge for the first time. He then brought the image of the European enlightenment of the world home to India. He celebrated the *ustād*s (a title for predominantly Muslim master musicians) who had adopted notation: significantly, other writers in his social milieu were busy relegating the *ustād*s to the past,

depicting them as the illiterate and ignorant obstacles to musical progress. He also recruited members of the *bhadralok*, the "genteel" or upper- and middle-class Bengali intelligentsia, to his cause, suggesting that the adoption of Western staff (or "symbolic", *sāṅketik*) notation was for the good of the country, aligning the fate of music with the state of the nation.

Bandyopadhyay knew that his manifesto for applying Western staff notation to Indian music was controversial. Many musicians maintained that writing out music was an unwelcome interference in the oral transmission of performance practices and repertoires, and incongruent with art music's valueing of improvisation. At the same time, reformist and neo-traditionalist scholars did see the value of notation for analysis, teaching, and curating a canon of the tradition, but—as in the case of Goswami and Tagore—favored developing a new system tailored for the specificities of Indian music. A public debate erupted over this in 1874, when Charles Baron Clark, inspector of schools in Bengal, dismissed Goswami and Tagore's claims of the cultural authenticity of their notation system, and advised that Western notation was adequate for Indian music scholars. Bandyopadhyay sided with Clark in this debate, and his published works reflect his efforts in this direction. Although other writers similarly used Western staff notation in their own studies, ultimately it was not adopted universally, especially with the promulgation of Vishnu Narayan Bhatkhande's *sargam*-based system in the twentieth century.

Richard David Williams

WORKS CITED

Atarthi, Sagnik (2017). "Whither musicology? Amateur musicologists and music writing in Bengal," *Ethnomusicology Forum* 26: 2, 247-268.

Bandyopadhyay, Krishnadhan (1885). *Gītasūtrasār*. Koch Bihar: Rajakiya Press.

Bhattacharyya, Anirban (2024). "From musical writings to writing music: book-writing leading to music school in nineteenth-century Calcutta," *Nineteenth-Century Music Review.* FirstView.

Capwell, Charles (1991). "Marginality and Musicology in Nineteenth-Century Calcutta: The Case of Sourindro Mohun Tagore", in Nettl, B. and Bohlman, P.V. *Comparative Musicology and Anthropology of Music: Essays on the History of Ethnomusicology*, Chicago: University of Chicago, pp.228-43.

Mukhopadhyay, Dilipkumar (1963). *Bāṅgālīr rāg saṅgīt carcā.* Kolkata: Firma KLM.

Williams, Richard David (2016). "Music, lyrics, and the Bengali book: Hindustani musicology in Calcutta, 1818-1905," *Music and Letters* 97:3, 465-495.

Williams, Richard David (2023). *The Scattered Court: Hindustani Music in Colonial Bengal.* Chicago: Chicago University Press.

Williams, Richard David (2024). "Epistemological *Jugalbandī*: Sound, Science, and the Supernatural in Colonial North India," in P. McMurray and P. Mukhopadhyay (eds.), *Acoustics of Empire: Sound, Media, and Power in the Long Nineteenth Century* (New York: Oxford University Press), pp. 134-155.

FURTHER READING:

Williams, Richard David (2023). *The Scattered Court: Hindustani Music in Colonial Bengal.* Chicago: Chicago University Press.

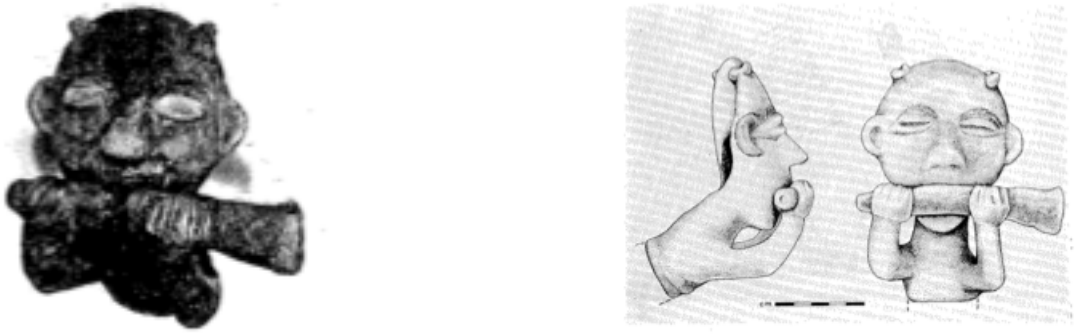
Akan-Ghanaian Ivory Trumpets

Source: (Figure 1) Kotononko (lit. Go and Fight Him/Her), short ivory trumpet at the Manhyia royal court in Kumase-Ghana

COMMENTARY

One of the most distinctive types of musical instruments of the Akan people from Ghana is a variety of ivory trumpets with different names depending on their role, but collectively called **mmɛn** (plural) and **abɛn** (singular) in the Twi language. Traditionally made from bored elephant tusks and often covered with rare cloths as **ahyɛnsoɔ** (lit. identifying clothing), the ivory trumpets are side-blown instruments with the mouthpiece cut near the tip of the tusk. Sound is produced by the vibrating lip in the embouchure and the technique of playing is known in Akan as **hyɛn.** Although the elephant tooth has a natural bore, carving a sound-producing instrument from ivory required special tools and skills. Because it was a costly and rare material, ivory instruments such as the trumpet pictured in Figure 1 became closely associated with the royal court, where they were integrated into rituals and used in processions to project the power of the ruler.

Akan elephant tusk instruments can be dated back to at least 1000 C.E., the very beginnings of Akan state formation. **Figures 2A and 2B** show a 16th–17th century terracotta sculpture and a depiction of court trumpeters from archaeological excavations in Asante. In the days of migration, territorial expansion, and warfare (500 C.E.–1500 C.E.), ivory trumpeters preceded fighting units so they could sound coded messages as signals for action.



Figures 2A and 2B: 16th–17th century ceramic sculptures of court trumpeters from archaeological excavations at Ahinsan in Asante. Source: University of Ghana Department of Archaeology and Heritage Studies Museum. Number: 52/235).

Asɔkwa is the Twi word for the pied hornbill, and the designation suggests the association of the ivory trumpets' sound with the cries of that bird. **Asɔkwafoɔ** refers to the players of a variety of ivory trumpets of various sizes and shapes. There used to be more than twenty types of ivory trumpets at the court of the Asantehene. A visual symbol of an ivory trumpet (**Figure 3**) is one of the best-known in Adinkra pictographic writing.

Figure 3: Akobɛn (lit. "War Trumpet," which embodies bravery, gallantry, and courage), a representation of ivory trumpets in **Adinkra** pictographic writing.

Today it is more common in Akan to have seven players perform in an ensemble.

Figure 4: Kɔkroanya ivory trumpet group at the court of the Asantehene in Kumase-Ghana

Like many other African music instruments that are used to convey language as a kind of surrogate speech (e.g. "talking drums"), Akan ivory trumpets are able to communicate language through inflections of the mouth when blowing through the embouchure. The idea of using ivory trumpets as surrogate speech stems from the need for communication across long distances in the Neolithic period (2000 B.C.E.–500 B.C.E.). Sedentary Akan hunter-gatherers were inspired to create sound producing instruments from materials with natural bore that were readily available in order to obtain calling signals that could travel farther than the human voice.

As its name implies, the **seseɛ**—the leading and smallest trumpet—is assigned the role of the "speaker" or "sayer" of long verses of poetry. At the end of the verses, the **seseɛ** then issues a call for the remaining sections to join in a cyclical call and response play. It is during the call and response section that the two **afrɛ** first join the sayer to call the other sections. The three **agyesoa** or responders join in to engage in further call and response with the sayer and callers, while the largest trumpet in the ensemble, **bɔsoɔ,** reinforces the total sound. In that sense, the players use the ivory trumpets to "speak" in place of the human voice, by imitating the tonal inflections or pitches in the Twi language. The sound produced on the **mmɛn** (ivory trumpets) are foregrounded in texts and not abstract melodies, harmonies, or rhythms.

The method of transforming words, phrases, and sentences into instrumental sounds which are then reinterpreted in verbal terms by the listener is a highly sophisticated technique that is linked to the tones or pitches found in the Twi language. As a tonal language with two pitches identified as high and low, meanings of words are deduced from linguistic tones. Thus, the ivory trumpets are technically not "melodic" instruments. Nor should the collective sounding during the cyclical call and response section be considered "harmony" or "chords" in the Euro-American sense of the word. Akan listeners attend to the poetry of ivory trumpets, but they do not dance to it.

Kwasi Ampene

FURTHER READING

Agawu, Kofi. 2016. *The African Imagination in Music.* Oxford, UK: Oxford University Press.

Ampene, Kwasi. 2022. *Asante Court Music and Verbal Arts in Ghana,* Abingdon, Oxon: Routledge Publishing.

Ampene, Kwasi. 2019. "Iconography, Documentary Evidence, Continuity, and Akan Musical Expressions Before the 15th Century." *Ghana Studies,* (22): 191-205.

Ampene, Kwasi, and Nana Kwadwo Nyantakyi III, 2016. *Engaging Modernity: Asante in the Twenty-First Century.* Second Edition, Ann Arbor, Michigan: Michigan Publishing.

Anquandah, James. 1982. "The Akan – 'a golden civilization' in the forest'" in *Rediscovering Ghana's Past,* Accra, Ghana and Harlow, Essex, UK, Sedco Publishing Limited and Longman Group Limited.

Kaminski, Joseph. 2012. *Asante Ntahera Trumpets in Ghana: Culture, Tradition, and Sound Barrage.* Farnham, Surrey; Burlington, VT: Ashgate Publishing Ltd.

Nketia, J.H. Kwabena. 1982. The musical traditions of the Akan." *Tarikh* 7 (2): 47-59

Shujaa, Kenya. 2014. "Akan Cultural History: An Overview." In *The Akan People: A Documentary History,* edited by Kwasi Konadu, Princeton: Markus Wiener Publishers.

1800s – present, CE. Bulgarian musicians muse about the terms *makam*, *makamliya*, and *makamliisko*

April 2008. Sofia. I am conversing with two instrumentalists who perform with the orchestra of Bulgaria's renowned National Folkloric Ensemble "Philip Kutev," a group with which I had conducted ethnomusicological fieldwork for twenty years. Established by its composer-namesake in 1951, the Kutev company is the country's premier ensemble of its kind, performing songs, dances, and instrumental works, principally using standardized indigenous instruments, on concert stages worldwide. Importantly, many of its initial or older members, including the two musicians with whom I am speaking, retain deep ties to earlier, rural musical practices. Intrigued by the legacy of Ottoman Turkish influences in Bulgarian musicianship, I ask the pair, a *kavaldzhiya* and a *gŭdular*,[1] what *makamliisko*, a word derived from the Turkish musical term *makam* (Arabic: *maqam*), means to them. In Turkish music, *makam* signifies mode, or more accurately, a complex system of melodic types, each manifesting a specific pitch content and intervallic structure, realized in composition or performance according to the *seyir*, or conventional path along which a melody evolves. I had encountered *makamliisko* as an adjective in titles of instrumental pieces—*makamliisko horo* [ring or line dance], *makamliiska rŭchenitsa* [fast-paced dance in 7/16], *makamliiski melodii* [melodies]—and wanted to know more. What I learned was both complicated and surprising.

"*Makamliisko*? It's a way of playing, one that causes you to feel something deep inside," replied *kavaldzhiya* Angel. In the hands of a fine musician, he noted, "sometimes it only takes one tone" to evoke such affect. He named some other *kaval* players possessing this capacity.

"*Umenie*," remarked Boyan, using a Bulgarian word meaning ability, skill, dexterity, or know-how. "It means to do something the best. "*Chalŭm*! Another Turkish word [*çalım*]," he explained further. "It's a synonym for *makam* and means to play in a particular manner that is the best." He turned to Angel. "Tell her about Misha and the cheese."

Angel then related the following anecdote, attributed to the late Romani *gŭdular* Mihail (Misha) Marinov, whose soulful playing as a soloist with the Folk Orchestra of the Bulgarian National Radio Ensemble, the Strandzha Group, and Balkana brought him international acclaim in the 1980s and early 1990s. "You have a block of *sirene* [feta cheese][2] and begin to slice it for a meal," he began, "but notice that whoever made the cheese somehow dropped a long single hair in it. Obviously, you want to take out the hair before eating the feta. So you pull it out very, very slowly and carefully, a little at a time, from deep inside the cheese, taking great care not to break it. *Makamliisko* is like this."[3]

A few years later, I checked my understanding of the term with Damyan, another expert *gŭdular*. "The Arab and Turkish *makam*s—the modes—are one thing," he said, "but when you say

[1] A *kavaldzhiya* is a performer of the *kaval*, an obliquely blown, keyless, wooden flute once played by shepherds, but which is now also a professional orchestral and solo instrument. A *gŭdular* is a performer of the *gŭdulka*, a bowed wooden lute with a shallowly rounded back, short neck, three melody strings, and a variable number of sympathetic strings, held vertically.

[2] Bulgarian feta is made from cow, sheep, or buffalo milk. Unlike its Greek cousin, Bulgarian feta tends to be denser and oilier, while also always moist from the brine in which it is preserved.

[3] Because I was unable to record this spontaneous conversation, I have reconstructed Marinov's narrative from field notes written immediately afterward. The names of other living interlocutors in this essay have been changed to protect their privacy.

that something is *makamliisko*, it means that it is done or performed just exactly as it should be in accordance with a given style—completely genuine. *Bash* [Turkish *baş*; first-rate, principal], right? There's another word Turkish word: *akana*. Something done precisely. Exactly as it should be."

"So," I ventured, "a *makamliiska rŭchenitsa* . . .

"— is a *rŭchenitsa* done [composed, played] with everything that the older tradition demands," he finished.

COMMENTARY:

The adjectives *makamliya* and *makamliiski/a/o* suggest the historical influence or presence of the Turkish modal system, *makam*, in Bulgarian musicianship, whether as a consequence of Ottoman colonization (which extended officially from 1396–1878, but to 1913, in the southwestern part of the modern state), Romani musical practices, or both. Modality and often, contrasting modalities are central components of the Bulgarian sound. Hundreds of Bulgarian melodies utilize pitch constructs related to Orthodox Christian church modes and/or (usually) tempered versions of major *makam*s, typically accompanied by other, recognizably Middle Eastern features: unpulsed improvisatory tunes or passages; sequences; conjunct, undulating melodic movement; and laddered ornamentation in descending melodic gestures, among others.

Until the 1990s, very few scholars explored links between Bulgarian modality and Turkish *makam* because this topic challenged the prevailing socialist political doctrine—one enshrined in cultural policy—that Turkish culture did not and must not ever influence the purity of indigenous Bulgarian music. Although a conservatory-trained composer and accomplished *gŭdular* who I consulted theorized that the two modal systems are closely related, and even "one and the same thing" in border regions such as Strandzha (southeastern Bulgaria), he explained that particularly before the political transition of 1989, and especially in the context of socialist-era state folk ensembles, to suggest such connections was "simply scandalous," and even today remains an "unpopular view." This ideological stance belies the cultural, linguistic, and ethnic diversity that characterized late Ottoman and pre-WWII Bulgaria, in which Bulgarian, Czech, German, Jewish, Romani, Russian, Turkish, and the musics of other Balkan peoples coexisted and interfaced, especially in towns and cities. Writing between 1905 and 1928, the composer and musicologist Dobri Hristov (1875–1941) documents the influence and borrowing of Turkish modal constructions, melodies, and genres in Bulgarian folk songs collected by himself and his ethnographer peers. Although he observes that the microtonality of "eastern Turkish-Arab music" only slightly influenced Bulgarian repertories, he nonetheless points to eighteen *makams* that "exhibit a striking similarity" with local tonalities. Likewise, in his collegiate textbook on Bulgarian folk music, ethnomusicologist Stoyan Dzhudzhev (1902–98) identifies seven such *makam*s found in local song melodies,[4] some exhibiting occasional microtones. As a technical term, *makam* was at least known to this handful of urban scholars.

More recently, ethnomusicologist Timothy Rice has documented four pentachords fundamental to the contemporary Bulgarian modal system (major, minor, Phrygian, and *makam* Hicaz) and their probable relationship, as realized in performance, to other Turkish *makam*s, such as Kürdi and Hüseyni. He further hypothesizes that the prevalence of these pentachords in repertory for the Bulgarian bagpipe (*gaida*) results, at least in part, from the fact that they are idiomatic to the instrument's chanter, pointing to the essential connection between instrument

[4] These are Hicaz, Hicazkar, Hüzzam, Karcığar, Müstear, Sultan-ı Yegah, and Suzinak.

fingering systems, technology, and modality.[5] My *kaval* teacher, Stoyan Velichkov (1930–2008), also frequently improvised modal passages in his pieces that I recognized as linked to *makam*s, but he never used that term or named a specific Turkish mode—even though he grew up in Strandzha, spoke Turkish, and may have inherited this musical legacy. Rather, he referred to Turkish scale-types as "oriental modes," a euphemism also documented by Rice in his longtime study with *gaidar* Kostadin Varimezov.[6]

How long, then, have *makam*, *makamliya*, and *makamliiski* been part of Bulgarian vocabulary? How did (and do) musicians actually understand these concepts? To what extent have their meanings diverged from the Turkish notion of modality over time, whether as a consequence of changing conversational practice, an absence of knowledgeable practitioners or pedagogical resources, or the anti-Turkish ethnonationalist rhetoric of the nineteenth and twentieth centuries, and in which musical circles? And what possible connection does this have to feta cheese?

One clue to the words' usage lies in excerpts from period literature. The *Dictionary of rare, obsolete, and dialectal words in our* [i.e., Bulgarian] *literature of the nineteenth and twentieth century* defines *makam* as "a *protochna* [protracted, slowly drawn out, lengthy, but also flowing] and *izvita* [meandering, twisting, curving] *melodiya* [melody]," or even a "timbre" in which such melodies are sung. The *Online dictionary of the Bulgarian language* (hereafter ODBL) prepared by the Bulgarian Academy of Science's Institute for Bulgarian Language, while noting that the term technically designates "mode" in Arab, Turkish, and Persian music,[7] describes it as "a *protochna* melody or chant in such a mode." Consider two nineteenth-century literary excerpts that inform these definitions, the first a poem published by poet and publicist Petko Slaveikov in the newspaper *Gaida* (1866) and the second from author Ivan Vazov's famous novel, *Pod ugoto* (Under the yoke) (1893).

Оселко видял славейка / и казва му: / . . . /	Oselko saw the nightingale/ and said to him: / . . . / Let's see which *makam*s you sing /
'Да видя, ти кои маками пееш /	
и колко майсторски умееш.	and how masterfully you do so.

— *Gaida* no. 8:130–31, 1866, cited in the ODBL

Циганите теглеха лъка по гъдулките и	The gypsies [Roma] pulled their bows
пееха с издути гърла турски маками.	across their *gŭdulka*s and with full throats, sang Turkish *makam*s.

— Ivan Vazov, *Pod igoto*, Part 1, Chapter 14, 1893, cited in Ilchev 1974:246

In both cases, the Bulgarian definitions emphasize a particular kind of *melody or song*, rather than *mode.* Nonetheless, these definitions capture well both the improvisatory, unpulsed character of

[5]For example, the interrelationships between the Arab *oud*, Turkish *saz*, and Persian *tanbur* with their respective modal systems are well-established.

[6] The two men were friends and colleagues who often concertized together. Therefore, it is possible that they shared a vocabulary for talking about the modality of the pieces they performed. Beyond this, however, Varimezov told Rice that until the *gaida* was refashioned to accommodate the equal temperament demanded by state folk orchestras in the 1950s, the second degree of the Phrygian pentachord (or *makam* Kürdi) fell in between a flat and a natural—i.e., a microtone—suggesting a scale type approaching that of *makam* Hüseyni (2018:168).

[7] Today, the seven modes of of Iranian or Persian classical music are termed *dastgah*, while the modal system as a whole is called *radif*. However, this system is historically related to *maqam.*

certain Turkish religious and secular genres, such as the call to prayer and instrumental *taksim*, as well as the so-called *bavni* (slow) songs and *svirni* (unmetered, improvised instrumental tunes) that are standard genres of Bulgarian musicianship.

One might surmise, then, that the adjectival synonyms *makamliya* (Turkish: *makamlı*) and *makamliiski*, deemed obsolete by these dictionaries but still in use among twenty-first-century musicians, might describe voices, songs, or tunes that carry a *makam*-like (or *makamlı*) quality. In fact, the Bulgarian suffix *-liya*, derived from the Turkish *-lı* (with), signifies the possession of a particular attribute; thus, as Rice maintains, *makamliya* literally describes something bearing or executed "with *makam.*" Likewise, the suffix *-iiski/a/o* suggests something appropriate to or representative of the thing it describes: a *kavaldzhiiska melodiya* is a melody created for and idiomatic to the *kaval*; by extension, a *makamliiska melodiya* signifies a melody indicative of "*makam.*" But once again, the notion of *makam* in question pertains more to the stylistic and moreover, aesthetic quality of the music than to that of mode. The ODBL defines *makamliya* as describing a "song, melody, [or] chant—that is protracted, melodic, [and/or] *makamliiski*," or a voice "that is melodic, sweet-sounding, [and] pleasant." Similarly, *makamliiski* describes a "song, melody, [or] chant" that is "protracted, melodic, [or] *makamliya*." The association of these adjectives with captivating musicianship is readily apparent in the passages that follow, again extracted from period literature: a story by the author, publicist, and politician Todor Vlaikov (1865–1943); and Ivan N. Popov's memoir of his teacher, Yani D. Rododarovich (b. 1839 or 1840), and the city of Lozengrad, where both lived.

Със сладък, макамлия глас, той запя най-напред трапезарски песни, после на седянка и на хоро.

With a sweet, *makamliya* voice, he first sang table songs [lengthy, narrative, "slow songs, sung for entertainment during communal meals], then [songs] for work bees and *horo*s [line or circle dances].

— Todor Vlaikov, "Sreshta" (Meeting), published 1890–1891

. . . в петъчен ден [Пахомий] от минарето е пял намаз и язан. Стари българи, които са го слушали, разказваха ми, че гластът му бил много сладък и макамлия.

. . . on Fridays, [Pahomii] sang *namaz* [salat; ritual Islamic prayers] and the *yazan* [call to prayer] from the minaret. Elderly Bulgarians who had heard him told me his voice was very sweet and *makamliya*.

— Ivan N. Popov (1857–1931), *Lichni spomeni ot zhivota i deinostta na Yani D. Rododarovich ot Lozengrad* (Personal recollections of the life and activities of Yani D. Rododarovich from Lozengrad), 1928, p. 130

And yet, in these extracts, our three terms appear mostly in association with *makam*-based repertories, demonstrating that the authors, like their musicological contemporaries, linked the concept with Turkish musicianship. The *makam* melodies sung heartily by the *gŭdulka*-playing Roma are Turkish; the golden-voiced cleric Pahomii intones Muslim Turkish religious genres from the minaret; and in the illustration below, from a novel about Constantinople written by Hristo

Brŭzitsov (1901–1980), the cosmopolitan mix of pieces described includes "*makamliiski* songs, Arab, Persian."

Свирена била Марсилезата, различни френски маршове, валсове, . . . , макамлийски песни, арабски, персийски.	The Marseillaise was played, different French marches, waltzes . . . *makamliiski* songs, Arab, Persian.

— Hristo Brŭzitsov, *Nyakoga v Tsarigrad* (Once upon a Time in Constantinople), 1966, p. 133

Even the *makam*-songs of the warbling nightingale will be judged in relation to unstated standards of mastery, recalling the conventions governing melodic development enveloped in every *makam*'s *seyir.*

Given that average Bulgarian villagers of the late Ottoman Empire were likely not schooled in *makam* theory (nor, I expect, were their Turkish counterparts), is it possible that certain qualities of Turkish music appreciated by Bulgarians in their own music-making—drawn out, flowing, undulating melodies with modal implications, fluid ornamentation, adhering to stylistic principles, and a sweet, affecting voice—became described as *makamliiski*? Or, conversely, if a *makamliya* voice is sweet, sustained, and supple, and a *makamliiska melodiya* one that is masterfully conceived or played, as a consummate display of the stylistic conventions it represents, might these be qualities once associated by Bulgarians with music designated as "*makam*"? The fact that my interlocutors resorted to Turkish words (*baş*, *çalım*, *akana*) to underscore their explanations is instructive, because it points to the legacy of Ottoman sounds—spoken language, songs, devotional practices—among many other phenomena, in daily Bulgarian experience.

Drawing on extensive interviews, in a groundbreaking ethnographic study published in 1999, ethnomusicologists Lozanka Peicheva and Ventsislav Dimov ascertain that *makam* and *makamliisko* indicate different things to different communities of contemporary musicians: a mode or modal system for some, "sweetness" and "melodiousness" to others, the presence of Balkan or Middle Eastern features to a third, a particularly artful or fluid manner of singing or playing, one elicited "from the heart" and "from the soul," in a regionally appropriate manner—as Damyan also insisted—for still others. Like Stoyan Velichkov and Kostadin Varimezov, their interlocutors represent the later legacy of earlier *makam* discourse, and I suspect that the diversity of meanings carried by these terms derives from the Ottoman age, as evidenced by the literary examples provided above.

With all of this in mind, we can begin to unpack Marinov's metaphorical anecdote. In a practical sense, to extract a hair slowly and continuously, without breaking it, from inside a hunk of cheese requires patience, concentration, and a certain finesse. If the hair breaks, the only way to find the remainder is to crumble the cheese, destroying the block. If the cheese is envisioned as a modal complex or resource, a *makam* containing all of the potential aspects of its sonic realization, then to pull the hair is to draw out the mode's melodic essence, its musical beauty, gradually, with a twisting curvilinear melody, rendering it exactly as it should be, in accordance with the prevailing *seyir*. If the cheese is reconfigured as the *izvor* or natural wellspring of tradition (yet another important musical metaphor), then to withdraw the hair is to imbue one's musicality with the essence of its waters. And if the cheese is reimagined as musicians' subjectivity, their "heart" or "soul," then to extract the hair is to convey one's sensibilities in the most evocative way possible, in every tone, melody, or song (*makam*). Given that Marinov was a *gŭdular*, perhaps he was also thinking about pulling his bowhairs across the strings of his instrument, evocatively and

with finesse, to create sweet, sustained tones and melodies whose affect would cause listeners "to feel something deep inside." As Peicheva and Dimov conclude (1999:55) in their discussions about *makam* with Romani musicians, "*Makamliisko* playing is a synonym for masterful playing, but not understood as the virtuosity of showy technique, but as a feeling for the music and an ability to convey through the hand that which is secreted in the soul."

Despite the negative valence acquired by "Turkisms" during Bulgaria's nineteenth-century struggle for independence and late twentieth-century socialist period, this discussion demonstrates unequivocally that the concept of *makam*, as understood by Bulgarian musicians, is a fundamental dimension of musical aesthetics. Good singing and good melodies are rendered "with *makam*," however that phrase is interpreted; and in contradistinction to ethnonationalist political sentiment, Turkish music is beautiful music.

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WORKS CITED

Brŭzitsov, Hristo. 1966. *Nyakoga v Tsarigrad* [Once upon a time in Constantinople]. Second edition. Varna.

Institute for Bulgarian Language. n.d. *Rechnik na bŭlgarskiya ezik (onlain)*. https://ibl.bas.bg/rbe/lang/en/

Ilchev, Stefan, ed. 1974. *Rechnik na redki, ostareli i dialektni dumi v literaturata ni ot XIX i XX vek* (Dictionary of rare, archaic and dialectal words in our literature from the 19th and 20th century). Sofia: BAN.

Popov, Ivan N. 1996 (1928). *Lichni spomeni ot zhivota i deinostta na Yani D. Rododarovich ot Lozengrad* [Personal memoirs of the life and activities of Yani D. Rododarovich from Lozengrad]. In *Trakiya prez Vŭzrazhdaneto: Spomeni* [Thrace during the National Revival: Memoirs], compiled by Iliya Todev, 104–91. Sofia: "Sv. Kliment Ohridski" University Press.

Slaveikov, Petko Rachov, editor. 1863–64. *Gaida* (satirical newspaper), nos. 1–23. Tsarigrad.

Vlaikov, Todor. 1890–1891. "Sreshta." In *Biblioteka Sveti Kliment*, Vol. 1: 268–84. Sredets: Druzhestvo Sveti Kliment.

FURTHER READING

Buchanan, Donna A. and Stuart J. Folse. 2006. "How to Spin a Good *Horo:* Structure, Mode, and Compositional Process in Traditional Bulgarian Instrumental Music." In *Analytical Studies in Non-Western Music,* ed. Michael Tenzer, 58–91. Oxford University Press.

Dimov, Ventsislav. 2008. "On Some Early Sonic Evidence of Musical Hybridization: Observations on Commercial Gramophone Recordings from Bulgaria." In *The Human World and Musical Diversity: Proceedings from the Fourth Meeting of the ICTM Study Group "Music*

and Minorities" in Varna, Bulgaria, 2006, edited by Rosemary Statelova, et al., 43–50. Sofia: Institute of Art Studies.

Dzudzhev, Stoyan. 1980. "Pregled na hromatichnite vidove v Bŭlgarskata narodna muzika" [Overview of chromatic types in Bulgarian folk music]. Chapter 10 in his *Bŭlgarska narodna muzika*, Tom 1, 328–72. Sofia: Muzika.

Hristov, Dobri. 1970. "Vliyanieto na iztochnata (orientalskata) muzika vŭrhu nashata [The influence of Eastern (oriental) music on ours]." In *Dobri Hristov: Muzikalno-teoretichesko i publitsistichesko nasledstvo,* Vol. 2, compiled by Venelin Krŭstev, 32–35. Sofia: BAN. Originally published in *Muzikalen vestnik* 3,1905–06.

Hristov, Dobri. 1970. "Tehnicheskiyat stroezh na bŭlgarskata narodna muzika (metrika, ritmika, tonalni I harmonichni osobenosti) [The technical construction of Bulgarian folk music (meter, rhythm, tonal and harmonic features]." In *Dobri Hristov: Muzikalno-teoretichesko i publitsistichesko nasledstvo,* Vol. 2, compiled by Venelin Krŭstev, 63–124. Sofia: BAN. Originally published in 1928.

Kirilov, Kalin S. 2015. *Bulgarian Harmony in Village, Wedding, and Choral Music of the Last Century.* NY: Routledge.

Kirlilov, Kalin S. 2021. "Petar Ralchev's 'Bulgarian Suite': Explorations of Asymmetry, Modality, and Metrical Dissonances." *Analytical Approaches to World Music* 9(1):55–135.

Peicheva, Lozanka and Ventsislav Dimov. 1999. "'Sladkata muzika': Bŭlgarski muzikanti za ponyatieto makam" ["Sweet music": Bulgarian musicians on the concept of *makam*]. *Bŭlgarski folklor* 25(3):51–59.

Rice, Timothy. 1994. *May it Fill Your Soul: Experiencing Bulgarian Music*. Chicago: University of Chicago Press.

Rice, Timothy. 2018. "The Impact of Turkic Musical Culture on the Music of Bulgaria." In *Turkic Soundscapes: From Shamanic Voices to Hip-Hop*, edited by Razia Sultanova and Megan Rancier, 163–74. London: Routledge.

Vlaeva, Ivanka. 2008. "Hybridity in Turkish Recordings from the 1960s in Bulgaria." In *The Human World and Musical Diversity: Proceedings from the Fourth Meeting of the ICTM Study Group "Music and Minorities" in Varna, Bulgaria, 2006*, edited by Rosemary Statelova, et al., 36–42. Sofia: Institute for Art Studies.

Otavalan Transverse Flutes and Gendered Expressions in Kichwa Music and Dance

SOURCE: Three sizes of Otavalan transverse cane flutes.

FIGURE 1: A diagram of a transverse flute made of carrizo cane and typical of Otavalo, Ecuador.

COMMENTARY:
Otavalan transverse flutes are one of the many popular aerophones played throughout Kichwa communities in the northern Andes Mountains and Ecuador's Imbabura Province. These flutes are integral to many Kichwa spiritual practices, rites of passage (e.g., weddings or funerals), and daily life (e.g., taking animals out to pasture or walking alone on a path, etc.). In oral histories they are said to represent a pre-Hispanic or pre-Incan musical heritage (Vallejo 2014:33-48). Regardless of the exact origins or age of these instruments, they are symbolic of Kichwa-Otavalan culture and have been central to their music for generations.

Today, Otavalan transverse flutes are made of the common cane plant known as *carrizo* in Spanish or by its Latin name *Arundo donax*, a plant that was brought to the Americas after contact with the Spanish. These instruments are most often called *flautas* or sometimes *sukus muku* (cane elbow) in Kichwa, referring to the plant and the characteristic joint or node at the middle of the flute. The plant tissue inside the central node is completely scraped out to allow air to pass freely. When sizing permits, the closure at the top node may be left intact on the proximal

end of the flute near the embouchure hole, but in the event the top portion of the cane is too long and needs to be cut for proper tuning, the end is sealed with a small cap carved of *mati* gourd or scrap wood. There are seven holes carved into the cane, including an embouchure opening and six holes for playing notes with the index, middle, and ring fingers on both hands. What makes this type of flute distinctive is how the embouchure and first two finger holes are carved above a node of the cane while the remaining four finger holes are bored below the cane's joint. Flute sizes vary throughout the region, and each community and flute maker tend to have their own systems of sizing and tuning. For example, in Cotama, there are three sizes of flutes: large, deep, or lower-pitched (*raku*, Kichwa), medium (*pariku*, K.), and small, thin, or higher-pitched (*ñañu* or *hansi*, K.) (Cotama musicians normally perform in trios or sometimes in duos, and each member of the group will play the same size of flute. In most other Otavalan communities, flutists tend to play in duos and there may be several different flute sizes. Each community will perform its own core repertoire suited to the community's instruments and unique tuning systems, but flutists often learn and perform tunes from neighboring communities.

Across the region, these flutes are constructed and sold as pairs of the same size. Between the pair of flutes, one flute will typically be pitched slightly higher or lower than its mate. Which flute will be higher or lower on a given day may change depending on the humidity, how someone is controlling their breath and embouchure, or based on its relationship to another person and their own set of flutes (especially when played in a trio). Flutists will often play an open note to check how a flute sounds in relation to others at a given moment. These slight tuning variations and wider tuning aesthetics compared to the Western 12-note chromatic collection are intentional, and flute makers spend a great deal of time fine tuning the instruments to make sure that a note will "*regresar*" (return, Sp.) or sound correct to them. The use of the term "return" or "regresar" is an example of when—depending on the context—the meaning may have many layers and be difficult to translate. When playing music in Otavalo, the sound of the flute "returning" to the listener may be a simple comment or critique about the construction and intonation of the flute or the player's tone production. For example, one flutist may try a new flute and say "no regresa," which translates to "it doesn't sound good" or "it's wrong." In other contexts, however, it is more directly related to Kichwa concepts of spacetime embedded in the term "tikramuchikmi," or "to make something [that is eternal] return," as Kichwa flutist and founding member of Hatun Kotama Patricio Maldonado explains. The sounds always exist and the flute playing facilitates the pitches and tunes returning and being heard.

When played in open position (no holes covered) and in the main register, a set of large flutes in Cotama may be tuned to about D5; a medium pair of flutes may be pitched close to E5, and a smaller pair may sound at about a G5 or Gb5. My set of medium Cotama flutes made by Mariano Quinchuquí in 2012 has one flute pitched at E5 +20 cents and the other at E5 +40 cents. Flutists in Cotama explain that the lower-pitched flute is the *ñawpak* or lead masculine flute that plays the higher-pitched melody. Contrary to many Western musical systems, higher pitches in a Kichwa-Otavalan soundscape are associated with masculinity in part because of men's social roles of connecting with spiritual entities that have high voices. Conversely, then, the higher-pitched flute (E5 +40) is considered the feminine flute, or the *katik* (follower) that plays the

lower-pitched countermelody.[1] When played in a trio, the flute that sounds in between will double the lower-pitched line with the more feminine flute.

Ecuadorian composers and classical musicians Julián Pontón and Daniel Flores have analyzed the pitch collections and estimate there are between 18 to 22 pitches within this musical system, which does not strictly adhere to the 12-tone tuning system used in many other styles of music (Cachiguango and Pontón 2010; Flores Días 2018). While Kichwa-Otavalan musicians do not discuss this type of flute music as having a scale, specific note names, or in terms of a tonic, they do listen carefully for intervallic pitch relationships that are performed in a moveable tonic type of system where the same tunes are transposed when played on different sizes of flutes. When correcting someone, a flutist will usually rely on visually demonstrating the finger placements or will point to a finger that needs to be changed on another player's hand.

Kichwa flutists compare their instruments to beings, even assigning specific genders to them, as I have noted above. But such gender designations may vary depending on their relative tunings and the melodic lines they play with one another. This sense of gender fluidity and a non-binary gender spectrum aligns with how gender is deployed within the Kichwa language and ascribed to all beings. Even rocks may shift their gender designation in Otavalan culture based on attributes like temperature. Kichwa scholar and Cotama native Luis Enrique Cachiguango writes that "for us, musical instruments are 'people' capable of conversing, and motivating people to dance and feel joy. And in the case of [these] Andean flutes, the instrument that plays the first flute is male and the flute that plays the second is female" (Cachiguango & Pontón 2010:63; my translation).[2] Furthermore, these flutes, which are considered living beings, are fed *aswa* or corn beer. Just as the musicians will toast each other during a performance, a shot of corn beer will also be fed to the flute, which drinks the beverage as it is tilted back and forth, eventually offering the corn beer to the Earth (*Pachamama* or Mother Spacetime) when the *aswa* is poured on to the ground.

Sonic elements, such as register and pitches, tempo, volume, instrumentation and texture transmit gendered sounds that are associated with specific types of events in one's lifetime as well as times of the year based on the sun's movement and the agricultural cycle. For example, throughout my fieldwork, Otavalan musicians explained to me that the peak masculine time of the Kichwa-Otavalan calendar occurs during the June summer solstice in the northern hemisphere. Dates of the festival vary from town to town. In Cotama, for example, the period around the summer solstice (called *Hatun Puncha-Inti Raymi*) occurs between June 22nd and the 27th (see also Cachiguango & Pontón 2010). By the end of the week, the music will have shifted to represent increasingly masculine energies as more people will play flute tunes in higher registers with driving steady beats at accelerating tempos. The dynamics or volume of the music also increases during the week as larger groups form with more dancers and teams of musicians culminating on June 27th. But on the following day of June 28th, called *Warmi Puncha* (Women's Day), smaller ensembles perform more relaxed, syncopated, and slower repertoire, such as the

[1] Early on in my lessons during fieldwork, flutists referenced the gendering of flutes and sound. For more information on gendered sound in Kichwa Otavalan flute music, including instruments that are considered people or spiritual beings, see also chapter 3 of Luis Enrique "Katsa" Cachiguango's book *Yaku-Mama La Crianza del Agua* (Cachiguango and Pontón 2010:63-107), Hatun Kotama (2013), and Vallejo (2014).

[2] Original in Spanish: "Para nosotros, los instrumentos musicales son 'personas' capaces de conversar, hacer bailar, y extasiar al runa. De esta forma en el caso de la flauta andina, el instrumento que hace de primera flauta es varón y la flauta que hace de segunda es mujer" (Cachiguango & Pontón 2010:63).

related *sanjuanito*, using larger flutes and string instruments to balance masculine and feminine energies. Cachiguango along with flutists in Cotama explain that the music played on this day is meant to be more relaxing and to complement the circle of life and balance of energies (Cachiguango & Pontón 2010:63). Whereas *Warmi Puncha* has been a time when more women dance in large public plazas, over the last 15 years, it has become increasingly common for more women and girls to play musical instruments such as the transverse flutes, harmonicas, melodicas, guitars, and violins.

Dancing that occurs along with this music follows much the same circular or spiral pattern as does the musical form. People move in non-defined lines and as large crowds alternating between counterclockwise and clockwise directions following the musicians at the spiral's center. Sometimes the dancing is called semi-circular due to these frequent shifts in direction. Throughout a week, groups move from home to home, community to community, and eventually to a central meeting place (e.g., a church plaza) to dance with large ensembles from a few nearby communities. The time spent walking in between places like this is in a formation of what locals describe as serpent-like and it is frequently accompanied by music. Flute tunes are very short, lasting approximately 30 seconds to a minute, and musicians repeat the tunes throughout the week, giving a sense of a spiral musical form that expands as more teams of musicians join a crowd.

Finally, when asked if this music and dance represent anything or carry a specific meaning, Cotama musicians explained to me that flute music and spiral dancing express gender and represent the movements of celestial beings. Essentially, Otavalan transverse flute music and its associated dancing are actualizations of Kichwa theories about genderfluid spacetime, and they inscribe this gender fluidity on to Kichwa-Otavalan lives and ancestral lands through sound and movement.

Jessie M. Vallejo

FURTHER READING:

Cachiguango, Luis Enrique "Katsa," and Julián Pontón. 2010. *Yaku-Mama: La Crianza del Agua; La Música Ritual del Hatun Puncha – Inti Raymi en Kotama, Otavalo*. Quito: Ministerio de Cultura del Ecuador.

Flores Días, Daniel. 2018. "Sonoridades Ancestrales en la Comunidad de Kotama del Cantón Otavalo: Descripción y Análisis Técnico Musical." M.M. thesis, Universidad Internacional de La Rioja.

Hatun Kotama. 2013. *¡Así Kotama!: The Flutes of Otavalo, Ecuador* [CD]. Washington, DC: Smithsonian Folkways SFW 40564.
Available online at http://www.folkways.si.edu/hatun-kotama/asi-kotama-the-flutes-of- otavalo-ecuador/latin-world-american-indian/album/smithsonian.

Mullo Sandoval, Juan. 2009. *Música Patrimonial del Ecuador*. Quito: Instituto Iberoamericano del Patrimonio Natural y Cultural-IPANC.

Vallejo, Jessie M. 2014. “La Música da Vida a Vida: Transverse Flute Music of Otavalo, Ecuador.” Ph.D. dissertation, University of California, Los Angeles.

Vallejo, Jessie M. and Jorge G. F. Moreno Soto. 2018. “Intergalactic Pachamama: Kichwa Cosmology vs. Western Astrophysics.” *Smithsonian Folklife Magazine*.
Available at: https://folklife.si.edu/magazine/intergalactic-pachamama-kichwa-cosmology-vs-western-astrophysics

Wibbelsman, Michelle. 2009. *Ritual Encounters: Otavalan Modern and Mythic Community*. Urbana and Chicago: University of Illinois Press.

1797 CE: Colin Campbell invents a written notation system for the Highland bagpipe from an oral tradition.

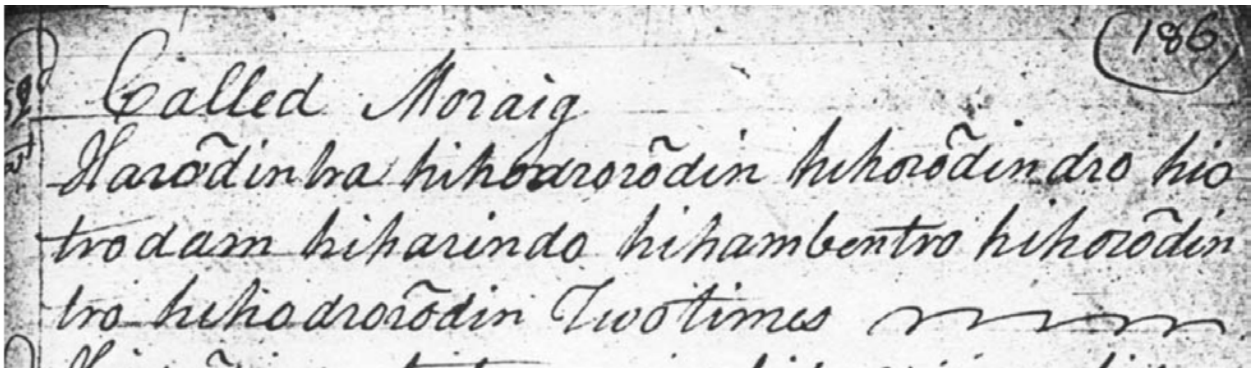


Figure 1: Music notation of the first stanza of a tune "Called Moraig." The letters and vowels are an altered transliteration of an oral notation system (*canntaireachd*) for the Highland Bagpipe.

Original Source Text.

Called Moraig
Harõdintra hihodrorõdin hihorõdindro hio
trodam hiharindo hihambentro hihorõdin
tro hihodrorõdin Two times —----------

SOURCE

"Colin Campbell's Instrumental Book, 1797. The First Volum Continuing [sic] 83 Tunes.", 1797., MS.3714. Archives and Manuscripts. Reproduced with the kind permission of the owner and the National Library of Scotland.

COMMENTARY

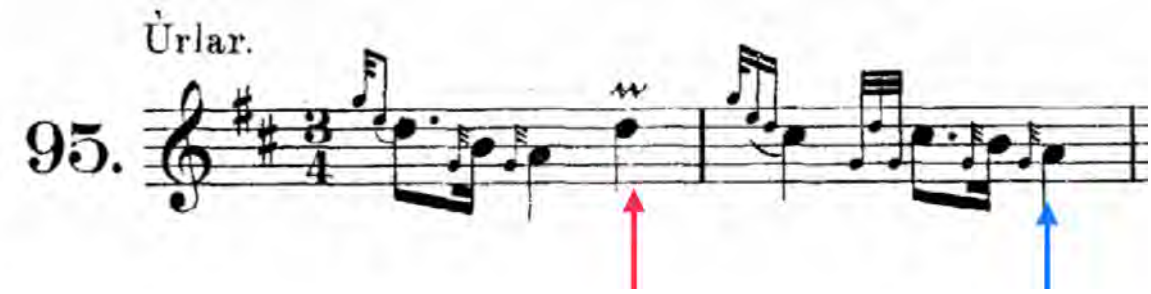
The two Campbell manuscripts (NLS MS 3714-5), housed in the National Library of Scotland, (third volume lost), are the earliest recorded evidence of a written system for the practice of *canntaireachd* [Gael. "chanting/singing;" IPA: /ˈkaʊntə-rəx/], an oral notation system for the Highland bagpipe. In the last quarter of the eighteenth century, Colin Mór Campbell, piper to the Earl of Breadalbane, designed and developed this written notation from a long-standing vocal tradition. The sung form of *canntaireachd* associates vowel sounds with specific notes of the

bagpipe scale and onomatopoeic clusters of consonants for particular grace note combinations. Though variable in many ways, prior to the eighteenth century this technique was passed on orally from master to apprentice; it was essential for the perpetuation of *ceòl mór*, or the "big music" of the Highland bagpipe (commonly known in English as *pibroch*), a style of music defined by elaborate variations on a melodic theme, elastically metered, used to commemorate events or as a form of lament in a panegyric context.

Campbell's decision to invent a notation system at the end of the eighteenth century was particularly significant. At this time, many expressive forms and structures of Scottish Highland culture had been prohibited for decades or imperiled through migration of Gaels to the New World. After the final defeat of the Jacobite Rebellion in 1746–the culmination of decades of conflict arising from Stewart claims to the British monarchy–the Hanoverian government applied various methods of systematic cultural repression to curtail further Highland resistance and anglicize the population. Among other traditions, bagpipe playing suffered under these restrictions. Subsequent attempts to preserve and promote Scottish Highland customs, informed by Anglican models, significantly transformed traditional practice. By 1781, The Highland Society of London, founded in 1778 as a supper club for affluent Highlanders living in the capital, began to organize bagpipe competitions that offered prizes for performance as well as incentives to encourage players to write down tunes in staff notation. The unique embodiment of the Campell notation indicates that the inventor was motivated to preserve the *canntaireachd* tradition in a written form that correlated with, rather than replaced, the oral system. When Campbell's son submitted a volume of his father's notated music to a Highland Society competition in 1818, it was rejected by the Society as illegible.

The rediscovery of these manuscripts in 1909 in the library of Ann of Oban had twofold significance–of the 169 tunes it archives, 70 had not been recorded in other sources, and thus, a substantial number of *pibroch* tunes were restored to the repertoire. More importantly, the method that Colin Campbell developed for inscribing *canntaireachd* contains the earliest recorded evidence of the oral practice, while also highlighting the benefits and disadvantages of both written and oral notation of this system. Campbell's manuscripts are not a transcription of sung practice, rather, through comparison with contemporary accounts and later manuscripts it is clear that the relative flexibility of the oral practice was altered to create stability in the written, letteral system. Campbell standardized certain conventions while also adding symbols (such as the tilde-like symbol in the image above) to indicate rhythm that would have been transmitted orally.

While a full explanation of this system is beyond the scope of this commentary, the following provides context for the correlation between the Campbell *canntaireachd*, staff notation, and sung practice. Here is a version of the first line of the tune "Called Moraig" depicted in the image above:



Campbell: ha rõ din tr a hiho dro rõ din

When compared with standard Western notation one can see how the vowels in each version of Campbell *canntaireachd* align with particular notes, such as "a" for pitch D (indicated by the red arrow) and "din" for the Low A (indicated by the blue arrow) in the image above. Clusters of consonants paired with particular vowels represent grace note combinations, such as “dro” in the second measure, which indicates the three preceding grace notes to the C, a combination known as a “grip.” These two files (Moraig 1, Moraig 2) show how sung *canntaireachd* of the same tune can vary from piper to piper.

To an eye trained in Western staff notation, Campbell’s system may seem woefully incomplete. Even with an understanding of the correlation between vowels and scale degrees, consonant clusters and grace note combinations, the notation has little to no indication of rhythm or even duration. And yet, in contrast to transcriptions of *pibroch* in Western notation, Campbell’s *canntaireachd* is not designed to provide fixity of a musical work; on the contrary, it functions as an *aide memoire* to foster a tradition under threat, which can only be completely understood in relationship to the sung practice. As the sound files above show, sung *canntaireachd* is highly subjective. Particularly in *pibroch,* where the grace note combinations and use of elasticized meter display a piper’s skill, experience, and expressive capabilities, a certain flexibility in how a tune is notated fosters individuality that a more rigid notation system proscribes.

Contemporary pedagogy in the bagpipe continues this reciprocal practice between oral and written traditions. At the Royal Conservatoire of Scotland in Glasgow, students must be able to play a pipe tune from *canntaireachd* and staff notation, and they must also sing in *canntaireachd*. The *canntaireachd* students use for chanting is not entirely fixed; it follows the basic principles of Campbell and other early sources, but students are permitted a certain amount of expressive freedom in how they chant. This practice embodies, to follow Leo Treitler, music writing as a contingent element of music making and memory that works in cooperation with oral practice. The two means of music-making are envisioned as a symbiotic practice, enhancing one another while gesturing to an intangible cultural heritage.

Ginger Dellenbaugh

FURTHER READING

Buisman, Frans. “Canntaireachd. Colin Campbell’s Verbal Notation - An Outline [1].” *Piping Times* 50, no. 3 (1997): 24–30.

———. “Canntaireachd. Colin Campbell’s Verbal Notation - An Outline [2].” *Piping Times* 50, no. 5 (1998): 28–33.

———. “MS. SRO 112/1/803. More Evidence on the Development of Campbell Notation.” *Piping Times* 47, no. 11 (1995): 21–28.

Cannon, Roderick D. “What Can We Learn about Piobaireachd?” *British Journal of Ethnomusicology* 4 (1995): 1–15.

Dellenbaugh, Ginger. “Between Song and Script: Oral and Written forms of *Canntaireachd* for the Highland Bagpipe.” *The Journal of Music Theory* (forthcoming)

Dickson, Joshua, ed. *The Highland Bagpipe: Music, History, Tradition*. Ashgate Popular and Folk Music Series. Farnham, England; Burlington, VT: Ashgate, 2009.

———. “Piping Sung: Women, Canntaireachd and the Role of the Tradition-Bearer.” *Scottish Studies* 36 (December 31, 2013): 45.

Moss, George. “Canntaireachd.” *Piping Times* 12, no. 1 (1959): 16–21.

“Pibroch Network.” accessed 1 September 2024. https://pibroch.net/

1888: Uruguayan historian Isidoro De María recalls the music and dance of Africans in Montevideo sixty years before.

The southern coast [of Montevideo] was the place of the **candombes**, that is, the field or the stage where the black race performed their open-air dances. […]
On Sundays, it was well known, there was no shortage of candombes, in which both old and young black men and women participated, with permission "from their worship the master or mistress," unless they were freedmen […]
Each **nation** had its own place to hit the **tango**, a small plot of land leveled by their feet and then covered with a layer of sand. The **Congos**, **Mozambiques**, **Benguelas**, **Minas**, **Cabindas**, **Molembos**, and in short, all those from Angola performed their dances there. To the sound of the **tambora**, the **tamboril**, the **marimba** in the **mate** or **porongo**, the **mazacalla** and the **palillos**, they happily gave themselves over to dancing with their [singing] *calunga cangué… eee elumbá*, and other songs, accompanied by the rhythmic claps of the dancers, who moved their legs, arms and heads to the rhythm of this *concert* [sic] that gave pleasure to the *tíos*.
The *tango*, the [sounds] of the "*chinchirin chindá, chinchí*" and of the "*tan-tan*" were the *divertimento* of the **clases** and of the [white] crowd that, following custom, moved down to the Paseo del Recinto to see it. […]
The tango lasted until sunset, with its moment of drinking **chicha**, to refresh their throat, dry from so much "*eee llumba, eee llumbá"*; finally, walkers and performers went home.
The **Day of Kings**! Oh! On that day of royal celebration, you had to be there: let's go to the Kings, to the **sala** of the Benguelas, the Congos and others throughout the southern neighborhood [...].
Each nation devoted its greatest effort to the grooming of its sala. This was also

Candombe: name of the dances of enslaved and freed Africans.

The African **nations** were groupings by ethnicity of origin, or by port or region of deportation in Africa.

Tango: name given to Black dances in documentation of the Colonial period.

Congos: from the Bantu kingdoms of Congo; **Mozambiques:** from the East African ports; **Benguelas:** from the Benguela port, Angola; **Minas:** named after San Jorge del Mina, a Portuguese fort in Ghana, the prefix "mina" referred to Africans deported from any port of the Gold Coast or the Slave Coast; **Cabindas:** from the Cabinda enclave between the Congo and Angola; **Molembos:** no known antecedents; it might refer to the Dembo ethnicity from the Congo-Angolan region.

Tambora: big drum. **Tamboril**: candombe drum. **Marimba**: a xylophone built with wooden plates of different lengths struck with two hammers and its corresponding lower gourd resonator. **Mates** [or] **porongos**: a hollow gourd covered with shells. **Mazacalla**: a metal "maraca" built from two conjoined tin cones containing pebbles, provided with a wooden handle. **Palillos**: sticks.

Tíos, tías: uncles, aunts; here refers to adult and elderly Africans.
Clases: lit. classes; here refers to enslaved and freedmen Africans.
Paseo del Recinto: promenade around the city's walls.
Chicha: corn beer.
Day of Kings: Celebrations of the holiday of the Día de los Reyes, or Epiphany.

noticeable in the clothing of the uncles and aunts, as to appear at court and do the honors to his Majesty Conga, Cambimba [Cabinda] or Mozambique. […]

Sala: was the name of the headquarter of each nation, which would have been small shacks or houses outside the walls, south of the city.

SOURCE: Isidoro De María, 1888, "El Recinto y los candombes, 1808-1829." In *Montevideo Antiguo. Tradiciones y Recuerdos. Libro Segundo*, pp. 162-172. Montevideo: "Imprenta Elzeviriana" de C. Cecchi. Reedited: 1957. "El Recinto y los candombes, 1808-1829 - II." In: *Montevideo Antiguo. Tradiciones y Recuerdos. Tomo I*, pp. 279-282. Montevideo: Ministerio de Instrucción Púbica y Previsión Social. Translated by Luis Ferreira.

COMMENTARY:
Isidoro De María (born in Montevideo 1805, died there in 1906) was a white Uruguayan historian and traditionalist who contributed to nation building. He published *Montevideo Antiguo. Tradiciones y Recuerdos* (Old Montevideo: Traditions and Memories) in 1888, when he was 73 years old; this book consists of short sketches of various aspects of life in Montevideo during his lifetime. The passages above, from a section entitled "El Recinto y los candombes, 1808-1829," recounts memories from his childhood and youth. In light of the general lack of documents about Africans life in Montevideo during the first third of the nineteenth century, this text is unusually valuable in providing rare descriptions of local African music, as well as detailed onomatopoeic expressions that, as sound fingerprints, help us to reconstruct the rhythmic organization of the music.

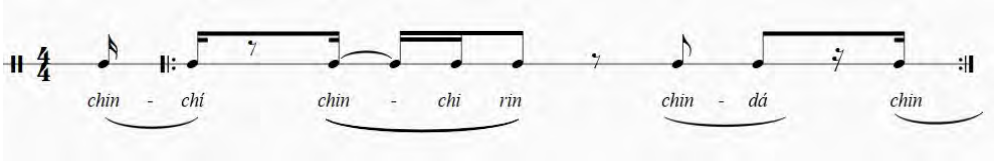
De María uses *tango* to indicate dance alone and *candombe* to name gatherings of the members of many African nations involving drums, song, and their traditional dances. The term "tango" appears in an 1808 petition by "the Residents of this City, slave owners," that asked the Montevideo Cabildo (colonial administrative council) to prohibit the "Tangos de Negros" (Draft of an official letter from the residents of Montevideo to Governor Elío, dated November 21, 1808). Indeed, in early 1816, the Cabildo banned the dances "known by the name of Tangos" within the city limits and only allowed them "outside the walls on the afternoons of holidays" (Proclamation printed on loose sheet and dated in Montevideo on January 27, 1816). The first appearance of the word *candombe* can be dated to 1834, when a local newspaper published a "Patriotic song of the Blacks, celebrating the law of freedom of wombs and the [Uruguayan] Constitution" signed by "Five hundred Blacks from all nations" ("El Universal", Montevideo, November 27, 1834). A police decree in 1839 ruled that "the dances called candombes with the use of drum" are prohibited inside the city and only allowed on the seafront towards the south, on holidays and must end by nine o'clock at night (Police Edict, Montevideo, June 28, 1839). As a youth De María seems to have frequented these Black spaces, and the text describes his familiarity with these African practices, despite his inability to distinguish between the sound and music of different African nations. In addition, it should be noted that the term candombe, stressed on the middle syllable "dom," differs from the term candomblé, stressed on the last syllable, which refers to African religions in Bahia, Brazil.

A lithograph published in a newspaper in 1843 ("El Tambor de la Línea" [The Line Drum], Montevideo, No. 2) is the earliest known image of African drumming in Montevideo.

The drummers were soldiers of the Battalion of Freedmen during the “Great War” (1839-1851) between Argentina and Uruguay. The drums depicted are barrel-shaped, about 2 feet high, with a membrane on top, and played standing while holding it between the knees. Today a similar drum is played standing, hanging from the shoulder and commonly called *tambor*.

De María’s report is fascinating in that it suggests several syntactic aspects of musical organization. First, a basic polyrhythmic structure can be deduced from the onomatopoeiac expressions in the text: the prominent sounds of the lower-pitched drums are depicted by *tan-tan*, with the open vowel sound “a” prolonged by the consonant “n.” Against this, De María presents the *chinchirin chindá chinchí* onomatopoia, with the “ch” Spanish digraph and its postalveolar affricate (tʃ) sound, plus the “i” vowel sound prolonged with the consonant “n”. Everything seems to indicate that this was his own onomatopoeic representation of a high-pitched sound of struck sticks and percussion instruments other than drums, rather than having heard it from the performers. It wouldn't be a song either because the reference to the *llambú* singing and “other songs” are mentioned a few lines before.

In contrast to the *tan-tan* which suggests a regular and symmetrical pattern, *chinchirin chindá chinchí* suggests an asymmetrical rhythmic pattern that might have been played above it. Moreover, the text implies that the musicians share their rhythms with singers and dancers who also clap rhythmically. The higher pitched pattern could have been a representation of a candombe drumming we can hear today, written in 4/4 meter as follows (although it could have been in 12/8 meter):



The asymmetrical structure of this pattern and its cyclic repetition invokes the African *time-lines*, just as it appears in present-day candombe, where it is typically played by a drummer hitting the drum shell with a stick (Ferreira, 2013, pp. 240).

De María's notation of the singing *calunga cangué… eee elumbá* does not seem to be an onomatopoeia but an actual lyric, that further appears to indicate a call-and-response structure as can be gleaned from his comment that the performers, probably the responding chorus, drink corn beer "to refresh their throats, dry from so much *eee llumba, eee llumbá*." This chorus line also displays rhythmic asymmetry: the first *llumba* stress occurs on the first syllable "llum"; the second *llumbá* stress is on the last syllable "bá." The word *calunga* can be found throughout the Caribbean and Brazil, where it is spelled with a "k." According to the *Diccionario de la lengua Conga residual en Cuba* (1998), Kalunga can refer to the sea; to the sea's life force; to Mother Water, or to the Goddess Yemayá, who represents the seawater and a mother's love. *Lumbá* and *llumba*, written as *yumba*, also appear as a lexical-suffix related to Afro-Cuban religions and the human head.

In the late nineteenth century, African nations disbanded, but their musical traditions lived on through the drumming of "comparsas" (carnival ensembles) in neighborhoods with sizable Afro-descendant populations. The ancient nations' ethnic musical markers evolved into distinct musical patterns in the bass drums that denote neighborhood affiliations ("barrio") and kinships, all based on a common polyrhythmic organization. Since the end of the twentieth century, *candombe* has been widely embraced by society at large and was officially declared "Intangible Cultural Heritage of the Nation" by the Uruguayan State in 2006. It was also inscribed on to UNESCO's "Representative List of Intangible Cultural Heritage of the Humanity" in 2009. Thus, for more than two centuries, this tradition of drumming and singing has been maintained and developed in Montevideo.

Luis Ferriera

FURTHER READING

Ayestarán, Lauro. 1953. "La Música Negra." In: *La música en el Uruguay*, pp. 51-111. Montevideo: SODRE.

———. 1968. "El tamboril afro-uruguayo." In: *Boletín Interamericano de Música*, nº 68, pp. 3-13.

Díaz Fabelo, Teodoro. 1998. *Diccionario de la lengua Conga residual en Cuba*. Santiago de Cuba: Casa del Caribe.

Ferreira, Luis. 2013. "Concepciones cíclicas y rugosidades del tiempo en la práctica musical afroamericana." In: Aharonián, Coriún (coord.), *La música entre África y América*, pp. 231-261. Montevideo: CDM/MEC.

Goldman, Gustavo. 2008. *Lucamba: herencia africana en el tango. 1870-1890*. Montevideo: Perro Andalúz Ediciones.

KEYWORDS: Candombe, African musical organization, musical onomatopoeias, Time-lines, African Diaspora, Uruguay, De María, sound fingerprints

Second century BCE. Akkadian ritual instructions for covering the *lilissu* kettledrum with the hide of a bull.

When the (occasion) to cover the bronze ***lilissu*** is before you, a knowledgeable expert thoroughly inspects a perfect black bull whose hooves and horns are intact from its head to the tip of its tail. If its body is (completely covered with) black hair, it will be taken for rite and ritual. If it is spotted with seven white hairs like a star, (or if) it was struck with a stick, it will not be taken for rite and ritual.

***lilissu*:** A large kettledrum made of bronze or copper used to accompany prayers of lament during rituals. The head of the drum was made from the hide of a bull.

When you bring the bull into the workshop in an auspicious month, on a favorable day, at dawn, you consecrate the place, you sprinkle pure water.

You arrange twelve bricks, you lay twelve linen cloths on them. You seat the twelve gods on them: **Three gods** – **Dingirgubba gods** – you station; **two gods** – **Dingirgida gods** – you draw (as) **curtains**; seven gods – "the sons of **Enmeshara"** – you scatter (as) heaps of flour.

Three gods: the three main gods of the pantheon: Anu, Enlil and Ea.

Dingirgubba (or: Angubba) gods: "stationed gods": A designation for a specific group of tutelary gods.

Two gods: the netherworld deities Lugalĝira and Meslamtae'a.

Dingirgida gods: "long gods": The designation is unclear.

Curtains: The meaning is ambiguous. It could also designate "flour."

Enmeshara: a primordial god.

You place twelve reed offering tables, each with seven barley loaves, each with seven emmer loaves, (and) confections of syrup and butter. You scatter dates and fine flour. You place beer and wine. You offer twelve sheep offerings. You present the shoulder, fat, and roasted meat. You set up barley, malt, (and) emmer.

You scatter white wool, red wool, blue wool, (and) aromatics on the bricks. You place (purifying) water in front of them.

wash its mouth: A cultic act intended for purification and deification.

circle of flour: A cultic way of defining ritual space.

You lay down a reed mat. You heap up sand under the reed mat. You lay (downwards) the sides of the reed mat and you surround (them) with sand. You have that bull stand on the reed mat and you sprinkle it with the water of a purifying vessel. You **wash its mouth**. You surround it with a **circle of flour**. You arrange a brick (in front of it). You scatter a censer with juniper. You libate first-class beer. You whisper: "**Incantation:** Great bull, exalted bull, treading on the pure meadow!" into its right ear through a tube of sweet reed. After this, you whisper: **"Incantation:** Bull, you are the offspring of **Anzu**!" into its left ear through a tube of sweet reed.

Incantation: Incipits of incantations known in full from other sources. The second incantation ends as follows: "May this bull be entrusted to Lumḫa (= the deity associated with the *lilissu*)! May its good voice be presented to the god Bel!"

Anzu: a mythical bird.

You scatter cedar balsam on the *lilissu*. You slaughter that bull in front of the *lilissu* and you scatter juniper on its heart. You libate beer. The lamentation priest uncovers his head and bows on his knees and (then) stands at (the bull's) head, and recites three times: "He who lies down, He who lies down." Following this he says thus three times: "These acts the totality of gods has performed! I have not performed (them)!"

You lift up the water and loosen the curtains.

You take that hide and soak it in water, beer and first-class wine with coarse flour of pure grain. You steep (it for dyeing) in butter from a pure cow, **gabû stone** from the land of **Ḫatti**, and **hūratu plant**, and you cover the bronze *lilissu*. You fasten its opening with the left sinew of the (bull's) loins. You wrap the pegs of the bronze *lilissu* in an acorn-shaped (container), you soak (them) in paint, you smear (them) with … and you return (them) into the *lilissu*.

In an auspicious month, (on) a favorable day, you perform these acts. You wrap the flesh of that bull in one red cloth, … you pour regular oil onto it. You bury it (…) and place its front towards the west. You bury with it the remainder of the bull-hide.

gabû stone: Alum, a mineral used for dyeing.

Ḫatti: A geographical designation of the lands to the west of Mesopotamia.

ḫūratu plant: Probably "madder" (Rubia tinctorum), a plant used for dyeing.

Source: BaM Beih. 2, 5 (Linssen 2004, 270–274) (Fig. 1). The tablet is damaged and illegible passages have been reconstructed according to parallel texts. (The reconstructed passages are not indicated in the translation). Some of the translations and restorations are uncertain.

COMMENTARY

Texts related to the ritual for covering the *lilissu* kettledrum with the hide of a bull, including ritual instructions, recitations, and an illustrated commentary on the ritual are preserved in cuneiform tablets from various sites in Mesopotamia, dating from the seventh century BCE up to the second century BCE. Of particular importance are the tablets from the city of Uruk (modern-day Warka, in southern Mesopotamia), produced in the Seleucid period (312-64 BCE) (including the text translated above).

The texts of these tablets provide much information on the religious perception of the drum and its construction, and consequently on the religious aspect of music. According to the ritual texts, the drum was divine, and the ritual for its fabrication included the deification of the bull whose hide was later used for the drumhead after it was slaughtered, as well as the deification of the drum itself. The ritual, and especially the killing of the bull, was linked with the myth of Enmeshara, an ancestral deity who was killed by Enlil, the king of the gods. The ritual also had an astral aspect, for the bull was associated with the constellation Taurus. Other texts explain

that the *lilissu* was understood as the heart of the god. The beating of the drum was therefore associated with the beating of the god's heart, and this association was key to the theological significance of the *lilissu*: The *lilissu* was played during the performance of lamenting prayers that describe how the wrathful heart of the deity causes destruction. These prayers ended with a plea for the heart of the god to calm down. Thus, the beating of the *lilissu* drum made the beating heart of the deity present in concrete form while the sorrowful prayers were sung.

Uri Gabbay

FURTHER READING:

Linssen, M.J.H (2004), *The cults of Uruk and Babylon: The temple ritual texts as evidence for Hellenistic cult practices* (Cuneiform Monographs 25), Leiden: Brill-Styx. See pp. 92–100, 252–282.

Gabbay, U. (2014), *Pacifying the hearts of the gods: Sumerian Emesal prayers of the first millennium BC* (Heidelberger Emesal-Studien 1), Wiesbaden: Harrassowitz. See pp. 118–139.

Gabbay, U. (2018), "Drums, hearts, bulls, and dead gods: The theology of the ancient Mesopotamian kettledrum," *Journal of Ancient Near Eastern Religions,* 18, pp. 1-47.

Tuputisi (medidas) – instrument makers' measuring sticks in the Bolivian Andes: archiving an aesthetic world

Introduction

The flute world of the Southern-Central Andes is astonishingly rich and complex. A central reason for this, among others, is the importance of producing specific types of sound that correspond to the needs of particular dances, rituals or seasons, or to the identity of a musical group or community. For this purpose, various flute categories are used, including edge blown flutes, where players shape their lips into an embouchure (e.g. *kena*— "notched flute"*, phala*—"transverse flute"*, siku*—"panpipe"), and duct flutes, where players blow directly into the instrument, like a recorder, (e.g. *tarka, pinkillo*), see **figure 1**. These flute types are usually played in consorts *(tropas)* of similar or varied size instruments of the same family, and have many variants - the panpipe *(siku)* family encompassing the greatest diversity. While consorts of flutes often comprise twelve instruments (in the La Paz region of Bolivia), ensembles may be smaller or much larger, even exceeding several hundred players, which are often—but not always—accompanied by drums.

Figure 1. Categories of flute: edge blown flutes (requiring an embouchure) *kena, phala, siku*; duct flutes (players blow directly into instrument) *tarka, pinkillu.*

Another important consideration is that these consorts of instruments frequently need renewing, especially those made from fragile cane. This need for repeated construction, often on an annual basis, gives rise to an immense market for instruments. In turn, specialised knowledge and skills are required from instrument makers as they respond to the specific requests of different communities and musicians. The specialised artisans who make these flutes are called *luriri* in Aymara or *maestros* ("masters") in Spanish. Many of these artisans reside, or originally acquired their skills, in specialised instrument-making communities recognised for the quality of their production. Bolivian examples include Walata Grande (in La Paz Department, near Lake Titicaca), Condo and Pampa Aullagas (in Oruro Department, near

lake Poopo) and Vitichi (in Potosí Department). Our co-author Martín Mamani Quispe, who is a *sikuluriri* ("panpipe artisan") and master *tarkero* ("tarka maker"), began his career in Walata Grande before further developing his craft in La Paz, Bolivia's capital city.

To respond to the demand for a wide range of flute families and sizes, each artisan relies on an "archive" or "library" of bamboo sticks. On each stick is inscribed the necessary information for constructing a specific flute type: these measuring sticks are called *tuputisi* or *tuputisi* in Aymara or *medidas* in Spanish. In this entry, which focuses on traditions from Walata Grande, we aim to demonstrate that in addition to serving as tools these measuring sticks reveal fundamental aspects of the musical organisation, values and sound aesthetics of the Southern-Central Andes, especially of Bolivia and Southern Peru.

Figure 2. An "archive" or "library" of *tuputisi* (labelled by collector). Photograph: Gérard Borras.

The language of the *tuputisi*

Tuputisi are used to make both panpipes and flutes with finger holes. To make these latter flutes the craftsman needs several measurements: the length of the instrument, the location of the fingerholes and, in some cases, the location of the window. Each type of flute generally corresponds to a specific *tuputisi* which artisans can usually quickly identify from the dozens he always carries with him, through observing the stick's length and configuration of notches, and without the need of a written label. Some craftsmen cut the tip of their *tuputisi* in the shape of the beak of a *pinkillo* or *kena* to make it easier to identify (see **Figure 3**). The *tuputisi* for many types of panpipes are recognisable by their tapered shape and pointed tip. This enables them to be used in two ways: (1) externally to give an approximate length when

cutting the cane and (2) placed inside the cane to check its internal length (**Figure 5**). Nonetheless, the variety of panpipe consorts *(tropas)* is so great that craftsmen sometimes attach a piece of coloured wool to identify specific types.

The specific forms of "writing" or "vocabulary" inscribed on *tuputisi* reflect the shared experience and the technical efficiency of these symbols. The "page" on which artisans inscribe the necessary information is a section of cane, which is very straight, strong, and not more than one centimetre wide. This stick provides the craftsman with different spaces to write information, including both the hard shiny external surface of the cane (recto) and on its softer internal surface (verso), i.e. a total of 2 surfaces and 4 edges. The basis of the writing is the notch, in the shape of a triangle, where size and orientation serve to communicate phoneme-like oppositions.

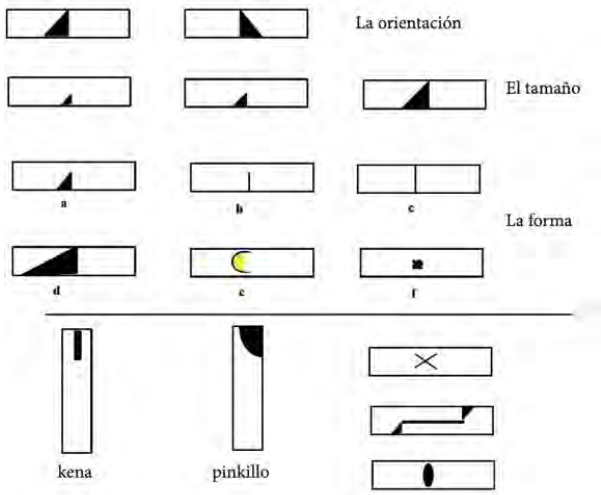


Figure 3. *Tuputisi* vocabulary: symbols used to convey specific instructions.

In figure 3, the 90° angle of a triangle marks the measurement point; larger triangles and their orientation define the space being measured (often the length of an instrument); and the size if the triangle may define the size of the flute being measured (when flutes of different sizes of the same family are included on the single *tuputisi).* For example, figure 4 shows the notches for making three sizes of *phala* transverse flute. The length of the flute is marked with a large notch (x), a nearby notch (F) marks the placement of the blowhole, and six further notches mark the fingerholes. The two largest sizes, tuned a fifth apart, appear on the outer (recto) side of the cane and the smallest size (one octave above the largest) on the cane's soften inner (verso) side.

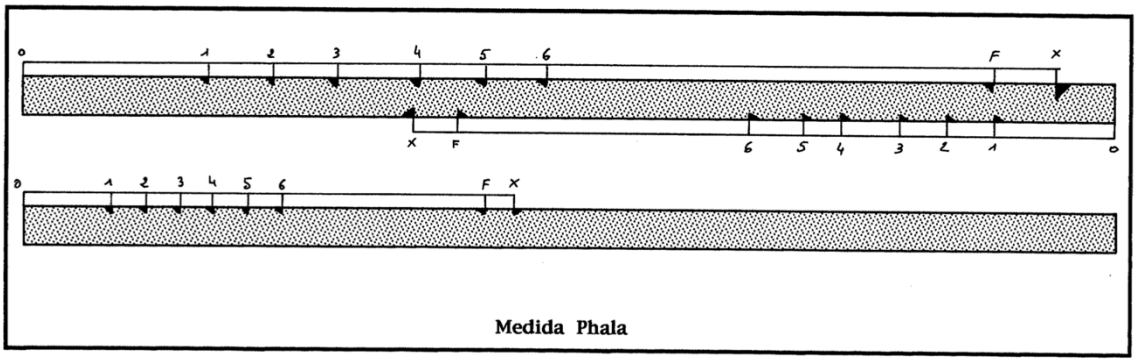


Figure 4. *Tuputisi* (or *medida*) for three sizes of *phala* (transverse flute), tuned at intervals of a 5th and octave, showing both surfaces (recto and verso).

Other symbols may be used to mark other details of an instrument's form or how the tuputisi is to be used. For example, in figure 5 the "X" and "I" marks denote the tube range of different size panpipes in a consort, where in this case each panpipe consists of 8 tubes. For the case of the *siku choquela* panpipe consort, the instrument maker knows that the consort consists of six instruments, each with 8 tubes, which are divided into three different sizes: one *chuli* (treble), four *maltas* (medium), and one *sanka* (bass).

Figure 5. *Tuputisi* (or *medida*) of Leonardo Limachi for the *siku choquela* panpipe consort.

The 13 notches of the *tuputisi* show the lengths that the artisan should cut the tubes (see Figure 5); here the shortest/highest pitches are shown on the left and longest/lowest pitched on the right. When making the *malta* (medium size) the artisan uses the notches to the right of the "X" mark on the *tuputisi* to cut 8 tubes, measuring from the narrow end of the stick. For the *chuli* (small size, pitched one octave above the *malta)* he uses the notches on the left-hand side of the "I" mark to cut 8 tubes, again measuring from the narrowed end of the stick. For the *sanka* (large size, pitched one octave below the *malta*), he doubles the measurement that he used for the *malta.*

The efficiency of the *tuputisi*

Tuputisi sticks are perfectly adapted for constructing specific sets of flutes or panpipes, but they do not record everything, such as cane type, cane diameter, or dimension of finger holes. Such prior knowledge is particularly crucial when constructing panpipe consorts. In some cases, all the notes of the scale may be played on a single panpipe (as with the *siku choquela* or Romanian *nai*), but most Andean panpipe consorts divide the notes of the scale between complementary *ira* and *arka* pairs (e.g. 3/4 tubes; 6/7 pipes, 7/8 pipes, up to 11/12 pipes). For example:

Ira 6 pipes: E-G-B-D-F#-A

Arka 7 pipes: D-F#-A-C-E-G-B

Alongside dividing panpipe ensembles into two groups of players, who dialogue between paired *ira* or *arka* instruments, it is common for consorts to include different sizes, typically tuned in parallel octaves and sometimes fifths. *Siku* panpipes are sometimes made as a single row of pipes, but many include two parallel rows of the same lengths or cut at the octave. (The second row of tubes furthest from the player's lips and not blown directly. These are open at both ends which means they resonate in sympathy one octave higher than the tubes sounded by the player. The open tubes add extra harmonics to the ensemble sound). If we take the classic case of a 6/7 pipe *siku* troupe with one low voice *(sanka)*, four medium voices *(malta)*, and one high voice *(chuli),* respectively tuned in three different octaves, this adds up to a total of 78 pipes. If made with two parallel rows, this would be 156 tubes. A double row *siku* troupe of 11/12 tubes would require 236 pipes. Cutting so many tubes to the correct length is a very repetitive task that is greatly alleviated by using the *tuputisi* (see figure 6).

Figure 6. Esteban Quispe (at his street stall/workshop in Juan Granier Street, La Paz). Cutting panpipe tubes and flutes to length. Photograph: Gérard Borras.

Here the *tuputisi* shows its efficiency, since the artisan has at hand all the necessary measurements to cut all the tubes for the desired musical scale. First, he selects the canes according to their length and diameter; the long tubes (bass) must have a larger diameter than the higher/shorter ones, and the progression from low to high must be well graduated. Then he takes the *tuputisi* and places its tip on the outside of the reed, where it has a natural node. Experience permits him to estimate the bottom end of the tube's interior, since he knows very well that it is the internal dimension of the tube that determines the pitch of the sound. He

then places his knife in the appropriate notch of his *tuputisi*, corresponding to the tube length he requires, and marks a line on the outside of the tube, as a guide to then cut it. If he has any doubts, he inserts the *tuputisi* into the tube to make sure that the edge of the cut tube corresponds exactly to the dimension indicated by the notch of the *tuputisi*.

***Tuputisi*: a key a complex sound world**

When cutting panpipes with a *tuputisi*, makers often only measure the outside of the tube – in a relatively arbitrary way – thereby intentionally incorporating tuning discrepancies into their consorts (Hachmeyer 2020:228). These discrepancies result in beating or pulsations, which – as Arnaud Gérard has observed - is a characteristic and aesthetic preference for all panpipes played in consorts of the rural Andes (Stobart 2023:34-35). More carefully planned tuning discrepancies are also evident in certain kinds of flutes with fingerholes. In these cases, the *tuputisi* measuring sticks incorporate two sets of fingerhole notches, around 2-3mm apart, and makers cut half the flutes to one measurement and half to the other. According to artisan Eulogio Mamani, this carefully planned tuning discrepancy would give the whole troupe a "lemony flavour", highlighting a sense of aesthetic preference. By contrast, when troupes of panpipes or flutes lack these tuning discrepancies, they are sometimes referred to as *q'ayma*, a Quechua word meaning "tasteless" or "insipid" (Gérard 2009: 126).

Archives of *tuputisi* may also incorporate other kinds of aesthetic preferences. An economic mainstay for many artisans today is the production of panpipes tuned to a G major scale *(seguna taquiña),* which are popular in urban areas and commonly commissioned for use in schools. However, alongside the *tuputisi*'s main notches, used for cutting pipes to an A440 equal temperament G scale, are a series of small notches used "for cutting in tune or to the measure". These small notches permit craftsmen to deviate from the standardised scale and achieve a "flavour" that some customers prefer, albeit not sounding "quite right" to ears accustomed to equal temperament. Thus, *tuputisi* archives may be seen to memorialise and reflect a deep sensibility to sound, their measuring sticks serving as keys for constructing and revealing a whole aesthetic world.

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WORKS CITED AND FURTHER READING

Borras, Gérard. 2023. "Los tuputisi de los artesanos de Walata Grande (Bolivia): ¿un archivo con poder?". In Miguel A. García, *Los archivos de las (etno)musicologías. Reflexiones sobre sus usos, sentidos y condición virtual*. Berlin: Instituto Iberoamericano, Estudios indiana, 14. Pp. 215-236.

Gérard, Arnaud. 2009. "Sonidos "ondulantes" en silbatos dobles arqueológicos: ¿Una estética ancestral reiterativa?" In *Revista Española de Antropología Americana* 39/1, 125-144.

Hachmeyer, Sebastian 2020 *Musical Bamboos: Flute Making, Natural Resources, and Sustainability in the Bolivian Andes*. PhD thesis. Royal Holloway University of London.

Stobart, Henry. 2023. “Beyond Pulsating ‘Dissonance’: Reflections on Andean Sonorities.” In *Flower World: Music Archaeology of the Americas*, volume 7. Eds. Matthias Stöckli, Mark Howell, and Alexander Herrera Wassilowski. Berlin: Ekho Verlag. Pp. 19-50.

A *mbira* key from the Later Iron Age (1000-1700 CE) is excavated at the medieval city of Great Zimbabwe.

Source: *mbira* key from Great Zimbabwe site. Photo: Foreman Bandama

The *mbira* is a complex musical ideophone (or "lamellaphone") whose sound is produced by striking thin metal keys mounted in a quasi-symmetrical arrangement on a wooden soundboard, sometimes enclosed in an open gourd that functions as an amplifying resonator. The depicted flattened iron bar from the Later Iron Age (1000-1700 CE) was excavated from the Terrace Midden, situated at the Hill Complex at the Great Zimbabwe World Heritage site, about 200 miles south of Harare (Bandama et al. 2016, 5; Kumbani 2020, 236). During the period of the Mutapa dynasty, partly derived from a branch of the Zimbabwe culture (which flourished between 1300 and 1450), *mbira* music was prevalent in the Shona courts. Some early European explorers and missionaries documented the character of the *mbira* in strikingly complimentary terms. In 1586, for example, the Portuguese missionary Frei João dos Santos described *mbira* music with reference to the music of the harpsichord and emphasized its social status in the court of the Mutapa: "Quiteve [the then-ruler of the Mutapa] … makes use of another class of [Africans], great musicians and dancers, who have no other office than to sit in the first room of the king's palace, at the outer door, and round his dwelling, playing many different musical instruments, and singing to them a great variety of songs and discourses in praise of the king, in very high and sonorous voices …. [The Africans] play upon [the "*ambira*"] by striking the loose ends of the rods with their thumbnails … and they strike the keys as lightly as a good player strikes those of a harpsichord. Thus, the iron rods are shaken and the blows resounding after the fashion of a jew's harp, they produce an altogether sweet and gentle harmony of accordant sounds" (quoted in Theal, 1901, 203). Over a century later, a diagram misnomered "CXLIV Marimba de Cafri" appears in the Italian Jesuit scholar Filippo Bonanni's *Gabinetto Armonico dâ Instrumenti Sonori* (1716). The figure depicts a dancing man striking a symmetrical

lamellaphone with his thumbs (likely from the Sofala coast). The depicted instrument is a curious inversion of the formal arrangement of lamella of different lengths found on local lamellaphones (*mbira, kalimba, matepe*, etc.).

The tradition of the *mbira* in the Zimbabwe region likely precedes these written and iconographic depictions by several centuries. The Zimbabwe culture, for example, founded on a trade route between the Leopard's Kopje culture (at Mapungubwe) to the west the Sofala Coast to the east became prosperous during the fourteenth century. By increasing its grip on the gold trade (via taxation), the rulers of the Zimbabwe State were able to finance skilled builders for the purpose of cutting, dressing, transporting, and laying of stone for massive stone enclosures and conical towers. The lifestyle of the rulers became increasingly elaborate as conditions in the valley became urbanized. Rulers imported cloth, silks, embroidered material beads, and iron gongs from Sofala, while a proportion of gold *en route* to Sofala was forged into ornaments by local goldsmiths. Various abstract designs and objects, such as stone monoliths, soapstone birds, female figurines, phalli and the chevron patterns on the outer walls of the great building complex, indicate the considerable luxury and wealth of the city of Great Zimbabwe. From the late 13th century, the rulers of Great

Zimbabwe were able to employ teams of builders, a military brigade, and an ensemble of full-time musicians for ceremonial purposes. Iron ore nodules and flattened iron ore bars have been excavated at the Great Zimbabwe, indicating the use of iron for various utilitarian purposes including musical instrument building.

Although the word "*mbira*" has been distorted over time to refer to lamellaphones in general, lamellaphones come in a great variety of historical forms and technical designs, ranging from the *timbrh* raffia lamellaphone from Cameroon to the 36-key *nsansi* lamellaphone from Mozambique. The instruments can be distinguished by organology, tuning systems, performance techniques, and archaeological findings. For example, radio-carbon analysis of Joseph O. Vogel's excavations of iron strips at Kumadzulo in Zambia date these back to between 500 and 700 CE, while those excavated by Brian M. Fagan at Kalomo and Kalundu date back to between 1000 and 1100 CE (Kumbani, 2020, 236). The archeological remnants are explained by the fact that highly developed metallurgy centers emerged in the greater Zambezi River Valley (including Zimbabwe, Zambia and Mozambique) during the Later Iron Age. Gerhard Kubik has suggested that lamellaphone technology likely dispersed toward the southeast from west and central Africa (where lamellaphones were historically built by organic materials) beginning about 2500 years ago (Kubik and Cooke 2001, 7). Today, the comparatively outsize archive for the *mbira dza vadzimu* (a metal lamellaphone variant of the Zezuru people) is likely explained by the urbanization in the 1890s of the then-colonial capital of Zimbabwe (Salisbury before 1979; Harare thereafter). Mistakenly referred to as a "thumb piano" by European settlers, the interface design of this *mbira* actually reverses the psychology of asymmetry found on the *pianoforte* in two senses. First, the instrument is designed around a more symmetrical seven-tone tuning template that places 'low'/'large' notes in the middle of the wood panel, with higher notes fanning outward toward its perimeters. Second, to the extent that these keyboard panels differ, it is the left-hand side of the template that deploys a double panel of keys played exclusively by the left-hand thumb; the right-hand thumb plays on a single panel.

Most strikingly perhaps, the performance practice of this instrument poses several fascinating challenges to common European theories of time and tone in music. In contrast to the common conception of meter and rhythm (consolidated in the European Enlightenment period), for example, in *mbira* music "melo-rhythmic" entities that are heard in the music, but not actually played (or "inherent patterns"), often remain stable, while metric schemes are meticulously rotated (1974, Omojola 2022, Kubik 1962). Meter emerges as an algorithmic transformation of a rhythmic

interaction between two interlocking performance parts—*kushaura* and *kutsinhira.* This division of labor elicits metric groupings set adrift of the embodied movements of individual performers, frequently recouping rhythmic similitude in the context of metric transformation (Scherzinger 2010). Additionally, the tonal movements of *mbira* music suggest a recursive system that resembles the iterative scaling of fractal geometry. Although it is but one branch of African mathematics, fractal geometry is a fundamental aspect of traditional African design ranging from board games, hairstyling patterns, textiles, sculpture, metalwork, symbolic systems, religious practices, quantitative methods, and of course harmonic systems (Eglash 1999, Bangura 2012). A consistent feature of iconic 19th-century *mbira* and *matepe* tunes, such as "Nhemamusasa" and "Aroyiwa Mwana," for example, is the use of recursive harmonic shapes—characteristic harmonic subsets within signature progressions—that constitute and resemble larger shapes found elsewhere in the cycles. The resemblance frequently involves identity across an imaginary mirror axis, projected either horizontally or vertically. As a result, harmonic shapes recur in augmented inversion or retrograde forms at various points within their respective cycles. (Scherzinger 2001, 2013). These iterative scaling techniques ground a non-linear system of harmonic permutations within a bounded pitch space.

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WORKS CITED

Bandama, Foreman, et al. «The Production, Distribution and Consumption of Metals and Alloys at the Great Zimbabwe,» *Archeometry*, 2016, 1-18.

Bangura, Abdul Karim. *African Mathematics: From Bones to Computers*, Lanham: UP of America, 2012.

Bonanni, Filippo. *Gabinetto Armonico dâ Instrumenti Sonori* (1716).

Eglash, Ron. *African Fractals: Modern Computing and Indigenous Design*, New Brunswick: Rutgers University Press, 1999.

Nzewi, Meki. "Melo-Rhythmic Essence and Hot Rhythm in Nigerian Folk Music." *The Black Perspective in Music*, vol. 2, no. 1, 1974, 23–28.

Omojola, Bode." Composing and Contemplating African Melo-rhythmic Polyphony," *Ghana Studies Journal,* Special Issue on *The African Imagination in Music* (edited by Kwasi Ampene), Vol. 24, 2022.

Kubik, Gerhard. "The Phenomenon of Inherent Rhythms in East and Central African Instrumental Music," *African Music* 3/1, 1962, 33–42.

Kubik, Gerhard, and Cooke, Peter. "Lamellaphone," *Grove Music Online*, 2001.

Kumbani, Joshua. "Music and sound-related archaeological artefacts from southern Africa from the last 10,000 years," *Azania: Archaeological Research in Africa*, 55:2, 2020, 217-241.

Scherzinger, Martin. “Negotiating the music-theory/African-music nexus: a political critique of ethnomusicological anti-formalism and a strategic analysis of the harmonic patterning of the Shona Mbira song Nyamaropa.” *Perspectives of New Music* (2001): 5-117.

Theal, George McCall, *Records of South-Eastern Africa. Cape Town, South Africa.* Printed for the Government of the Cape Colony, 1901.

FURTHER READING

Bangura, Abdul Karim. *African Mathematics: From Bones to Computers*, Lanham: UP of America, 2012.

Kubik, Gerhard. *Theory of African Music,* Vols. 1 & 2, Chicago, Chicago University Press, 2010.

Kubik, Gerhard, and Cooke, Peter. “Lamellaphone,” *Grove Music Online*, 2001.

Kumbani, Joshua. “Music and sound-related archaeological artefacts from southern Africa from the last 10,000 years,” *Azania: Archaeological Research in Africa*, 55:2, 2020, 217-241.

Matiure, Perminus, “Mbira in Urban Spaces,” in *Performing Zimbabwe: A Transdisciplinary Study of Zimbabwean Music* (Eds. Luis GAmoros and Maurice T Vambe). Durban: Kwazulu-Natal Press, 2018

Nketia, J. K. H. “The Hocket-Technique in African Music.” *Journal of the International Folk Music Council* 14, 1962, 44–52.

Tracey, Andrew. “The System of Mbira,” *Papers Presented at the Seventh Symposium on Ethnomusicology*, University of Venda, 3-5 September, 1988. International Library of African Music, Grahamstown, 82–104.

Music-theoretical Implications of the Mbira Nyunganyunga

Source: Modern Mbira Nyunganyunga, photo and diagram by Luka Mucavele (Mucavele 2022, 235).

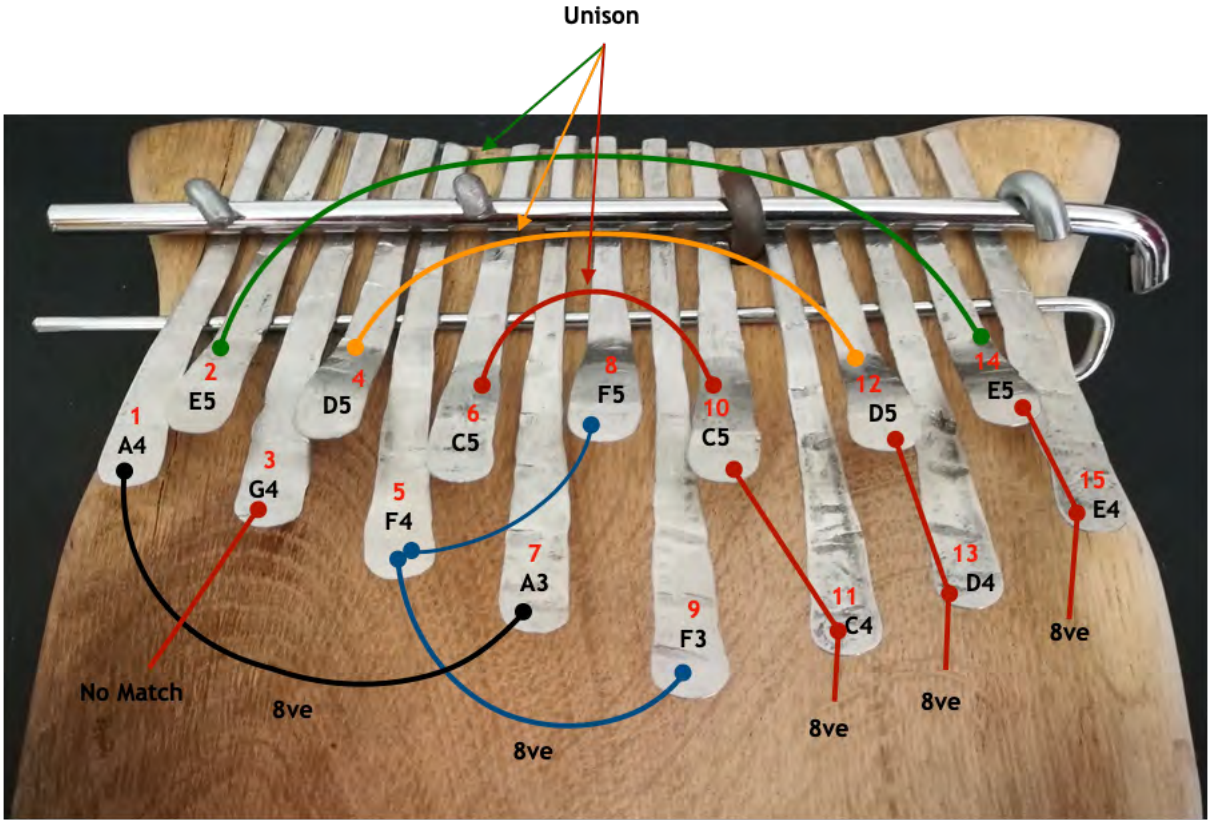


Figure 1: Unisons and octaves on the Mbira Nyunganyunga

Dating back at least 3000 years, the musical practices associated with the Mbira have been deeply interwoven with southern African history, cosmology, and culture. Its religious importance is demonstrated by the sacred status accorded to the music, acting as a communicative link to our ancestors. In the vaShona tradition, for instance, the name of a related instrument, the 22-25 key Mbira Dzavadzimu—mbira of the ancestral spirits—makes this link explicit. The keyboard layout also symbolizes familial and kinship relations. For example, the functions of its different keys (lamella), as well as their resultant sounds, are compared to the roles of family members. In this way, its lowest sounds are often described as the voices of old men; its medium register as those of adolescent boys; and high-pitched sounds as the voices of women and children.

Mbira Dzavadzimu, in Shona means “Mbira of the ancestral spirits”

Today there are at least five main instruments in the Mbira family within the modern Mozambique/Zimbabwe/Zambia region alone: Mbira Dzavadzimu, with 22 or 28 keys, Nyunganyunga with 15 keys, Njari, with 30 or 32 keys, Nhare, with 23 or 24 keys, and Matepe, which has 26 keys. Ergonomics play an important role in the key arrangement and playing technique, which in turn, facilitate and guide the performance of particular musical styles associated with each instrument. In the case of the Nyunganyunga, for example (See Figure 1), sliding one’s right-hand fingers down from keys 10,

Mbira Nyunganyunga: This 15-key instrument was given this name by the Mozambican master musician Jeke (or Jege) Tapera in the 1960s in honor of his teachers, who were Nyungwe, an ethnic group from the present-

12, and 14, to keys 11, 13, and 15 respectively (on the right-side key panel), is easily effected, producing smooth octave leaps between proximate keys. [Note: these octaves are not strictly twice the frequency, but nonetheless act as structural unities]. On the other hand, sliding the fingers from keys 2, 4, and 6 to keys 1, 3, and 5 respectively (on the left-side panel) produces smooth downward leaps of a fifth. In performance, the two hands are largely interlocking their parts, thereby weaving their respective pitch sets to create melodic lines. The instrument's interface design thereby enjoins a particular harmonic structure—the assumption of inexact octave equivalence, the framing of harmonic blocs in fifths, and melodic-harmonic motion grounded in thirds and fifths.

There are a number of culture-specific concepts of music theory associated with Mbira Nyunganyunga, such as the terms kukekela, kundhondhoza, and kumbvarambvandza. In the music theory of the xiChangani (Shangani/Tsonga people, an ethnic group from Southern Mozambique, South-East Zimbabwe and North-East South Africa), for instance, the term kukekela designates or instructs the musician to play in the instrument's highest register, while the term kundhondhoza refers to playing in a lower register. The term kumbvarambvandza refers to the buzzing sound typically generated by snail or sea shells or bottle tops mounted on a metal plate (or of the metal beads strung on a wire) immediately following the strike.

In the context of the vaShona Mbira dza Vadzimu, the terms kushaura and kutsinhira refer to the two separate instrumental parts (or roles). The first part, kushaura (meaning to lead or start), interlocks with the second part, kutsinira (meaning to follow or intertwine with), producing figures of intricacy and variety that exceed the movements of the fingers alone. If the instrument is played in a gourd resonator or calabash (gutsa, deze or dende) the sound is amplified and extended in time, while the added vibrators lining the outer edge of the gourd effect another layer of buzzing. The buzzing, variously activated by the different keys (sometimes vibrating in sympathy and sometimes not), is heard together with (or just after) the striking that elicits it. The snare-like smudge produced by buzzing objects (shells, spider webs, etc.) is a desirable aesthetic attribute in many southern African musical practices, including various bow traditions (from the vaShona chipendani to the isiXhosa uhadi) and xylophone traditions (from the Lugandan amadinda to the vaCopi timbila).

These concepts cover considerable conceptual terrain—from pitch space to instrumental roles, by way of percussive aesthetics—and are central to kalimba/mbira musical praxis. They are applicable to both vocal and instrumental performances, where they specifically express the musical rules, preferences and aesthetics of the Shangani and Shona respectively.

day Tete province of Mozambique, where Tapera learned to play it. According to several ethnographic accounts, the name "karimba," or "kalimba" was one of the original names of these traditional lamellaphones.

Nhare, according to oral histories, is an old Shona term for iron, which refers here to the use of metal for the keys.

Kutwananisa: a Tsonga term meaning to make things hear/understand/like each other – "to harmonize"

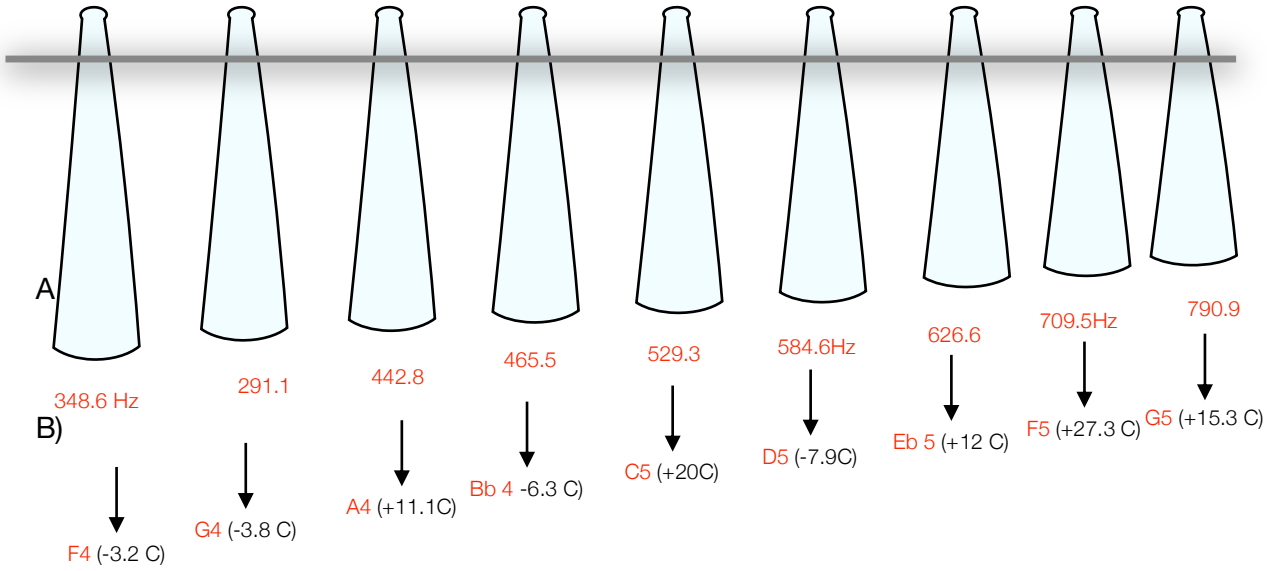
Zvoyimbayimba: a Cicewa term, meaning "things that sing-sing"

Likewise, the Tsonga (Shangani) term kutwananisa describes the process of tuning a musical instrument, in terms of things that "hear each other". In the context of the mbira/kalimba this entails attentiveness to the overtone distribution and other spectral characteristics, the co-resonance of keys, adjustments for range, and, above all, to the process of tuning keys in relation to the voice of the singers. Music in many African cultures prioritizes the voice, with instruments used in a complementary and supportive role. Evidence for this conceptual hierarchy can be seen in the way various instruments are used, and even named, when substituting for a voice. Examples are the Xizambi, a mouth bow of the Shangani; the donno, popularly known as the talking drum of West Africa; and finally, the designation Zvoyimbayimba for musical instruments in the Cicewa language of modern-day Malawi.

When the concept kutwananisa is replaced by the term tuning, the idea of harmonizing the instrument to the voice, and "making the instruments hear each other" is lost. Likewise, when African choir directors adopt the Western modes of vocal distribution, replacing kukekela with "soprano," for example, or kundhondhoza with "bass," and so on, the precise vocal styles characteristic of local musical cultures that are prescribed and embedded in musical concepts are at risk of being erased and forgotten.

The tuning of the Mbira has various possible schemes and tonal systems. Some of these tuning systems are given a general formal designation (such as gandanga, nyamaropa or dambatsoko tunings); others are unique to individual performers (such as nemakonde) credited to the late Sekuru Gora; while still others seem to be linguistically unmarked. Figure 2 shows the vibration frequencies of the right-side keys of my Mbira DzaVadzimu, which is tuned in the Nyamaropa tuning, one of the common tunings for this mbira type. . Most immediately noticeable perhaps is the interval from the seventh key to the eighth in the higher/right-side key layer of Mbira Dzavadzimu, which is usually larger than a Western semitone and smaller than a tone.

Figure 2: The Nyamaropa tuning of nine high-register pitches of a Mbira Dzavadzimu, detailed in cents. In row A), below each key the respective vibration frequency is indicated in Herz, and in row B), the pitches are indicated with letter names. The degree of discrepancy from equal temperament is expressed in cents in brackets. Note the extreme discrepancy between the first note (F4, -3.2 cents) and the eighth note, approximately F5 (+27.3 cents). The Mbira does not necessarily repeat the same pitches at the octave, as the spectral characteristics of its timbre play an important role in the tuning.



To end with a personal reflection: As a Mbira researcher, builder, and performer, I have often experimented with tuning the instrument to equal temperament using a chromatic tuner. While the keys individually may have sounded "in tune," the resultant sonority of the whole instrument was unappealing. Many characteristic features of its sound were now lost: the Mbira lacked its identity and/or personality, and I missed the pleasure of it. Most of all, the general sonic texture, and the inherent patterns produced by the interaction of parts, which master Nyunganyunga player Dumisani Maraire (1944-1999) described as "present but not obvious sounds" (Maraire 1984) sounded distorted. In equal temperament, we no longer hear the chorus effect produced by the slightly detuned octaves, the mystical atmosphere and elusive aural effect produced by the rich array of overtones that are the hallmarks of Mbira music.

Luka Mucavele

Further Reading:

Berliner, Paul. *The Soul of Mbira: Music and Traditions of the Shona People of Zimbabwe. Chicago:* University of Chicago Press, 1993.

Jones, Claire. 2008. "Shona women Mbira players: Gender, tradition and nation in Zimbabwe." In Ethnomusicology Forum, vol. 17, no. 1: 125-149.

Maraire, Dumisani. 1984. "Mbira and its Function," *Insight* 84:1, National Gallery of Zimbabwe, Harare.

Mucavele, Luka. 2022. African Musical Instruments from a Contemporary Global Perspective: Mbira and Xizambi. *PhD Dissertation*, University of Jena.

Matiure, Perminus. "Mbira Dzavadzimu and its Space within the Shona Cosmology: Tracing Mbira from Bira to the Spiritual World." Muziki 8, no. 2 (2011): 29-49

Tracey, Andrew. 196r1. "Mbira Music of Jege A. Tapera." *African Music: Journal of the International Library of African Music* 2, no. 4: 44-63.

———. 1970. "The Matepe Mbira Music of Rhodesia." *African Music: Journal of the International Library of African Music* 4, no. 4: 37-61.

———. 1972. “The Original African Mbira?.” African Music 5, no. 2: 85-104.
Scherzinger, Martin. 2001.“Negotiating the Music-Theory/African-Music Nexus: A Political Critique of Ethnomusicological Anti-Formalism and a Strategic Analysis of the Harmonic Patterning of the Shona Mbira Song Nyamaropa.” *Perspectives of New Music*: 5-117.

1584: How Zhu Zaiyu had his Epiphany over Twelve-Tone Equal Temperament

Zhu Xi once said the following [in his ***Theory of the Tuning of the Qin***] :

> "The ***qin*** has fret marks designating the finger positions for playing the various notes of the scale. Each mark is matched with a ***lü*** proper to that position, and one plays a note by pressing down on the string at the position aligned with its appropriate fret mark. As for how the fret marks should be placed, their positions should be proportional to the harmonic numbers of their respective notes and to the lengths of their respective pitch pipes: that is, their positions should be determined by the up-above and down-below mutual generations of '**triple divisions with one part subtracted or added**' [2:3 or 4:3] as discussed earlier. Yet people today do not know this at all. Instead, when placing fret marks, they only follow this rule called, 'four-fold the string and split it in between' [1:4, 2:4 (=1:2), or 3:4]. This must be some little trick invented by the lowly and the unrefined. Granted, in terms of matching the fret marks with the notes and the *lü*, this trick seems simple and easy. But in terms of complying with the natural principles and patterns, I am not sure of the origin [or rationale] of such a method. It therefore inevitably suffers from imperfections."

I used to follow Zhu Xi's opinion, computing the fret mark positions of the *qin* according to the ancient "triple divisions with one part subtracted or added" method. Yet I began to doubt his argument after discovering that the fret mark positions thus produced do not accord with the actual sounds produced by the *qin* [in its normal playing]. Day and night, I pondered and pried, in order to exhaustively fathom the principle behind this. One day, a flash of understanding struck, and I began to understand that the four different ancient methods of computing the *lü* [the lengths of the pitch pipes] according to Sima Qian [145–86 BCE], Jing Fang [78–37 BCE], ***Writings of the Prince of Huainan*** [139 BCE], and ***Book of the Later Han*** [440s CE] were all but approximations of the true sounds. This is something that, for two millennia, scholars writing about tuning have failed to understand. The only exceptions have been the artisans who make *qin*. In placing the fret marks, they follow a method of "four-fold the string and get rid of one part" [3:4] in addition to "three-fold the string and get rid of one part" [2:3]. These have been transmitted by word of mouth among the vulgar craftsmen, who do not know where it

***Theory of the Tuning of the Qing* (12th cent.)**, by Zhu Xi (1130–1222), the key formulator of "Learning of Principles" (*lixue*), the orthodox and later state-endorsed interpretation of Confucianism between the fourteenth and nineteenth centuries

Qin, a seven-string zither, the paradigmatic instrument of the literatus and scholar-official

Lü, pitch pipe and/or pitch class

Triple divisions with one part subtracted or added: the conventional tuning ratios, 2:3 and 4:3, which, when applying to the lengths of strings or (problematically) pipes, roughly translate to ascending by a perfect fifth and descending by a perfect fourth, respectively.

Writings of the Prince of Huainan, by Liu An (179–122 BCE)

Book of the Later Han, by Fan Ye (396–446), though its "Treatise on Pitch Pipes and Calendar" referenced

originated. I suspect it must have been the ancients who left behind such a method, only that it had never been recorded in writing. Confucius said [reported in the ***Book of the Han*** (82 CE)], "when the perfect rites have been lost, go find them in the countryside!" This is to say, we cannot take anyone lightly just because they are lowly and unrefined.

here was by Sima Biao (c. 238–306)

Book of the Han, by Ban Gu (32–92)

[... a quote from the ***Spring and Autumn Annals*** (241 BCE) on the importance of tuning]

Spring and Autumn Annals, by Lü Buwei (291–235)

To wit, musical tones are what originate from numbers. If the numbers are accurate, no tone will fail to be accordant. Any tone being discordant is because the numbers are not perfectly accurate. To attain the principle of numbers and tones, one must be flexible and adaptable, not fixate on any one idea. I therefore jettison "triple divisions with one part subtracted or added" and propose a New Method instead. First, I posit the length of one ***chi***. Then, I calculate a **Precise Proportion** [the twelfth root of two] and use it to divide one *chi* twelve times to compute the accurate numbers [lengths] of all the twelve *lü*. This method, compared to the four different ancient methods, is particularly straightforward and efficient. And these precise and accurate numbers when cross-checked with the sounds of the *qin* are the most accordant there have ever been. May this method be savored in detail by Confucian scholars erudite in learning and well-versed in rites and by gentlemen experienced in music and skilled at calculation: some of them will surely get something out of it. But it is certainly nothing to be appreciated by the mediocre or the tawdry!

Chi, a unit of length roughly the magnitude of a foot

Precise Proportion, 1.059463094, which is effectively the twelfth root of two

SOURCE: Zhu Zaiyu, *A New Theory in the Study of Tuning* (1584) [律學新說]. Translated by Lester Hu.

COMMENTARY:

For many later Western music theorists such as Hermann von Helmholtz and historians of science such as Joseph Needham, Zhu Zaiyu's formulation of twelve-tone equal temperament, apparently the world's first, was groundbreaking, not least for having preceded the efforts of European writers like Vincenzo Galilei, Marin Mersenne, and Simon Stevin. In this chapter debuting his discovery, Zhu appeared cognizant and proud of his iconoclasm: he termed his temperament the "New Method" and "Precise Proportion" while dubbing the conventional "triple divisions" as the "Old Method" and "Rough Proportion." Still, instead of renouncing the past—a sentiment not rare during the late Ming with the rise of radical subjectivist philosophies—, Zhu attributed the inspiration for his original twelve-tone equal temperament to the ancients, specifically through two sources. First, a historiographic source: instead of dismissing the "triple divisions" in the old sources as wrong, Zhu argues one must read them as approximations, thus reconciling his New Method with the ancient texts. Second, an

ethnographic source: while arguing for caution in reading authoritative texts, Zhu whole-heartedly embraced the "lowly and unrefined," here specifically the artisans making zithers, as a proper source of music-theoretical knowledge—knowledge not textually but orally transmitted. In fact, his entire inspiration regarding twelve-tone equal temperament came from realizing that, after all, the artisans have always been placing the fret marks based not on "triple divisions" alone but also on quadruple divisions.

This latter fact presents somewhat of a puzzle, which we leave for the reader: how did Zhu Zaiyu go from point A to point B? How did the realization that quadruple divisions had always been used got him to think of computing the twelfth root of two—a major mathematical undertaking—and using that to reinvent Classical Chinese tuning? One answer may lie in how Pythagorean tuning, quadruple divisions produce perfect fourths. But do "fourths" properly exist in admittedly Pythagorean-esque "triple divisions with one part subtracted or added"? And how would the introduction of "pure fourths" do to a system that only normally has augmented thirds?

Gus Holley and Lester Zhuqing Hu

FURTHER READING:

Kuttner, Fritz A. "Prince Chu Tsai-Yü's life and work: a re-evaluation of his contribution to equal temperament theory." *Ethnomusicology* (1975): 163-206.

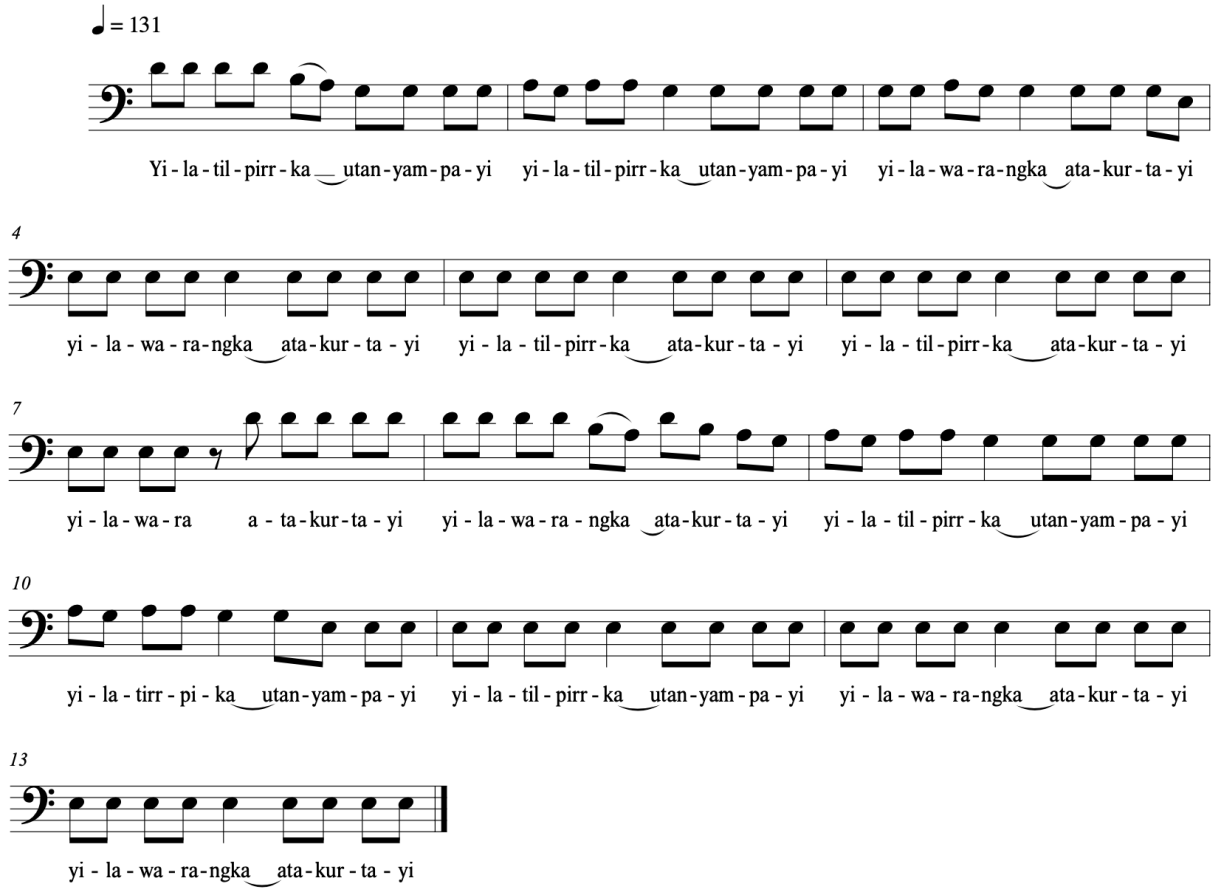
Rehding, Alexander. "Fine-tuning a Global History of Music Theory: Divergences, Zhu Zaiyu, and Music-Theoretical Instruments." *Music Theory Spectrum* 44.2(2022): 260-275.

Tonietti, Tito M. "The mathematics of music during the 16th century: The cases of Francesco Maurolico, Simon Stevin, Cheng Dawei, and Zhu Zaiyu." *Ziran kexueshi yanjiu* [*Studies in the History of Natural Sciences]* 22 (2003): 223-244.

Woo, Shingkwan. "The Ceremonial Music of Zhu Zaiyu." Ph.D. dissertation, Rutgers University, 2017.

Xu, Fei. "Zhu Zaiyu and the Equal Temperament 12." In *The High Tide of Science and Technology Development in China,* p. 427. New York: Springer, 2021.

1975: An Alyawarra choral song performance reveals implicit formal awareness



Example 1: A public initiation song, recorded in 1975 at Arurrunga camp, Northern Territory. Performed by local residents; transcribed by Richard M. Moyle. No translation available. Recorded 10.11.75. Archived by the author in the Australian Institute of Aboriginal and Torres Strait Islanders Studies, ref. Richard Moyle collection tape 5655.

COMMENTARY:

The vastness of the Central Australian desert is the traditional land of Indigenous Australians comprising three major language groups: Arrernte, Western Desert and Warlpiri. These groups share a singing style that differentiates them from the rest of the continent. All songs are sung by groups, are short—typically around 35 seconds—and are not sung singly but in a series whose sequence is fixed, to the extent that, in the event of no singer remembering the next song in the series, the performance cannot "skip" to a later song. Indeed, difficulty in remembering the "next" song may result in a vamp of multiple repetitions of a song until leaders succeed in recalling the correct "next" one. Some series run to more than 300 songs, demonstrating remarkable feats of memory by song leaders. Men and women segregate for private or secret series, sometimes deep in the desert, but combine in camp for social singing. Children are said to be "ignorant" of group singing and are present only at social events.

Most series narrate events in the distant past whose indigenous name uses the local word for "dream"—translated variously as Dreamtime, Dreaming, The Dream—when the world was populated by mythological beings, some in human form, who roamed over the land, creating what are now features of the natural landscape: mountains, rock formations, and particularly water sources. The sequence of songs in each series celebrates those ancestral routes by retracing them

using such features as waypoints. Through performance, participants hold that they can contact the supernatural world to beneficially influence the natural world: maintaining sufficient food sources, gaining an appropriate marriage partner, healing wounds and generating sexual attraction.

All singing is in unison, and any inadvertent departures by individual singers may be immediately criticized. However, although some errors are inevitable in any performance, discussion of errors and their outcomes is rarely mentioned in published studies. For Central Desert dwellers, the ability of each participant to maintain error-free vocal unison over several hours is aided by procedural rules normally unspoken but voiced as criticism when unison is absent: two such rules are the subject of this entry.

Typically, each song consists of a short series of individual words — e.g. a mix of verbs and nouns — rather than grammatically correct constructs. We can see this in the following song of the Pintupi people of the Western Australian Desert:

Pintupi	*nyakula*	*wantjarnu*	*waringka*	*tulkutjurnu*	*puntunya*	*tjananya*
Literal Translation	saw	spoke	sky	turned	men-they	they two
Meaning	"The two men saw [an eaglehawk] circling in the sky; it spoke to them"					

Example 2: Moyle, Pintupi Fieldnotes, 1976, 1979.

Most series have their own unique melody whose contour is divided into segments sung consecutively to the same syllabic rhythm regardless of pitch changes; in other words, isorhythm is the melodic organizer. This is the first procedural rule. In Example 2, the isorhythm (i.e. the syllabic rhythm) in each measure is:

Indeed, the link between sung word and rhythm is so strong that most singers try to recall the words of a half-forgotten song by mouthing syllables to one rhythm after another until the lyrics come. Some series maintain a single isorhythm throughout whereas other series vary between two or more. Once the words and isorhythm for any individual song are known, competent singers are able to maintain unison.

At a Central Desert ritual I attended in the 1970s, a man known to be a poor singer kept departing from the required unison, to the point where another singer called out, "No, stop: you're singing beyond" (W*iya wanti, munkara yinkin*). "Beyond" what? Analysis of transcriptions of more than a thousand songs (both men's and women's) confirmed the answer: the singer was prematurely moving ahead to pitches properly associated with the next isorhythmic cluster (i.e. "beyond") before all the words in the present cluster had been sung, in violation of the first rule. In the notation above (which shows what the other men were singing), the errant singer moved to the higher pitch shown in measure 7 while singing the words of measure 6. By this means, and although such organizational units (i.e., isorhythm) are not named, the concept of song structure was articulated without the need for specialized terminology.

But how can a singer have a repertoire of as many as 10,000 songs in an adult lifetime? By the application of the first procedural rule, which is, by definition, a shared pathway that asks only that you follow. Indigenous Australian singing is a confluence of pitches and syllables held in place by a framework of isorhythm. Of these three elements, only the syllables need be committed to memory, and even that task is eased by a singer's assumed knowledge of the myth those songs encapsulate and celebrate.

The second procedural rule relates to the moment in the melody where all singers take a breath and restart higher (measure 7) as at the start of the song. The unspoken rule here is: keep singing on the lower level pitch until the breath is exhausted, and only then breathe and recommence singing. (The errant singer in this example also broke this rule.) Varying lung capacity among singers means all must wait until the last person singing takes a breath, which occasionally happens, although most respectfully imitate the senior singers and breathe together. Widespread sampling of recorded songs confirms that such operational procedures are found throughout the Central Desert region as a whole.

Richard M. Moyle

WORKS CITED:

Moyle, Richard M. 1974, 1979. "Pintupi Fieldnotes." From *Field Work 1974-1982*. Canberra, Australian Institute of Aboriginal and Torres Strait Islander Studies Library, MS 5183.

FUTHER READING:

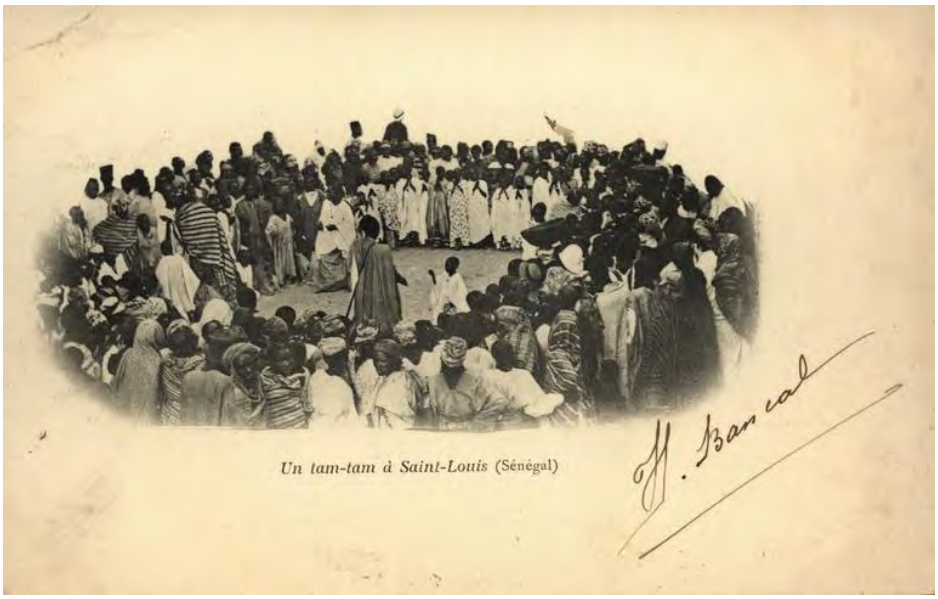
Moyle, Richard M. 1979. *Songs of the Pintupi: Musical Life in a Central Australian Society.* Canberra, Australian Institute of Aboriginal Studies.

——. with the help of Slippery Morton,1986. *Alyawarra Music: Songs and Society in a Central Australian community.* Canberra, Australian Institute of Aboriginal Studies.

——. 1997. *Balgo: The Musical Life of a Desert Community.* Nedlands, W. A., Callaway International Resource Centre for Music Education, School of Music, University of Western Australia.

Koch, Grace and Turpin, Myfany, 2008. "The language of Central Australian Aboriginal songs" in Morphology and Language History: in Honour of Harold Koch. *Current Issues in Linguistic Theory,* 298:167-183.

West-African Dance Circles and Choreo-Music Analysis



Source: Figure 1. Music-dance circle in Saint Louis, Senegal, from the first decade of the 20th century. Image #1998 from CD-Rom Atlas du Patrimoine n°4, West African Postcards (1895–1930). Produced by Philippe David, Images&Memoire, Paris; edited/distributed by ICG Mémoire directe, Paris, in the name of UNESCO.

Figure 2. Djembe drummers, rattle players, and hand-clapping spectators cheering on two dancers in a music-dance circle performance. Saguele, southern Mali. Photo: Rainer Polak (2019).

COMMENTARY

In a vastly diverse variety of historical and contemporary traditions of music and dance performance, including staged, ritual and vernacular genres from all continents, the two expressive modes are integrated to the degree that they appear as coherent choreomusical entities of "music-dance." Musicologists and anthropologists have described the "dance circle" or "dancing ring" as a performance context for such music-dance genres in various parts of West Africa, including Ghana, Senegal, Gambia, and Mali. Sporadic descriptions of such music-dance circles appear in European travel literature of the eighteenth and nineteenth centuries, suggesting that contemporary practices in West Africa represent living traditions of considerable historical depth.

The image in Figure 1 shows a music-dance circle in what today is Senegal from around 1900. The photograph in Figure 2 was made in the context of ethnographic fieldwork in Saguele, a village of family-based small-holder peasants located seventy-five kilometers southwest of Bamako. They identify as Maninka, a Mande-speaking group in southern Mali and in neighboring northern Guinea that are regarded as the descendants of the Malian Empire (ca. 1400–1700 C.E.). The pictures show a djembe music-dance performance as is typically held in Maninkaland on social and ritual occasions such as weddings. The participants form a circle whose orientation and line of sight define the open ground in its center as a performance space: an arena for dance performance in an amphitheater built from musicking and spectating human bodies. Whereas the circle is accessible for anybody to enter from the outside, it bounds and closes off the dance floor at the center from the outside. The specialized musicians—singers and drummers—do not themselves perform in the center; instead, they compose part of the circle alongside the non-specialized participants who contribute with hand-clapping, rattle-playing, and as spectators. All present in the circle are invited to step into the ring as dancers, meaning that they take the leading role, despite being non-specialists performers, and temporarily become the focus of public attention, as coordinated through floor-taking and turn-taking mechanisms. There is no separate audience in the strict sense. Nonetheless, the music-dance interaction is a performance viewed for its aesthetic values and depends on social recognition and validation through audiencing behaviors. Without a separate audience, these audiencing behaviors occur embedded in performance behaviors, such as the hand-clapping, rattle-playing, or djembe drumming. Not least, the solo dancers usually address their performances to the lead drummer; the latter's role is to musically follow and elaborate, or "mark" the dancers' moves, as is the expression in the local Mande language (Maninkakan). The lead drummer thus puts a sonic spotlight on the dancers and helps to aesthetically carve out the dance performance and socially validate it.

Together, the singing and instrument playing performed from the circle and the dancing at the center form a coherent whole: an instance of music-dance performance. The single modes (song, percussion, dance) are virtually never performed in isolation from each other. The situation of different modes of expression that are distinct but at the same time closely connected to each other is also reflected at the linguistic level. For instance, Mande languages from southern Mali distinguish between dance (*dòn*), percussion music for dance (*fòli*), and song (*dònkili*); the latter term for song is a compound word that translates literally as "call to dance." At the same time, the usage of the term "*jenbe*" (djembe) speaks of a close integration of the expressive modalities. In Mali this term's denotation is not limited to the djembe drum and the genre of djembe-centered drum ensemble music, as it is in the Global North. Rather, it also refers to the corresponding forms of dance and song; it is thus common to speak not only of "djembe music" but also of "djembe dance" and "djembe song." Similarly, the term "*sabar*" in the Wolof language from Senegal denotes a drum instrument and related drumming genre, a corresponding dance genre, and a type of public celebration that is the performance context for sabar music-dance, all at the same time.

In summary, ethnographic studies of contemporary performance practices allow researchers to elicit the implicit theoretical concept of the participatory music-dance circle typical of expressive culture in West Africa. Historical reports by colonial-era observers and the presence of music-dance

circles across cultural groups and sub-regions within West Africa suggest that these practices extend back to the region's past. The implicit concept is consistent with the understanding of musical practices as forms of embodied and situated interaction and communication, and thus has implications for music theory, with regard to what music is, or can be, and how it should be analyzed. In contrast to conceptions of music as the activity and product of specialists presenting their work to informed listeners whose reception and responses are separate from the music "itself," the West-African music-dance circle involves audiencing behaviours, such as the hand-clapping in Figure 2, that are part and parcel of the music. Furthermore, the concept of music-dance, which is broader than "music" alone, posits that the two expressive modes together form a single coherent expressive interaction system whose analysis necessitates a consideration of both on an equal footing. This demand has been proclaimed in African studies for decades, and the recent surge in choreo-music analysis has produced sufficiently varied case studies from around the world to indicate that music-dance is characteristic of humanity at large.

Rainer Polak

FURTHER READING

Abiola, Ofosuwa M. 2019. *History Dances: Chronicling the History of Traditional Mandinka Dance*. Milton: Routledge.

Alexander, James E. 1840. *Excursions in Western Africa: And Narrative of a Campaign in Kaffir-land, on the Staff of the Commander-in-Chief*. London: Henry Colburn.

Atkins, John. 1742. *Voyage to Guinea, Brasil, and the West Indies*. London: Caesar Ward and Richard Chandler.

Cross, Ian. 2014. "Music and Communication in Music Psychology." *Psychology of Music* 42 (6): 809–19.

Haugen, Mari R. 2021. "Investigating Music-Dance Relationships." Journal of Music Theory 65 (1): 17–38.

Kubik, Gerhard. 1994. "Introduction." In *Theory of African Music: Volume I*, edited by Gerhard Kubik, 9–46. Wilhelmshaven: Florian Noetzel.

Neveu Kringelbach, Hélène. 2013. *Dance Circles: Movement, Morality and Self-Fashioning in Urban Senegal*. New York: Berghahn Books.

Nketia, Joseph H. Kwabena. 1963. *Drumming in Akan Communities of Ghana*. London: Thomas Nelson.

Polak, Rainer. Forthcoming. "Performance in the round: Embedded audiency at music/dance events in Mali." *Journal of the Royal Musical Association*, in press.

Seye, Elina. 2014. *Performing a Tradition in Music and Dance: Embodiment and Interaction in Sabar Dance Events*. Helsinki: Global Music Centre.

Small, Christopher. 1999. "Musicking - The Meanings of Performing and Listening: A Lecture." *Music Education Research* 1 (1): 9-22.

Stepputat, Kendra, and Elina Seye. 2020. "Introduction: Choreomusical Perspectives." *The World of Music* 9 (1): 7–24.

Veroli, Patrizia, and Gianfranco Vinay, eds. 2018. *Music-Dance: Sound and Motion in Contemporary Discourse.* London, New York: Routledge.

Mid 5th century BCE: Marquis Yi of Zeng inscribes a set of bells.
Source: Inscribed sets of 65 bells and 41 chime stones unearthed in 1978 at Suizhou in Hubei province, now in the Hubei Provincial Museum in Wuhan.[1]

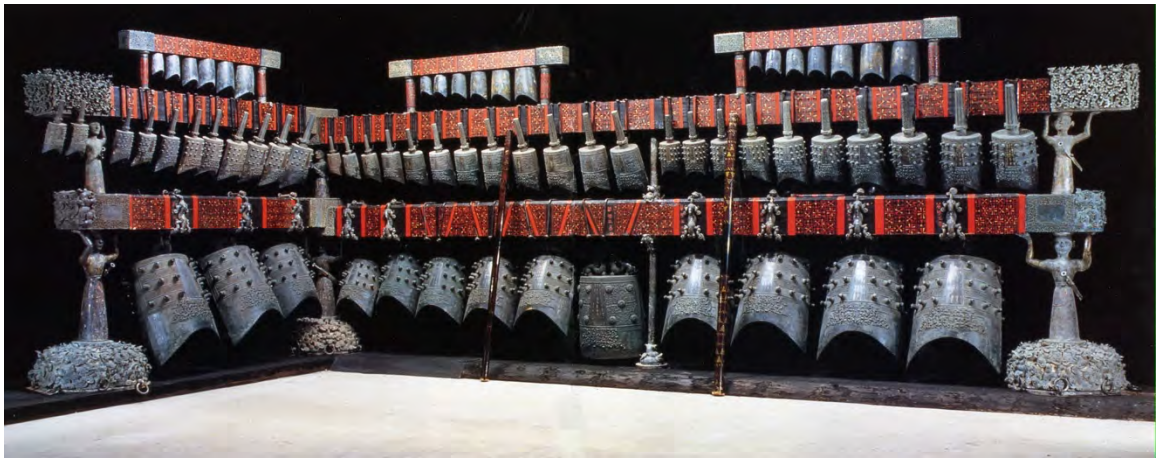


Fig. 1. Set of 65 bronze bells from the tomb of Marquis Yi of Zeng (d.433 BCE) at Suixian in Hubei province. Long arm of the stand 2.65 x 7.48 m, short arm 2.73 x 3.35 m. Source: Hubei Provincial Museum.

COMMENTARY

Tuned sets of bronze bells struck on the exterior and able to sound two distinct pitches go back at least to the 12th century BCE in China. By the 9th century, when a typical set supplied three octaves of the scale *do mi sol la* (Chinese *gong jue zhi yu*), inscribed bells attest a function for bell music in rituals addressed to ancestors. A unique 5th century set has inscriptions that instead concern music theory. It comes from the waterlogged tomb of Marquis Yi of Zeng (d.433 BCE), ruler of an ancient state located in the middle Yangzi region. The bells were found still hanging in three tiers on a wooden stand (Fig. 1). Nearby were a set of chime stones with related inscriptions (Fig. 3) and eighteen uninscribed drums, winds, and zithers. Altogether the bells weigh 2,500 kg; the largest, pitched two octaves below middle C, weighs 200 kg. Small bells on the upper tier were not played; nine of them pitched at whole-tone intervals display a set of nine named pitch standards. The middle and lower tiers hold four overlapping subsets that apparently were cast at different times. The three on the middle tier were sounded by three players, each with two mallets (Fig. 2; contemporary depictions show sets being played in this way). Two players, each with a long pole, sounded lingering low-pitched harmonizing notes on the lower-tier bells. The mallets and poles (leaning against the stand in Fig. 1) were found in the tomb. Because the bells are almond-shaped rather than circular in cross section, they have low inharmonicity and fast attenuation, and each affords two distinct pitches separated by a minor or major third, one sounded by striking on the central axis and one by striking near the side. The larger bells were apparently meant to be struck only on the central axis, however, perhaps because their second tones were difficult to tune or

inferior in quality. Pitch measurements show that twelve pitches per octave divide the scale more or less equally. Pairs of pitches separated by 3, 4, or 7 semitones form intervals that sound consonant without fitting any standard European tuning system particularly closely.[2]

Fig. 2. Performers behind the long arm playing two middle-tier sets. Source: Hubei Provincial Museum.

Fig. 3. Chime stone no. 12. The pitch is G and the inscription reads (translating *gongzeng* as *sol*-sharp, *yujue* as *do*-sharp)

[*right end*] **12**
[*upper face*] ***sol*-sharp on *zhuo*-GUXIAN**
[*visible edge*] ***do*-sharp on XINZHONG, *mi* on *zhuo*-WENWANG, *re* on *zhuo*-XINZHONG, *do* on *zhuo*-SHOUZHONG**
[*back edge*] ***la* on MUZHONG, *sol* on GUXIAN**

Source: Zhengzhou 1996: 259.

The bells, the chime stones, and their inscriptions constitute the earliest known Chinese text on music theory. The inscriptions of the bells, cast with them and inlaid with gold, are written in an ornate script remote from everyday writing and not easy to read (Fig. 4).

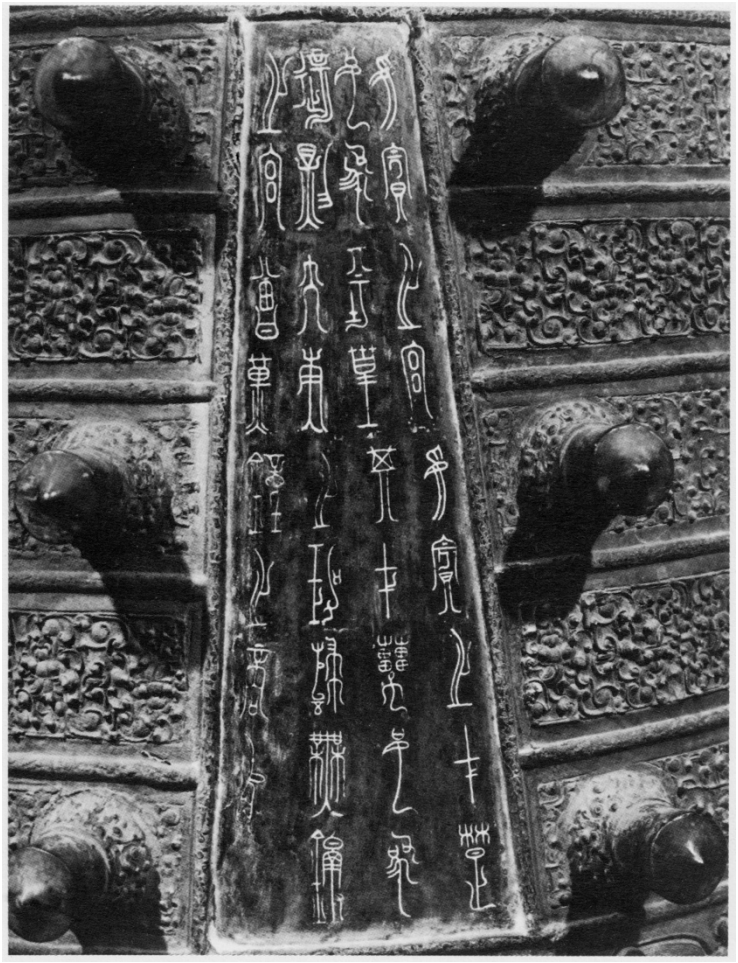


Fig. 4. Inscription for the central-axis pitch on a lower-tier bell (second from left in Fig. 1). The pitch is D and the inscription reads "***Do* on RUIBIN.** *In Chu, RUIBIN is called PINGHUANG. In Shen it is called YIZE.* **Lower-octave *mi* on TAICOU, *sol*-sharp on WUYI, *sol*-flat on HUANGZHONG.**" RUIBIN, TAICOU, WUYI, and HUANGZHONG are all Zeng standards; *sol*-sharp is *gongzeng*, *sol*-flat is *shangjue*. Source: Rao & Zeng 1985, pl. 13.

They total 3,500 characters. They are not a self-sufficient text copied onto an instrument but annotations next to the strike points of the pitches they refer to. The inscription at a strike point locates the pitch produced there in several different pentatonic scales related by transposition (the number seems to depend on the space available on the bell). Still able to sound their original pitches, the bells can be thought of as a set of tuning forks, each inscribed with its place in the chromatic scale and its functions in pentatonic scales on different tonics. The inscriptions of fourteen of them include hints that in the course of casting the set—a colossal undertaking—extramusical significance was introduced into what was originally a purely musical program. Since the program is conveyed jointly by tone-specific inscriptions and their patterned display, to give an idea of it requires explaining both the terminology of the inscriptional formula and the pitch distributions of the instruments.

Section 1: The instruments.

The chime stones. The chime stone inscriptions exhibit the terminology in its simplest form. The 41 stones are spaced at semitone intervals, from $G^{\#}_4$ to C_8, and numbered in pitch order. Each is inscribed with its pitch. Pitches are named by combining a pitch standard with a solmization term, as though we were to call A "*la* on the C scale." A pitch standard is not a scale step but a choice of tonic; the inscriptions use a set of twelve spaced at semitone intervals. The set begins with GUXIAN, whose measured pitch is near C. "*La* on the C scale" is thus GUXIAN zhi *yu* ("zhi" is a possessive). Since the inscriptions also use a set of twelve solmization terms, a pitch can be named in any of twelve different ways. Though deterioration of the stones has made some inscriptions illegible, the formula they follow seems clear. On one end each stone is numbered; on one side its pitch is located with respect to the reference pitch B, on its lower edge with respect to $F^{\#}$; and on the upper and lower edges it is identified by its function in each of the five pentatonic scales it belongs to. The three stones pitched at G, for example, are numbered 12, 24, and 36, labeled as *sol*-sharp on the B scale and *do*-sharp on the $F^{\#}$ scale, and identified as *do* on the G scale, *re* on the F scale, *mi* on the $D^{\#}$ scale, *sol* on the C scale, and *la* on the $A^{\#}$ scale (Fig. 3). Clearly the *do mi sol la* scale attested in 9th century bell sets had by the 5th century ceased to be central to court music. The primacy of the pentatonic scale *do re mi sol la* is demonstrated by the Zeng instruments and inscriptions in many ways, most concretely in the form of three wooden boxes for storing the chime stones. The boxes have numbered, fitted slots. The first box holds the stones of the pentatonic scale on C, the second holds the scale on $F^{\#}$, the third holds three octaves of B's and F's, and the boxes are labeled GUXIAN, XINZHONG ($F^{\#}$), and "intermediates." The solmization nomenclature itself has a pentatonic basis: an older pentatonic set of monosyllables, *gong shang jue zhi yu*, was apparently expanded by converting *jue* into a suffix meaning "plus a major third" and introducing the suffix *zeng* to mean "plus two major thirds." This yielded the chromatic set *gong yujue shang zhizeng gongjue yuzeng shangjue zhi gongzeng yu shangzeng zhijue*, an elegantly patterned series that must have had considerably more appeal for theorists than utility for performers. In somewhat the same way the set of twelve pitch standards seems to have been generated from an earlier

whole-tone set of six with the help of a flatting prefix: *zhuo*-GUXIAN is B; *zhuo*-XINZHONG is F.

The chime stone inscriptions might be thought to have a practical rationale, since the instrument is chromatic and could, in principle, play in all five of the scales listed on any stone. But when we consider the bronze rack that held the stones and the ensemble found with them we will conclude that the instrument no less than the inscriptions was designed not for performance but as some sort of theoretical statement. The rack supports only 32 of the 41 stones, 16 (three pentatonic octaves plus an extra *do* at the top?) on each of two bars, and the suspension mechanism does not allow quick changes. Since the set of 41 has no duplicates, the only pairs of pentatonic scales that could be installed complete are scales separated by a semitone or a tritone, musically unlikely combinations. Even if it had been practicable to play the chime stones and bells in all twelve pentatonic tonalities, the winds and strings would not have been able to accompany them in more than two or three.

The bells. The overlapping bell subsets have more complicated pitch distributions than the chime stones, and their inscriptions expand the simple formula just described. Together they span five octaves, from C_2 to C_7. Their overlapping creates a stretch of 33 consecutive semitones from B_2 to G_5, but no subset is chromatic. The only pentatonic scales available over the full compass of a subset (and thus over the assemblage as a whole) are the ones on C and F. The chromatic stretch scattered among the subsets looks like an unplanned side effect of building scales from two-pitch bells whose second pitch was not always needed, a side effect that was at some stage turned into a theoretical statement by adding an extra gap-plugging bell to each of three subsets. The stretch has no apparent performance rationale, nor do pitches duplicated by the overlap of subsets constitute an attempt at temperament.

The bell inscriptions employ the same set of twelve solmization terms as the chime stones, along with many variants (e.g. for octavic equivalents), and they name pitches using the same formula, “pitch standard plus solmization term.” On the front of each bell, two strike points, one on the central axis and one near the right side, are labeled with the pitches they sound, but using solmization terms alone: the reference pitch C is assumed in all four subsets. On the back of each bell, the corresponding locations bear longer inscriptions that relate each pitch to a series of pentatonic scales.

In the first middle-tier subset, the one on the short arm of the stand, each strike point on the back of a bell is inscribed as though it were a chime stone, but with three differences. (1) The reference pitch is not B or $F^{\#}$ but C. (2) The pitch produced at the strike point is identified by its functions in some but not all of the pentatonic scales it belongs to: the list of transpositions, exhaustive on a chime stone, is incomplete on a bell. (3) Though incomplete, the list includes transpositions to scales other than C and F, scales not available in the subset. Suitably arrayed, the 41 chime stones could have been played in any of twelve pentatonic scales. But the bell inscriptions list transpositions that the player of a subset could not make. Neither they nor the chime stone inscriptions were addressed to the players. They seem to make a theoretical statement: the chromatic scale is isomorphic with all possible transpositions of the pentatonic scale.

The inscriptions of the other three subsets introduce further complications. First, the inscription at a strike point does not confine itself to pentatonic scales in which the pitch had a function. It frequently also locates the pitch with respect to the tonics of scales it does not belong to. Second, though the inscriptions of these three subsets use the same set of twelve pitch standards encountered on the chime stones—GUXIAN, XINZHONG, and ten more—they use others as well. One is the set displayed on the unplayed upper-tier bells. This is a set of nine at whole-tone intervals, and it begins not on C but on $F^{\#}$, which it calls WUYI. Each of nine bells is inscribed on one side with its position on the WUYI scale (e.g. "*mi* of WUYI") and on the other side with the name of the standard at that pitch (e.g. TAICOU).

The WUYI standards displayed on the upper tier are mentioned on twenty of the middle- and lower-tier bells, three of which stand out both for their inscriptions and for the pitches they supply. They add $F^{\#}$ and $A^{\#}$ in three successive octaves, plugging gaps in the chromatic scale, but they are inserted into three different subsets, in other words given to three different players. On the front of each bell the labels at the $F^{\#}$ and $A^{\#}$ strike-points assume the reference pitch C; on the back the two pitches are equated with standards belonging to the WUYI set. For example, the back of the $F^{\#}/A^{\#}$ bell in the second middle-tier subset mentions YINGZI (an octave above WUYI), TAICOU ($A^{\#}$), and MUYIN (an octave above TAICOU). But then, instead of going on to list transpositions, it glosses the pitch standards (boldface for definitions, italics for glosses):

> [central axis] **On YINGZI this is *do*.** *In Chu, YINGZI is called XINZHONG. In Qi it is called LÜYIN.*
>
> [side] **On TAICOU this is *do*.** *In Jin, the pitch an octave higher is called BANZHONG.* **On MUYIN this is *do*.** *In Chu, MUYIN is called MUZHONG. In Jin it is called LAYIN.*

Similar glosses appear on eleven other bells. Chu was a state in the middle Yangzi region, a powerful neighbor of Zeng. Qi and Jin were northern states. The glosses give us two remarkable pieces of information. First, they identify one of the pitch standard sets for us: the set used on the chime stones, on the first middle-tier subset, and (with others) on the other three subsets, is that of the Chu state. Second, they tell us that four more states had their own names for standards, though Chu is mentioned as often (17 times) as the other four together. But we are never told what state used the names displayed on the upper tier, the whole-tone WUYI set. The author of the glosses explicitly identifies other standards with particular states but takes the upper-tier standards for granted. Surely they are the pitch standards of Zeng, the state whose ruler commissioned the middle- and lower-tier bells: each is inscribed "Marquis Yi of Zeng made this to cherish and use always."

On the chime stones only the Chu standards appear, with no mention that they are Chu, and the same is true of the first middle-tier subset and the three lower-tier bells of lowest pitch (C_2, D_2, E_2). These inscriptions look as though written for Marquis Yi by a Chu theorist. Their content is strictly musical, and the bells that bear them may be the oldest in the assemblage. But the other lower-tier bells and the other middle-tier subsets include bells that mention standards of Chu, Zeng, and four other states. The linking of

standards with states suggests that, after the casting of the first bells, a political or cosmological message was added to Yi's inscriptional program. We are told that although different states named pitches differently, their pitches were compatible, and since we are told this by gold-inlaid inscriptions spread across a uniquely ambitious set of bells, it was important. The walls of American concert halls do not proclaim "In Germany B-natural is called H." For the Marquis of Zeng and his contemporaries, absolute pitches must have had significance outside music, and their alignment in different states must have meant something, but we have no contemporary source to tell us what.

Section 2: Commentary

As the oldest Chinese text on music theory yet known, the inscribed instruments from 5th century Zeng are the first evidence in China for (1) the pentatonic scale (though some earlier bell sets probably played it), (2) a pentatonic solmization terminology still in use today, (3) twelve distinct pentatonic scales co-related by transposition and evenly distributed across a gamut of octave-equivalent pitches representing twelve pitch classes, (4) names for fixed pitches, many of which end with the syllable *zhong* "bell," and (5) the attachment of extramusical significance to those pitches.

The pitch-standard names must have originated as the names of bells (notable bells are given names in many cultures: Liberty Bell, Big Ben, Tsar Kolokol).[3] In a musical ensemble that took its tuning from its most important fixed-pitch instrument, a music master could use a bell name to specify a starting pitch. Players of zithers accustomed to transposing from one bell to another of a tuned set will not have been slow to arrive at the idea of a chromatic reservoir containing twelve pentatonic scales. On the evidence of the Zeng inscriptions, the chromatic scale arose by the transposition of pentatonic scales anchored to the fixed pitches of named bells. Arising as a purely auditory phenomenon, it will have been conceived by 5th century theorists as an equal-semitone scale because there was no reason for it to be thought of in any other way. It was not a tempered scale, an adjusted scale, because it was not an arithmetic construction that needed tempering. The chromatic scale of Western music theory, arrived at by string arithmetic, was fundamentally different from its inception.

The attachment of deep significance to absolute pitches is a central feature of later Chinese philosophizing. The pitch of the Yellow Bell, HUANGZHONG, had cosmological import, and finding its proper value was a matter of anxious concern to successive dynasties. Western thinkers were instead fascinated by calculated intervals that seemed magical because they connected human sensations of consonance with small-integer ratios. String arithmetic and calculated scales are not attested in China until two centuries after Marquis Yi, in a text of c.239 BCE called the *Lüshi chunqiu*.[4] Scales long in use were at that time fitted to numbers and turned into mathematical entities, and Chinese music theory thenceforward was preoccupied with calculated scales, temperament, and numerology. But pitches named after famous bells were too loaded with meaning to be dispensed with; they had somehow to be married to the arithmetic of scales. Founding themselves on a fable of the origin of music recounted in the *Lüshi chunqiu*, theorists put numbers to bells by giving them the pitches of bamboo pitchpipes whose lengths, since they had been cut to match the cries of phoenixes, had been furnished by nature.[5] These contortions illogically turned bells into receivers rather than givers of pitch.[6]

Robert Bagley

NOTES

1. The inscriptions of the bells and chime stones are transcribed with commentary (in Chinese) by Qiu Xigui and Li Jiahao in the excavation report, Beijing 1989, vol. 1, 532-52. For illustrations of all the Zeng instruments see So 2000 and Zhengzhou 1996. For detailed accounts in English of the instruments and their inscriptions see Bagley 2005 and 2015; Bagley & Wang forthcoming, chap. 16; Falkenhausen 1988 and 1993. The author wishes to thank Richard Cohn for valuable comments on drafts.

2. Lehr 1988.

3. Falkenhausen 1992; Price 1983, Appendix A.

4. The chromatic instruments and inscriptions in the Zeng tomb have themselves been cited as evidence for Pythagorean generation, but only because it has been assumed that the chromatic scale could not be arrived at in any other way (see e.g. Chen Cheng-yi 1994 *passim*; Cook 2020). The oldest evidence for scale arithmetic that does not depend on this assumption is the *Lüshi chunqiu*'s allusion to calculating a chromatic set of pitches (a text called *Guanzi*, often cited in this connection, was traditionally dated to the 7th century lifetime of its supposed author but is now thought to be late 3rd century). The correlative cosmology (Five Phases theory) that arose at about the same time may have taken its inspiration from the pentatonic scale, since of all the things correlated (elements, colors, seasons, etc.), only the five pitches of the pentatonic scale are actually given by nature, in the mechanism of human hearing. On the *Lüshi chunqiu* see Knoblock & Riegel 2000.

5. See e.g. Chen Yingshi 1988. In the 20th century, Needham and Robinson, trusting traditional numerology to reveal the early history of scales, bells, and pitch standards, gave a nonsensical account of all three (Needham 1962, 126-228).

6. Bagley 2015, 75-79.

WORKS CITED AND FURTHER READING

Bagley 2005. Robert Bagley. "The Prehistory of Chinese Music Theory." *Proceedings of the British Academy* 131: 41-90. Online at www.britac.ac.uk.

Bagley 2015. _____. "Ancient Chinese Bells and the Origin of the Chromatic Scale." *Zhejjiang University Journal of Art and Archaeology* 2: 56-102.

Bagley & Wang forthcoming. Robert Bagley and Wang Haicheng. *Art and Artistic Thinking in Ancient China* (chap. 16). 2 vols. San Francisco: Asian Art Museum of San Francisco.

Beijing 1989. Hubei Provincial Museum, ed. *Zeng Hou Yi mu*. 2 vols. Beijing: Wenwu.

Chen Cheng-yih 1994. Chen Cheng-yih, ed. *Two-tone Set-bells of Marquis Yi*. Singapore: World Scientific Publishing Company.

Chen Yingshi 1988. Cheng Yingshi. "Temperamentology in Ancient Chinese Written Records." *Musicology Australia* 11-12 (1988-89): 44-62.

Cook 2020. Scott Cook. "Technology in a New Key: Toward a Reexamination of Musical Theory and Practice in the Zeng Hou Yi Bells." *T'oung Pao* 106: 219-65.

Falkenhausen 1988. Lothar von Falkenhausen. *Ritual Music in Bronze Age China: An Archaeological Perspective*. Doctoral dissertation, Harvard University, published on demand by ProQuest.

Falkenhausen 1992. _____. "On the Early Development of Chinese Musical Theory: The Rise of Pitch-standards." *Journal of the American Oriental Society* 112.3: 433-39.

Falkenhausen 1993. _____. *Suspended Music: Chime-Bells in the Culture of Bronze Age China*. Berkeley and Los Angeles: University of California Press, 1993.

Falkenhausen & Rossing 1995. Lothar von Falkenhausen and Thomas D. Rossing. "Acoustical and Musical Studies on the Sackler Bells." Appendix 2 (pp. 431-84) in Jenny F. So, *Eastern Zhou Ritual Bronzes from the Arthur M. Sackler Collections* (New York: Arthur M. Sackler Foundation).

Knoblock & Riegel 2000. John Knoblock and Jeffrey Riegel. *The Annals of Lü Buwei: A Complete Translation and Study*. Stanford: Stanford University Press, 2000.

Lehr 1987. André Lehr. "The Tuning of the Bells of Marquis Yi." *Acustica* 67.2: 144-48.

Needham 1962. Joseph Needham. *Science and Civilisation in China, Volume IV Part I* (Cambridge: Cambridge University Press).

Price 1983. Percival Price. *Bells and Man*. Oxford: Oxford University Press.

Rao & Zeng 1985. Rao Zongyi and Zeng Xiantong. *Suixian Zeng Hou Yi mu zhong qing mingci yanjiu*. Hong Kong: The Chinese University Press.

So 2000. Jenny F. So, ed. *Music in the Age of Confucius*. Washington, DC: Smithsonian Institution.

Zhengzhou 1996. Huang Xiangpeng, ed. *Zhongguo yinyue wenwu daxi, Hubei juan*. Zhengzhou: Da Xiang.

1st c. BCE – 9th c. CE: Clay-modelled waylla k**epa shell horn from Shillcop cemetery (Yungay, Peru)**

Figure 1: Ceramic waylla kepa shell horn. Left: Coiling and mouthpiece. Right: interpretation (Precolonial Andes, South America, CE 600 – 800). Private collection, Shillcop, Yungay, Peru.

Figure 2: The deep V-shaped cut typical of Formative Period *Titanostrombus* shell horns at Chavín de Huántar increased visibility for the player suggesting performance in movement.

Figure 3. Drop-shaped ceramic shell horn with interior mouthpiece (Museum zu Allerheiligen Cat. 14514)

Figure 4: Modelled bottle in Moche style depicting a shell horn player (CE 200 – 600, Precolonial Andes, South America). Museo de Arqueología y Antropología de la Universidad Nacional Mayor de San Marcos, Jiménez Borja collection Nr. 3001-03741

COMMENTARY

From the Caribbean and Pacific coasts of northern South America to the Andes mountains of Lake Titicaca, the deep and potent sounds of shell horns have been deployed by Andean people to structure ritual spaces and times for millennia. The earliest archaeological finds of marine conches of various species are contemporaneous with the rise of monumental public architecture, built by agrarian societies around five thousand years ago. Colonial texts from Chibcha and Quechua speaking areas attest to the use of shell horns —variously known as *Nymsuquy, Fotuto, Pututo, Huanapaya or Waylla Kepa*—and shed some light on local mythological associations and modes of performance during the fifteenth and sixteenth centuries CE. The etymology of the term *Waylla Kepa* indicates symbolic associations with sprouting and the global water cycle that are probably very old, whereas the interpretation of *Huanapaya* is linked to myths and rituals surrounding the creation, nurturing and distribution of Lamas and Alpacas in the Huarochirí manuscript (crossref Huarochirí entry).

Sounded by messengers and pilgrims when travelling along pathways and within temple and mortuary architecture, often built to resonate with the landscape, shell horns also feature prominently in Andean iconography with stone and clay sculptures showing human and non-human trumpeters in procession, holding or playing the instrument. Ceramic shell horns, such as the example in Figure 1, reveal a long history of independent inventiveness marked by a range of technical and organological developments.

Large gastropods are mostly native to warm tropical waters, and their display and deposition at archaeological sites hundreds of miles from their habitat is evidence of long distance procurement. The thick, hard shells of *Titanostrombus galeatus* (T. G.) were probably preferred for durability—their hard, thick surface amenable to polishing, incising and carving—as well as for the potency and richness of their sound. Since the shape of the conch limits the visibility of the player, a deep cut was often made at the proximal end of the outer lip (Figure 2). This allowed the player to walk and sound the shell at the same time, as well as better modulate the sound by inserting more of the hand into the narrow aperture, thus increasing the variety of performance techniques. The materiality of the conch was important in other ways too, as powdered shell—obtained by abrasion of the surface—was consumed in ritual, leading to the "death" of individual instruments over decades or centuries.

The material shift from conch to ceramic, possibly as early as 2,200 BCE, opened up new possibilities for manipulating the aerophone´s mouthpiece, tube length and aperture size, as well as for visual—carved, modelled or painted—signification. Compared to the morphological limitations of natural conches, ceramic shell horns with built–in mouthpieces, and ergonomic apertures afforded new sonic opportunities and eased movement during performance. As well as adding to the variety of forms such shell horns could take (to include modelled, incised and painted imagery), local availability of clay and skill reduced dependence on long distance procurement of conch shells. Intriguingly, ceramic shell horns largely disappear from the archaeological around the tenth century CE, whereas the use of conch shell horns continued into the Inca and early colonial periods. In a handful of places in the rural Andes today the presence of community authorities and ritually important moments, such as Sunday mass, are marked by the sound of shell horns.

The shape, style and organology of instruments in museum collections suggest that two main traditions developed, largely independently, in the modern-day Ecuadorian and Peruvian Andes. Drop-shaped horns with an interior mouthpiece (Figure 3), which are often incised, first appear during the Chorrera Period (c. 1,300 BCE-300 CE), continuing in Tumaco – La Tolita (c. 300 BCE-400 CE). This musical technology blends into the tradition of side-blown globular flutes with interior coils in the Nariño-Carchi highlands of Colombia and Ecuador (crossref Herrera, "Clay-modelled globular flutes").

A second hotspot of ceramic shell horn production encompasses the coast and highlands of northern Peru. In the valley-oases of the Pacific coast, Moche artisans (crossref "Moche Ceramics") fashioned elegant instruments with mouthpiece–body segmentation visibly marked through modelling and painting. Such instruments were used in courtly and mortuary ritual alongside natural shell horns for centuries (Figure 4). At about the same time, in the neighbouring highlands of Huamachuco and Recuay, instruments with marked exterior coils were modelled. These were made by coiling the resonant tube around a central stake, and removing it before adding the mouthpiece, and firing. Flat-coiled ceramic horns from the same area, modelled without this technique, were probably the latest to be developed (1000-1400? CE). Their smaller interior volume meant that sounds were no longer as deep or loud. Instead, long, uncoiled metal trumpets rose to prominence from the 12th century CE onwards in Sicán and Chimú contexts.

The acoustics of these end–blown trumpets tend to be variable. From a sample of different shell species, with varied inner volume and tube length, fundamental frequency ranged between 265 and 445 Hz (T.G.: 296,1 – 299,1 Hz). However, the blast was invariably loud (> 100 Db). Through modulation of breath, lip position and hand insertion, it was found that a major third interval can be played; a variation range of 400 cents. Attached mouthpieces have been found to enrich the range of harmonics and timbral variety. Importantly, when played in ensembles two kinds of acoustic effects— beats and combination or Tartini tones—may be produced and perceived at short distances. What little is known about performance from the Huarochirí manuscript—moving very slowly in a circle while playing— strongly suggests that these sounds, and acoustic effects helped mark key moments of ritual and religious experience.

Alexander Herrera Wassilowsky

FURTHER READING

Bolaños, Cesar. 2007. *Origen de La Música En Los Andes : Instrumentos Musicales, Objetos Sonoros y Músicos de La Región Andina Precolonial.* Lima: Fondo Editorial del Congreso del Perú.

Herrera Wassilowsky, Alexander. 2010. "Pututu and Waylla Kepa: New Data on Andean Pottery Shell Horns." *In Studien Zur Musikarchaeologie*, edited by R Eichmann, E Hickman, and C. Koch, VII:17–37. Orient Abteilung des Deutschen Archaeologischen Instituts.

Herrera Wassilowsky, Alexander, Isabelle C. Druc, and Juan Camilo González Galvis. 2023. "Crafting the Voice of God: Ceramic Waylla Kepa Shell Horn Technology in the Andes." *Journal of Anthropological Archaeology* 69 (March): 101470. https://doi.org/10.1016/j.jaa.2022.101470.

Herrera Wassilowsky, Alexander, Juan Pablo Espitia Hurtado, Juan Gregorio García Moncada, and Alejandro Morris. 2014. "Arqueomusicología de Las Trompetas de Caracol Andinas: Distribución, Organología y Acústica." In *Music Archaeology of the Americas,* edited by Matthias Stöckli and Mark Howell, 3:141–68. Berlin: Ekho Verlag.

Kolar, Miriam A. 2017. "Sensing Sonically at Andean Formative Chavín de Huántar, Perú." *Time and Mind* 10 (1): 39–59. https://doi.org/10.1080/1751696X.2016.1272257.

Kolar, Miriam A. 2020. "Conch Calls into the Anthropocene: <I>Pututus</I> as Instruments of Human-Environmental Relations at Monumental Chavín." *Yale Journal of Music & Religion* 5(2). https://doi.org/10.17132/2377-231X.1151.

Montagu, Jeremy. 12AD. "The Conch in Prehistory: Pottery, Stone and Natural." *World Archaeology* no. 3: 273–79. http://www.jstor.org/stable/124238.

Paulsen, Allison C. 1974. "The Thorny Oyster and the Voice of God: Spondylus and Strombus in Andean Prehistory." *American Antiquity* 39 (4Part1): 597–607. https://doi.org/10.2307/278907.

Works Cited

Taylor, G, ed. 1987. Ritos y Tradiciones de Huarochirí: Manuscrito Quechua de Comienzos Del Siglo XVII. Lima: Instituto de Estudios Peruanos: Instituto Francés de Estudios Andinos.

ca. 1750 CE: Capuchin Mission Images Reveal the Central Role of Marimba Players in the Royal Courts of Early Modern Kongo and Angola.

Figure 1-2. Bernardino d'Asti, *The Missionary Father sings Mass* (top) and *Meeting and reception I was given by the Prince of Soyo* (bottom). Circa 1750. Watercolor on paper, 19.5 × 28 cm. From *Missione in prattica*, Biblioteca Civica Centrale di Torino, MS 457, fol. 7r-9r. Photo courtesy of the Biblioteca Civica Centrale, Turin.

Figure 3-4. Bernardino d'Asti, *The missionary, before entering a locality, is welcomed by the ruler accompanied by his entourage* (top) and *The missionary gives his blessing to the Mani during sangamento* (bottom). Circa 1750. Watercolor on paper, 19.5 × 28 cm. From *Missione in prattica*, Biblioteca Civica Centrale di Torino, MS 457, fol. 9v-18. Photo courtesy of the Biblioteca Civica Centrale, Turin.

Full Source Citation: Bernardino Ignazio da Vezza d'Asti. "Missione in prattica: Padri cappuccini ne' Regni di Congo, Angola, et adiacenti" [ca. 1750]. Ms 457, Biblioteca civica Centrale di Torino. https://bct.comune.torino.it/gallerie/missione-prattica

COMMENTARY

This series of watercolors comes from the circa 1750 Capuchin missionary manuscript *Missione in Prattica: Padri cappuccini ne' Regni di Congo, Angola, et adiacenti* (Mission in Practice: Capuchin Fathers in the Kingdoms of Kongo, Angola, and Adjacent Regions), attributed to the Italian friar Bernardino Ignazio da Vezza D'Asti (born 1702, died 1757). This manuscript served as a practical guide for novice friars undertaking apostolic work in west-central Africa, particularly in the powerful Kingdoms of Kongo and Angola. Comprising nineteen full-page watercolors—each accompanied by a short explanatory text—alongside eight folios of written content and a title page, *Missione in Prattica* provided essential instruction, from an eyewitness perspective, on appropriate conduct and the practical challenges missionaries were likely to encounter in these distant territories.

In this region, Capuchins worked under the patronage of local rulers, many of whom had adopted Catholicism long before the missionaries arrived, following their first encounters with Portuguese explorers in the late fifteenth and early sixteenth centuries. This unique reality profoundly shaped the missionaries' visual and written representations, which, while drawing on the language of exoticism and pre-established European templates for depicting non-European people, also reflected the decades-long engagement of west central-African communities with European Christian culture and the close relationships friars had established with local people in order to carry out their missions successfully.

These aspects strongly emerge from Bernardino d'Asti's manuscript alongside the large corpus of Capuchin works about and from the region (for further references, see Fromont 2022). Like these other works, *Missione in Prattica* did not limit to give advice and narrate first-hand experiences the author had lived, it also helped to challenge European friars' most common preconceptions, fostering a better understanding of the social, cultural, and political landscapes of early modern Kongo and Angola. It is in this context that the selected images should be examined as an extraordinary testimony to the vibrant music cultures of Kongo and Angola in the eighteenth century. In particular, they offer a vivid snapshot of the central role the marimba (locally known as *madimba*) played in the display of political power in this area of the continent. While parallels can be drawn to the court practice of the Buganda *amadinda* in Uganda—discussed in detail in related entries (#crossref#)—the Angolan tradition described here is primarily distinguished by its tuning, instrument construction, and playing techniques, as outlined below.

While missionaries and explorers frequently mention the marimba in their writings as early as the sixteenth century, their references often focus on its construction features and materials — such as the number of calabashes and wooden bars, sometimes reaching up to sixteen — and its sound, which produced what Friar Girolamo Merolla da Sorrento described as a "harmonic effect" (Merolla 1697, 114; cfr. Cavazzi 1687, 167). In contrast to these textual accounts, Bernardino D'Asti's images provide essential details on the instrument's function and use, also distancing themselves from other common visual representations.

Unlike other missionary drawings that portrayed musicians as decontextualized figures, the watercolors in *Missione in Prattica* have the power to reinscribe them into their cultural and social environment, immersing viewers in the musical landscape they evoke. Each vignette

illustrates a different type of encounter and interaction between missionaries and local people, led by their ruler — identified in the second image as the Prince of Soyo, from the capital of the coastal province of the Kingdom of Kongo.

Marimba players feature prominently in the watercolors, alongside other musicians, serving as key figures of the royal entourage during events ranging from mass celebrations (Fig. 1) and receptions (Figs. 2-3) to martial performances in preparation for battles, known as *sangamentos* (Fig. 4). Their position at the forefront, dynamic postures, and detailed rendering of their instruments emphasize not only their visual prominence but also their role in shaping the auditory experience of these encounters, suggesting that the significance of high-ranking African dignitaries was conveyed not only through insignia and elegant garments, but also through the power of sound.

Further, the images not only provide insight into the various contexts in which the marimba was played but also into the techniques used to play it and the instruments employed for accompaniment. In this regard, it is important to note that in the watercolors, marimba players are consistently depicted together at the forefront of the royal entourage, accompanied by a *ngoma* (drum) player (referred to in other sources as *ngamba*; ibid.). With the exception of Fig. 1, where marimba players stand behind the ivory horn (*mpungu*) players, the other images show the xylophones prominently positioned at the front of the parade. Furthermore, in the first three figures, the marimbas are depicted as being played in pairs, with two marimbas featured each time. This positioning and manner of performing are consistent with oral history accounts and ethnographic data among the Ambundu people, the major ethno-linguistic group historically inhabiting north-central Angola, alongside the Bakongo people.

The practice of playing the marimba in pairs reflects a musical continuity particularly among the Jinga, an ethnolinguistic subgroup of the Ambundu who primarily inhabit the Kalandula municipality in Malanje province. According to their tradition, three players perform seated behind two marimbas tuned to an apparent heptatonic scale, though not strictly diatonic in the Western sense, —one with 17 keys and the other with 19—playing together as an ensemble. Each musician has a distinct role and executes a different rhythmic-melodic pattern. The chief xylophonist, who also serves as the soloist, stands at the right end of the 19-key marimba, while the bass pattern player (*dinuma*) is seated at the left end, where the lower keys are located. A third performer plays a basic pattern, known as *akaxi* or *sasu*, alone on the 17-key marimba, acting as a rhythmic and melodic bridge between the solo part (*jithele*) and the bass line. The soloist enjoys greater freedom to improvise, often employing harmonies based on parallel thirds and engaging in an antiphonal style with the vocal line, for which he is also responsible as the most skilled and senior member of the group (Baratti 2024; cfr. Kubik 1991, 259-261).

Due to the limited availability of marimbas, it is common today for all three parts to be performed on a single instrument, a practice more widely observed among Mbondo and Mbangala communities in the historical region of the Baixa de Kassanje, which remains predominantly Ambundu and spans areas of both Malanje and Lunda Norte provinces.

The centrality of the marimba in royal courts, as depicted in the watercolors, is also supported by Ambundu oral tradition, which holds that the marimba was introduced to the region by Ngola Kiluanji, the legendary founder of the Ndongo Kingdom, from which Angola derives its name. Other narratives specifically link the instrument's origins to an important figure in Ambundu history, Kajinga Ka Mbulu. Along with Ngola Kiluanji, Kajinga Ka Mbulu initially resided on the island of Luanda before settling in the Baixa de Kassanje to escape the Portuguese. In his study of the formation of the Ambundu kingdoms, historian Joseph Miller recounts that Kajinga Ka Mbulu herself had cut up the body of a leader hostile to her and "made his skin into a rope, a drum, a *marimba*, and a bowstring which gave her control of her enemy's magical powers" (Miller 1976, 99).

The role of marimba players as ministers of *sobas* (local authorities) is still vivid in the memory of today's practitioners in north-central Angola. This association is especially reflected in their repertoire, where many songs are about the lives and deeds of powerful rulers and warriors (Baratti 2024, Appendix B). Even today, according to Kimbundu-speaking marimba players, specific rhythms evoke the gait of sobas, musically preserving the motion of the royal processions and reasserting their role as central figures of leaders' entourage.

Although the painter may not have been entirely accurate in portraying specific organological details in *Missione in Prattica*, such as the number of wooden bars and gourds on each marimba, a few elements seem to confirm other typical features of the xylophone from that era. These include its flat design, which would later be replaced by the now more common curved version, as well as the use of straps made from the skin of local tigers (*onça*), a detail also found in earlier sources (cfr. *Parma Watercolors*, Fol. 72, "Black musicians" in Fromont 2022, plate 47).

Nina Baratti

FURTHER READING

Bassani, Ezio. *Gli antichi strumenti musicali dell'Africa nera: dalle antiche fonti cinquecentesche al "Gabinetto armonico" del Padre Filippo Bonanni*. Padova: Zanibon, 1978.

Caiado, José Pedro and Domingos Morais. *Os Instrumentos Musicais e as Viagens dos Portugueses*. Museu de Etnologia, Lisboa: Instituto de Investigação Científica Tropical, 1986.

Osório Nelo, Manuel Neto Matos, Armando Assunção Soares, and Paula Catarino. "Etnomatemática da Marimba: Instrumento Etnográfico da Província de Malanje em Angola." *Revista Latinoamericana de Etnomatemática* 10, no. 1 (2017).

Redinha, José. *Instrumentos musicais de Angola: sua construção e descrição: notas históricas e etno-sociológicas da música angolana*. Coimbra: Instituto de Antropologia, 1984.

WORKS CITED

Baratti, Nina. *Music, Citizenship and Vernacular Cosmopolitanism in Luanda, Angola*. PhD diss., Harvard University, 2024.

Cavazzi da Montecuccolo, Antonio Giovanni, and Fortunato Alamandini da Bologna. *Istorica descrizione de' tre' regni Congo, Matamba et Angola sitvati nell' Etiopia inferiore occidentale e delle missioni apostoliche esercitateui da religiosi Capuccini*. Bologna: Giacomo Monti, 1687.

Fromont, Cécile. *Images on a Mission in Early Modern Kongo and Angola*. University Park, PA: Penn State University Press, 2022.

Kubik, Gerhard. "Muxima Ngola - Veränderungen und Strömungen in den Musikkulturen Angolas im 20. Jahrhundert." In *Populäre Musik in Afrika*, edited by Veit Erlmann, 201–271. Berlin: Staatliche Museen Preussischer Kulturbesitz, 1991.

Merolla da Sorrento, Girolamo. *Breve, e succinta relatione del viaggio nel Regno di Congo nell' Africa Meridionale, fatto dal P. Girolamo Merolla da Sorrento, Sacerdote Cappuccino, Missionario Apostolico: Continente variati Clima, Arie, Animali, fiumi, frutti, vestimenti con proprie figure, diversità di costumi, e di viveri per l'vso humano*. Naples: Francesco Mollo, 1692.

Miller, Joseph C. *Kings and Kingsmen. Early Mbundu States in Angola*. London: Oxford University Press, 1976.

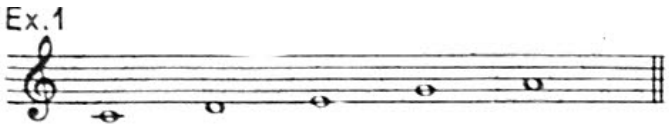
1922-30: An African musician analyzes African music

I

After I had completed the course of my academical training in music, being a West African negro, I searched in vain for information about native scales – their formation and their mode of treatment. As I had to study the English textbooks, I was well conversant with all scales in Western Europe but was unable to express myself in the musical language of the country where I was born, at least intelligibly.

One great difference between African music and that of the Caucasian races is that of the leading note. The African, untouched by European musical influence, does not at any time use the note a semitone below as the lower auxiliary note to any principal tone. When one's ear has been trained so to use the lower auxiliary, he is bewildered to find that the music of his own people does not fit itself easily to the rules given by his tutors. It is true that some of the ecclesiastical modes possess this peculiarity – that is, a note which is a whole tone below the final. It is also true that some composers usually approach the cadence in the major key through the minor seventh; but these composers do not write in the native African scales, nor does the study of the ecclesiastical modes assist one in his quest on some data to work upon any more than an assiduous study of Greek literature furthers one's progress in the mastering of, say, the Mendi language or any other African language. The only avenue open to me, therefore, was to embark upon the task of studying the native scales or any of them and the best mode of treatment.

The musical scale of the negroes of Northwestern Africa-that is, in Senegal, Gambia, French Guinea and Sierra Leone-consists of five principal tones:

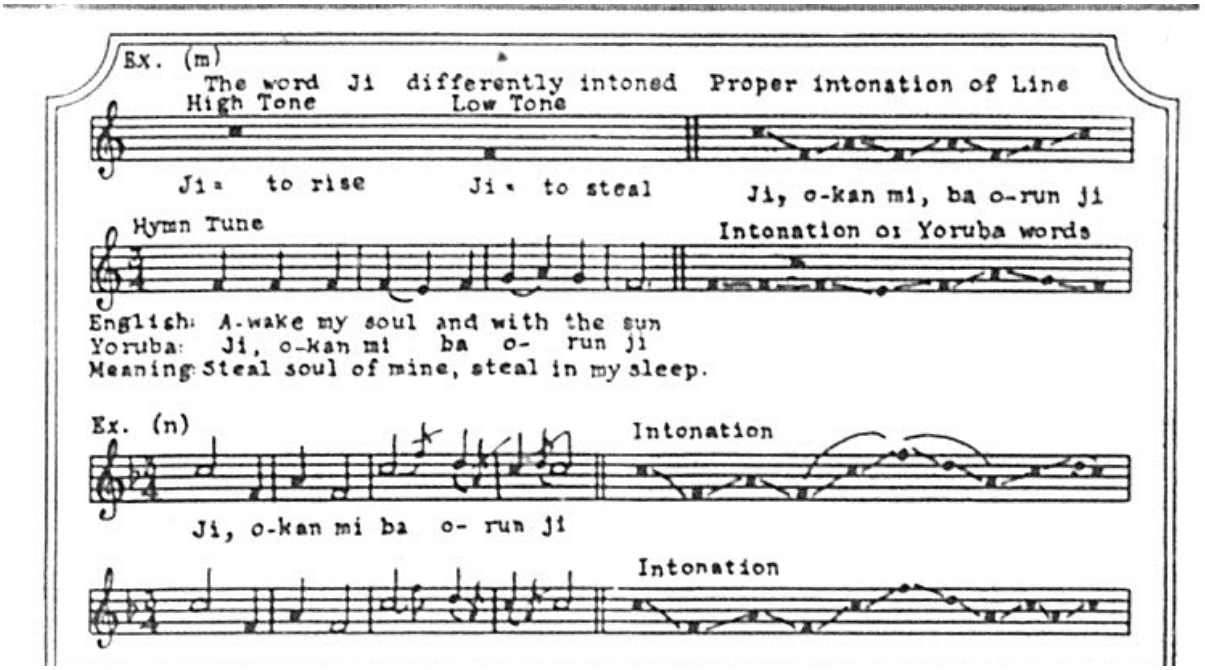


These tones are those that could be produced by an instrument resembling the flute and made of wood, which the Mendis called "Ballanji" and the Jolloffs "Gerar."

II

Most languages in West Africa are tonal, and therefore, it is not every melody that fits into a verse of poetry. This is the greatest difficulty encountered by the missionaries-hymn tunes with appropriate hymns according to the intonation of the words. In Ex. m I give a typical line translated from the English Hymnal. The tones of the words are suggested by the notes above them and the different meanings assigned to different tones. It is essential that, in order to get the precise meaning, the exact intonation should be followed, but when the line was sung to the English hymn tune a different meaning from what was intended is conveyed. The language is Yoruba. Such a line would be rendered

by the Yorubas themselves as indicated in Ex. n. The short graces notes are necessary to fix the tones of the words, and at the same time to produce a beautiful melody.



III

The portion of Africa which has been the scene of my investigation for many years extends from the Senegal to the Cameroon. There are various tribes, and one would expect to find a common culture among them; but on account of external conditions the musical perception of some of those tribes have undergone a change. In some it is so slight as not to be noticed, whilst in others it has been great.

These changes are brought about by contact with Eastern and Western culture. All along the borders of the Sahara down the coast at a distance of 300 miles or thereabouts one meets with evidence of Islamic culture which greatly influence the musical expressions of those tribes. This culture is not confined to that area but is brought down towards the coast by tribes which have embraced Islam. On the other hand, peoples along the coast have another perception, due to the influence of Western civilization. Between these two points one finds real African musical perception….

…it will be recognized that there are numerous forms for the purposes of melodic expressions. The most important is the five-tone scale; but there are so many inflections of the tones of that scale that the fundamental character has been altered. It is not easy to note down African music by existing musical notation, as the signs would convey a different idea from what they are intended to represent. A wholly different notation is necessary to do this properly.

It is interesting to observe that on account of these different perceptions the African is able to appreciate and understand other systems of music. Although the perception of the African to-day presents the same features as that of Western music in days gone by, the European has, by confining himself to the development of one form to the exclusion of others, lost the perception of the latter.

The fundamental of rhythmic perception is duple time throughout. Each beat of this duple time may be divided into two, three, or four parts. When more than one rhythmic instrument take part, or when the chorus is accompanied by hand clapping or other rhythmic devices, these different divisions of the beat are brought into effect. One part may divide the beat into twos, another into threes, another into four parts and a further division into six parts, giving intricate rhythmic effects in which syncopation plays an important feature. This rhythmic device is so highly developed that whole phrases may be syncopated; that is to say, they may be shifted from strong to weak pulses at pleasure without disturbing the rhythmic balance, although at the same time other parts are doing the same things or their opposites.

The African Form of Expression

There is one form of expression all over Africa. This is the solo and chorus. But some tribes have progressed beyond this form. By overlapping the form takes the nature of catch of round, and when they are so conceived there are usually three or more parts engaged.

There is no perception of harmony as the term is understood in music. What enters into a musical expression by way of tone combination is a highly developed form of polyphony, which may embrace two, or at most three parts. This polyphonic form is the freest from the point of view of concords and discords and it is preponderantly rhythmic; that is to say, each part preserves its rhythmic individuality. There appears to be no condition as to the succession of intervals; and although there is evidence of the use of some intervals rather than others, especially in the cadence, one could not prove the rule.

The perfect fourth is the basis of harmonic combination; that is, where the two parts sing together tone by tone…
Music is not cultivated in Africa for its own sake. It is always used in connection with dances or to accompany workmen. The rhythmic interest of the songs impels them to work and take away the feeling of drudgery. In accordance with these usages, songs range as follows in order of emotional content:

> --Work songs-mainly rhythmic-short phrases mostly of two bars; solo and chorus follow each other instantly; the chorus is in many cases composed of two or three ejaculatory words, answered by the workmen. Tempo moderate.

--Play songs-more melodic-accompanied mostly by handclapping. The chorus takes a more decided character; overlapping of solo and chorus. Tempo moderate.

Dance songs-these fill a great range; from the wild dances of the Bassas in Liberia to the highly artistic dances of the Yorubas in Nigeria. In the lower scale the solos are mostly ejaculatory sentences; but sometimes they are of great length and end after the chorus begins. Tempo fast; 2-4 time; simple rhythm. The next higher class finds an instance in the Mendi dances. Rhythm intricate and tempo not too fast. Here one meets with melodies which end a fraction of a beat before the accent falls. The highest class is the artistic dance of the Yorubas. Tempo moderate; 2-4 time combined with 6-8; 3-4 with 9-8 and 18-16; two bars being perceived as one whole bar of 6-4. Cross rhythms in abundance. In these dances one meets with characteristic rhythms; that is to say, rhythms that have meanings ascribed to them directing the dancer how to proceed; they act as cues, not necessarily with reference to a change of dance steps, but with reference to action, either retire, or to come forward, or go backward. There are many drums in these dances, but only one does the drum talking. He is the leader of the rhythmic group of instruments.

Ceremonial songs-these are used more or less in processions. Very little handclapping is done, and there is hardly any other instrument of rhythmic interest except a large drum. There are long rests between the end of one chorus and the beginning of the next repetition of the solo. Tempo slow; rhythm simple, although the large drum syncopates the pulses; 6-4 time.

Love songs-these are solo songs, usually for the female voice. There are no handclappings except when these songs are used as dance songs. Tempo slow; 4-4 time. Sometimes when sung as duets they are accompanied by rhythmic instruments and they take the character of lively pieces in 2-4 time.

I. Nicholas G. J. Ballanta, "An African Scale", *Musical Courier* (June 29, 1922), 6.

II. _____, "Gathering Folk-Tunes in the African Country," *Musical America*, 27 (1926), 4.

III. _____, "Music of the African Races," *West Africa* 14 (1930), 752-3.

Commentary

Nicholas Ballanta (1893-1962) was one of the first scholars to describe and analyze African music from an African perspective. He was born in Sierra Leone and largely self-taught in organ, composition, harmony and counterpoint with the help of English textbooks. In 1917, he passed the first part of a Bachelor of Music degree remotely from Durham University (North England). But it was only in 1921 that he was able to leave Sierra Leone and travel to the United States where he attained a scholarship to study composition at the Institute of Musical Arts (now Juilliard), receiving his diploma in 1924. During this time, Ballanta came to know the businessman and philanthropist George Foster Peabody who helped to finance his travels and research while putting him in touch with influential people. Peabody encouraged Ballanta to

travel to the South of the United States to study and transcribe negro spirituals sung by African-Americans there. His edition of 103 spirituals was published by G. Schirmer in 1925.

Peabody's support also enabled Ballanta to travel in 1924 to West Africa, including Gambia, Nigeria, and his home in Sierra Leone, to conduct further research in African music. According to his own account, he traversed some 7000 miles across West Africa (!) and collected "over 2000 examples of African songs" (Ballanta 1926, 11). A trip to Northern Europe in 1926 allowed him to meet, among others, Erich Moritz Hornbostel, then the leading comparative musicologist of his time and director of the important Phonogram-Archiv in Berlin. (It was evidently the Columbia University anthropologist, Franz Boas, who put Ballanta in touch with Hornbostel.) Ballanta was awarded the very first Guggenheim Fellowship for Music Research in 1927 (renewed in 1928). After his grant money ran out, he returned to Sierra Leone where he taught music at a Grammar School in Freetown while also composing, including a number of folk operas drawing upon African music. He died in Sierra Leone in 1962.[1]

Ballanta did not publish much research during his lifetime. Whatever knowledge he had of African music, he acquired it on his own. Since he could not read German, he would not have known the work of Hornbostel and other German comparativists who were beginning themselves to study African music. The three excerpts cited above are from the only three extant scholarly articles of his that we know of.

Passage I, from an article that Ballanta published in 1922, makes two important points. The first corresponds to Hornbostel's observation that unlike modern Western music, African music is not harmonic and its scales lack a leading tone. More important is his second point, which stands in opposition to Hornbostel and his students. Hornbostel took an organic approach to music, believing it evolved over time in phylogenetic stages of complexity. African music, Hornbostel argued, was not unlike European music except that it was in an earlier stage of development, one that was more closely related to medieval music. Ballanta strongly rejected this idea. Already in this early publication, he argued that medieval church modes had nothing in common with African scales, and that African music needed to be studied on its own terms. In other words, his goal was to develop a separate set of tools for understanding African music.[2]

The passage from Ballanta's second article from 1926 would have been of interest to church missionaries because it discusses the issues that arise when attempting to set Western hymns with West African languages, most of which were tonal languages. We know that Peabody had arranged for him to read a paper at the 1926 International Missionary Conference in Le Zoute, Belgium on this question. These were large events where missionaries from all over the world assembled. While do not have a copy of his presentation there, we can assume that this short article from the same year likely reflected some of the points he made in his lecture. In this excerpt, he explains how precarious it is to translate hymn lyrics into local African languages without resulting in a deformation of the hymn melody. Ballanta's talk evidently made a strong impression on at least one of the missionaries present, Walther Trittelvitz of the German Bethel

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[1] For more details concerning Ballanta's biography, see Busse Berger (2020, 74-88) and Klein (2008).
[2] Note, though, that in his last article he modified this view and states: "Although the perception of the African to-day presents the same features as that of Western music in days gone by, the European has, by confining himself to the development of one form to the exclusion of others, lost the perception of the latter" (Ballanta 1930, 752

Mission, who completely reversed course and tried to introduce local music into the hymnals he was producing for his African congregation (Busse Berger 2020, 76).

In the first two paragraphs of his last article from 1930, Ballanta shows that, like Hornbostel, he was concerned about maintaining the authenticity of African music and shielding it from the influence of both Arabic and European music. As for the tonal system of African music, he was fully aware that it was not at all uniform, with important differences among various tribes. He describes the basic African scale as pentatonic, though with many variants. For instance, he claims to have heard numerous "inflections" of both a quarter and a semitone in much West African music. (Klein 2008, 60-68). As a result, he was the first scholar to voice serious doubts about using Western notation to transcribe African music. Klein has given a detailed description of the seventeen-note scale Ballanta claimed to hear in some African music, and Peabody even had a custom organ built to replicate the tuning.[3] Ballanta's hope was that this organ would be able to accommodate all African tonal systems.

Ballanta was at his best when he described African rhythms. He stressed the primacy of duple time while observing that other meters can also occur simultaneously. Note, that he used the term "cross rhythm" long before A. M. Jones (Jones 1934). Similarly original is his classification of the types of music he observed in West Africa.

Ballanta never managed to publish a book bringing together his research on African music despite strong support from Peabody, and even though he had a manuscript draft of the book in hand, tentatively entitled "The Aesthetics of African Music." Oxford University Press was evidently ready to publish the book if there had been a positive review and someone would have edited the manuscript. The manuscript includes the same material as in the articles, but in addition provides much information on African instruments and rituals not available elsewhere. Ballanta's manuscript also contained some 350 transcriptions of musical examples. In the 1930s there was very little known about African music, so these examples alone would have warranted publication.

Unfortunately, Ballanta never found the support he needed to get his manuscript into print. He had already burnt bridges with Hornbostel ,who remained irritated with Ballanta for never having sent back to Berlin the recordings of African music he had promised using the phonograph Hornbostel had given him for his journey through West Africa. (Ballanta always protested he had done so but that the shipment must have gotten lost somewhere.) Ultimately, George Herzog, a former student of Hornbostel, was asked to review the manuscript. But his two evaluations (one in 1936 and the other in 1939) were devastating on virtually every account (even if unfairly so in places) and doomed all prospects for its publication.[4] The manuscript remains lost.

Anna Maria Busse Berger

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[3] It may be that Ballanta was describing here the irregular tunings observed by Kubik and others in African xylophones of both equidistant pentatonic and hexatonic scales. {cross list to Kubik} For a full discussion of Ballanta's tonal theories, see Klein, "Proud Possessions of the African," 61-66.

[4] For a fuller account of the fraught history of Ballanta's efforts to get his manuscript published, see Busse Berger 2020, 85-88.

Works Cited and Further Reading

Busse Berger, Anna Maria. 2020. *The Search for Medieval Music in Africa and Germany, 1891-1961*. Chicago: University of Chicago Press.

Jones, A. M. 1934. “African Drumming: A Study of the Combination of Rhythms in African Music.” *Bantu Studies* 8, 1-16.

Hornbostel, Erich Moritz. 1928. “African Negro Music.” *Africa* 1, 30-62.

Klein, Tobias Robert. 2008. “Proud Possessions of the African: N. G. Ballanta und die frühe westafrikanische Musikhistoriographie.” In *Moderne Traditionen. Studien zur postkolonialen Musikgeschichte Ghanas*, 25-68. Frankfurt: Peter Lang.

Kubik, Gerhard. 1983. “Sozialisierungsprozeß und Gesänge der Initianden in Mukanda Schulen,” in Artur Simon, ed. *Musik in Afrika*, 343-60. Berlin: Museum für Völkerkunde.

1844/1852: Johanna Kinkel calls for the emancipation of the quartertone

... Chopin's melodies, on the other hand, are unheard of [*unerhört*]; nothing similar was invented before them. That is probably why, when he first appeared, practically everyone over the age of forty hated him and found him completely incomprehensible, while young people were passionately enthusiastic about him.

If we now ask ourselves what it is in Chopin that so unsettles us beyond words, filling us with dread and delight, an answer appears that might seem to many like a tall tale: Chopin wants to rescue the quartertones that now appear like ghostly doppelgangers, shadowlike, among the inharmonic exchanges.[1]

To justify this view, we must look a few good steps backwards in music history. In the earliest centuries of the Christian era, when it was not the ear, but mathematical calculation that determined which intervals ought to sound good or bad, polyphonic settings moved in [parallel] fifths and octaves, one after the other, because thirds were considered intolerable dissonances. In other words, at that time, what we now consider the most atrocious harmonic sequence was considered the only correct one. The human ear was not yet sufficiently educated to distinguish between closer harmonies. The fifth, and at most the fourth, was still far enough apart; but the minor third (that wheedling and voluptuous [*schmeichlerische*, *wollüstige*] favorite of *our* hearing) probably made the same impression then as the minor second or augmented unison of C and C# does for us now when it is struck together.

If we now imagine that quarter tones have been included in our interval system, the second may one day become what the third is for us now. Anyone who has studied music history will remember the revolution caused by the first introduction of the third, which provoked the downfall of the old musical system, and provided the basis for the entire structure of the one we use at present. How long it took for it to be recognized as harmonious. Now we have to thank it for the sequence of the most splendid harmonies that have refreshed our souls for centuries, each outdoing the other. But sometimes it seems as if the source is nearly depleted; newer melodies sound more and more like imitations or superficial modifications of the older ones that have often been seen before. The ear sighs for something completely new, unheard of.

Emancipate the quartertone, and you will have a new world of sound [*Tonwelt*]!

To us, who are used to the long-established division [of the octave] into semitones, this innovation will sound dreadful, like a mere cacophony of dissonances. But perhaps the next generation, or the one to follow, having absorbed these foreign sounds with their mother's milk, will find in them a newly risen and doubly rich art.

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[1] In German: "...unharmonischen Verwechslungen..." This appears to be a play on the concept of the "enharmonisch Verwechselung," or enharmonic exchange, as when G# is substituted for Ab (e.g. Fink 1846, 105). By calling them "inharmonic" instead of "enharmonic," she may be suggesting that their logic exceeds the strictures of common-practice harmony; indeed, in "Chopin als Komponist," Kinkel points repeatedly to enharmonic exchanges (e.g. Dbb for C—see figure 1) as supporting evidence for her argument that Chopin was straining to break into microtonality. It is unlikely to be a typographical error because she reprinted the passage exactly as so in three separate publications.

Chopin seems to rattle this mysterious gate; his melodies creep unwillingly through the semitones, as if they were groping for finer, more spiritual nuances than those available for his intentions. Once this gate has burst open, we are yet again one step closer to the eternal sounds of nature: for why can we not faithfully capture in tones the Aeolian harp, the rustling of the forest, the magical sounds of the water, but only imitate them feebly, as our so-called whole tones and semitones are too crude and patchy, whereas nature possesses not only quarter- and eighth-tones, but an infinite scale, broken down into tiny sound atoms!

It is as if a Chopin nocturne were struggling to evoke the mood [*Stimmung*] that wafts around us in deepest, loneliest midnight, when we stand, listening, on a high open place and all the whispering sounds that are usually drowned out during the day are awakened. It flows down from the stars, rises upwards from the depths of the valley, and harmonizes as a scarcely audible Something. It is not buzzing [*Schwirren*], nor is it sound [*Tönen*] that fills the vast atmosphere: but it is there, the music of the night, for which there is no name—no one can deny it once they overheard it.

Source: First published in Johanna Kinkel, “Das moderne Klavierspiel,” *Der Maikäfer: Zeitschrift für Nichtphilister* 5, nos. 4, 7, 9, and 12 (1844): 249–50, 271–2, 283–5, 305–8. Later reprinted in *Acht Briefe an eine Freundin über Clavier-Unterricht* (J.G. Cotta, 1852), 75–80, and expanded in "Chopin als Komponist," *Deutsche Review* 27, nos. 1, 2, and 3 (1902): 93–106, 209–23, 338–69.

COMMENTARY

Johanna Kinkel (Bonn, 1810—London, 1858) was more than just a music theorist: a pianist, a teacher, a composer, a salonnière, a novelist, a feminist, an activist, and at the same time, a mother of four children in a home that was, by all accounts, a picture of bourgeois domesticity. This excerpt—from an article she wrote, for a periodical she edited for a literary society she managed—combines each of these sides of her multifaceted life and career. In keeping with the strict guidelines of her literary society, the article was written and sent for publication in less than twenty-four hours. But the ideas this passage presented would resonate for the remainder of her abbreviated life, reprinted it verbatim in a volume on piano teaching (Kinkel 1852), and eventually expanded for a public lecture on Chopin's compositions (Kinkel 1902 [1855]).

Her argument, swaddled in the figurative diction typical of her fiction, is that the novelty of Chopin's melodies stems from their evocation of microtones (or “quartertones” as she calls them) that fall between the twelve equally tempered keys of the piano, thus heralding a second musical “revolution.” The first, centuries ago, introduced the major and minor third into the pantheon of consonances, provoking the “downfall” of the old musical system with its progressions in parallel fifths and octaves, and paving the way for the triumphant rise of triadic harmony. The second, initiated by Chopin, will “rescue” intervals smaller than the semitone. This will grant music new mimetic capacities, enabling it to emulate the sounds of nature—"the Aeolian harp, the rustling of the forest, the magical sounds of water"—that she imagines are

composed of indivisibly small intervals or "sound atoms."[2] She hears these small intervals throughout Chopin's nocturnes, which conjure what she calls the "*Stimmung*" of a starlit evening, using a polysemous word to evoke its "atmosphere," "mood," and even its "tuning" all at once.[3] The Polish composer is rattling the gates, leading the advance to the ultimate goal: "Emancipate the quartertone, so that we will have a new world of sound!"

All this, she admits, sounds rather like a "tall tale." Where are these supposed "quartertones" in Chopin's music, and how did no one notice them before? In her lecture expanding on these ideas (1902 [1855]), Kinkel elaborates on one representative example, (**figure 1),** from the end of the A section in the First Impromptu in Ab Major, Op. 29.

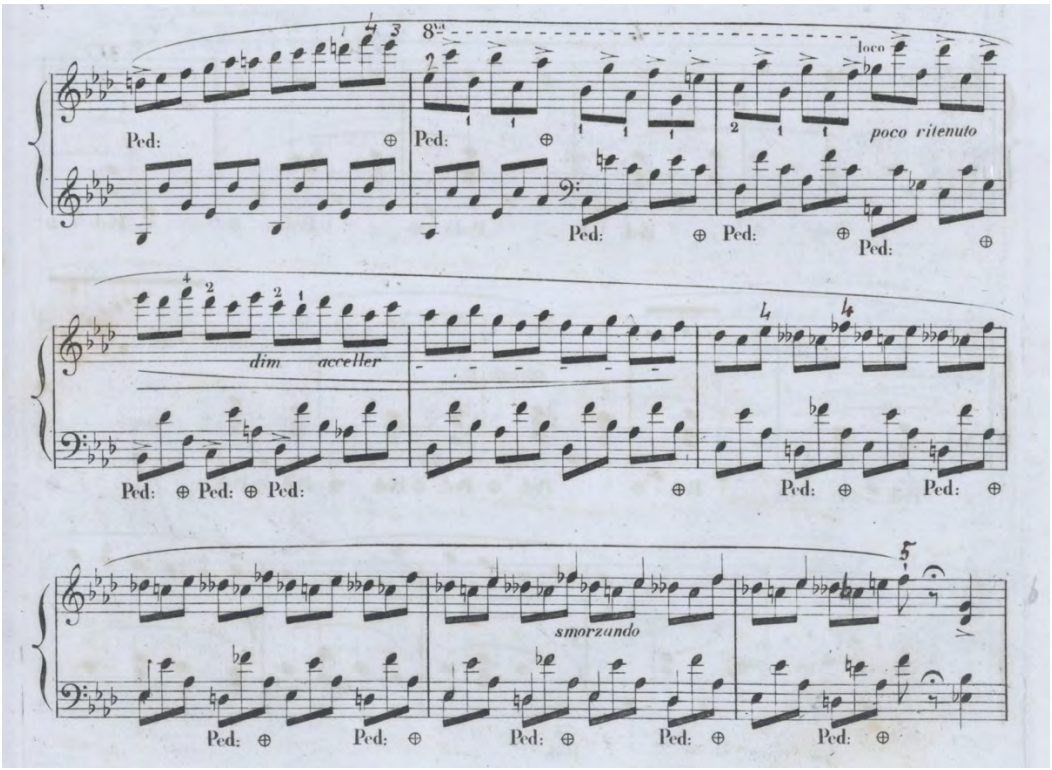


Figure 1: Chopin, Impromptu No. 1 in Ab Major, Op. 29, mm. 22-30.

She highlights the enharmonic oscillation that appears in the upper voice between C5, which functions as the third of the V6/4 chord that closes the piece's A section, and Dbb5, which functions as a chromatic upper neighbor to the fifth of what might best be called an inverted German sixth: this offers "the finest distinction of which our harmony is capable," emulating the "spirit voices whispering in the spheres... which only the soul can perceive" (Kinkel 1902, 220). Both pitches are produced by the same white key on the piano, thus acoustically identical. But *spiritually* they are distinct, which is why Chopin has notated them differently. This is the only example she discusses in detail; in the rest of her lecture, she points only glancingly at others,

[2] An idea like the "sound atom" exists in occult philosophy, rooted in the concept of *ākāśa* from Hindu cosmology, theorized as both a substance structured by etherial atoms and the vehicle that carries sound. See Kahn 2004.
[3] See Wellbery 2018 and Wallrup 2023.

like the melodic slither between D#, Cx, D-natural, and C# that opens the third Nocturne in B Major, Op 9 no. 3 (**figure 2**.)

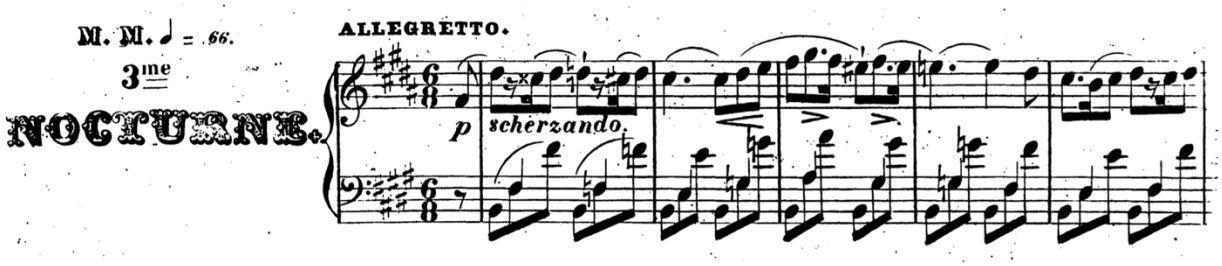


Figure 2: Chopin, Nocturne in B Major, Op 9 no. 3, mm. 1-5.

But other theorists, including none other than Heinrich Schenker, found further ones.[4] In his *Harmony,* he points to the penultimate bar of Prelude No. 23 in F Major, **(figure 3),** where a mysterious Eb5 intrudes on the arpeggiation of the final tonic triad. This, he writes, is not your average Eb, supplying the minor third above C, but a "poetic-visionary attempt" to evoke a microtonal interval that lies approximately one-sixth of a tone lower: namely, the seventh partial above the F2 fundamental supplied by the bass (Schenker 1954 [1906], 27).

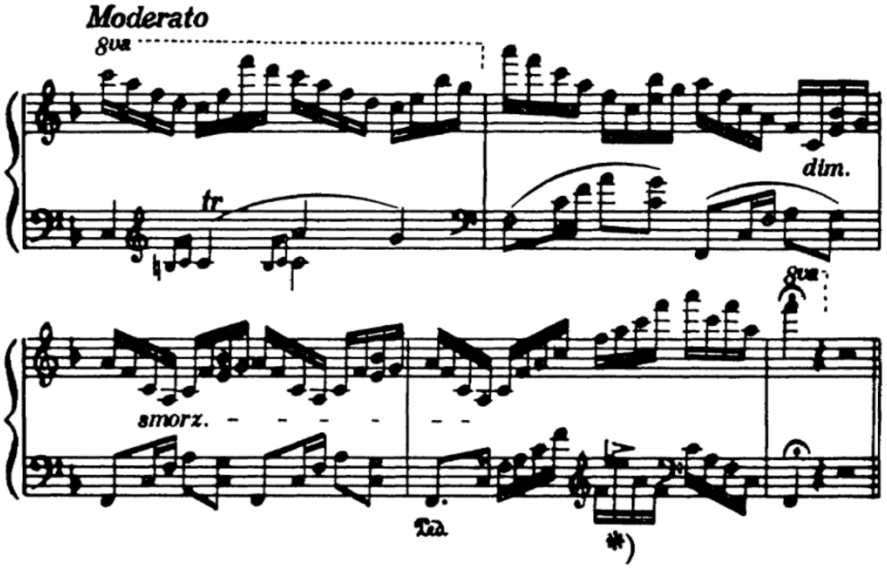


Figure 3: The closing bars of Chopin's Prelude No. 23 in F Major, Op. 28, in Schenker 1954 [1906], 27.

Kinkel is *not* suggesting that Chopin's music requires a keyboard with more than twelve divisions per octave, like those recently introduced by Thomas Perronet Thompson.[5] Nor is she advocating for the piano to be tuned to a system other than equal temperament. Rather, she is

[4] Whether Schenker read Kinkel's work is impossible to determine, but it is doubtful, as her scholarship had faded from view by the twentieth century. Nevertheless, she was read widely in her own time: see for instance Riehl 1855, who picks up (and reacts against) the political implications of her work.
[5] On such instruments, see Barbieri 2006, Conti 2008, and Walden 2017.

introducing a theoretical proposition akin to what Hugo Riemann (1992 [1914]), sixty-odd years later, would call the "tonal imagination": that there is a distinction to be made between the acoustical and conceptual levels of music, between the reality of tones and the ways in which our minds (or "spirits") make sense of them. The former is finite and tempered, as music is made with only twelve equally spaced divisions of the octave. The latter is construed as infinite and un-tempered in attunement (*Einstimmung*) with "nature." A single key on the piano can thus evoke an infinite number of conceptually distinct pitches: as in **figure 1**, C5 can signify the C-natural that lies a major third above Ab4, or the Dbb that lies a minor third below Fb5. It could also be the B# that lies a major third above G#4, or the A###5 a major third above F##4. Theoretically, the prospects are endless. Chopin's power resides in his ability to liberate a broader, continuous range of conceptual possibilities with the discrete, chromatic keyboard than any composer before him.[6]

Kinkel, as an associate of Karl Marx and a veteran of the 1848 Revolutions, does not use the rhetoric of "emancipation" lightly. She draws on a potent metaphor between the elevation of subordinate interval classes and the salvation of suppressed social classes that resonates with later arguments by Adorno, in his writings on Schoenberg's "emancipation of dissonance," and Schenker yet again, who cast them in negative relief to argue against any innovations that might threaten the diatonic (and white) status quo.[7] More specifically, she suggests that the microtonal imagination will carve a greater space for the participation of women in musical life. The future lies not in the grand genres of the symphony, oratorio, and opera, but in the nocturne, impromptu, and prelude—the idioms of the domestic salon, held in private homes and hosted by women. And it is Chopin, roundly painted as "effeminate" by contemporary critics, based on a compositional syntax that one author memorably dismissed as "harmony of the tea table," who leads the way forward (Kallberg 1996). As Kinkel often argued, the democratic revolutions of 1848 required active leadership by women who tended the private sphere of the home, where education and the formation of spirit (*Bildung*) began (Klaus 2008). What was true in politics was true in music: parity was the path to progress. The lessons of music analysis, she teaches us, can shed light on the social good.

Daniel K.S. Walden

FURTHER READING

Bunzel, Anja. "Johanna Kinkel's Pedagogical Approaches as a Socio-Political Mirror of Her Time." *Musicological Explorations* 14 (2014): 27–58.

Kallberg, Jeffrey. *Chopin at the Boundaries: Sex, History, and Musical Genre*. Harvard University Press, 1998. '

Klaus, Monica. *Johanna Kinkel: Romantik und Revolution.* Böhlau, 2008.

Moseley, Roger. "Chopin's Aliases." *19th-Century Music* 42/1 (2018): 3–29.

Riemann, Hugo. "Ideen zu einer 'Lehre von den Tonvorstellungen.'" *Jahrbuch der Musikbibliothek Peters* 21-22 (1914): 1–26. Translated by Robert W. Wason and Elizabeth West Marvin as "Ideas on a Study 'On the Imagination of Tone,'" *Journal of Music Theory* 36/1 (1992): 81–117.

Walden, Daniel K.S. "Emancipate the Quartertone: The Call to Revolution in Nineteenth-Century Music Theory." *History of Humanities* 2/2 (2017): 327–344.

[6] See Moseley 2018.

[7] Buck-Morss 1997, 130; Cook 2007, 196; Ewell 2020.

WORKS CITED

Barbieri, Patrizio. *Enharmonic Instruments and Music 1470-1900*. Il Levante Libreria Editrice, 2008.

Buck-Morss, Susan. *Origin of Negative Dialectics: Theodor W. Adorno, Walter Benjamin, and the Frankfurt Institute.* Free Press, 1977.

Conti, Luca. *Ultracromatiche sensazioni: il microtonalismo in Europa (1840–1940)*. Libreria musicale italiana, 2008.

Cook, Nicholas. *The Schenker Project: Culture, Race, and Music Theory in Fin-de-siècle Vienna.* Oxford University Press, 2007.

Ewell, Philip. "Music Theory and the White Racial Frame." *Music Theory Online* (2020): https://mtosmt.org/issues/mto.20.26.2/mto.20.26.2.ewell.html

Fink, Gottfried Wilhelm. *Der musikalische Hauslehrer, oder theoretisch-praktische Anleitung für Alle, die sich selbst in der Tonkunst, namentlich im Pianofortespiele, im Gesange und in der Harmonielehre ausbilden wollen.* Verglas-Magazin, 1846.

Kahn, Douglas. "Ether Ore: Mining Vibrations in American Modernist Music." In *Hearing Cultures: Essays on Sound, Listening and Modernity*, edited by Veit Erlmann, 107–130. Routledge, 2004.

Riehl, Wolfgang Heinrich. *Hausmusik*. J.G. Cotta, 1855.

Schenker, Heinrich. *Harmony.* Edited by Oswald Jonas. Translated by Elisabeth Mann-Borgese. Chicago: 1954 [1906].

Wallrup, Erik. "Music's Attunement: *Stimmung*, Mood, Atmosphere." In *The Oxford Handbook of the Phenomenology of Music*, edited by Jonathan de Souza, Benjamin Steege, and Jessica Wiskus. Oxford University Press, in progress. Published online in 2023 at https://doi.org/10.1093/oxfordhb/9780197577844.013.10

Wellbery, David. "Stimmung." Translated by Rebecca Pohl. *New Formations* 93 (2018): 6–45.

1493: Tuned bronze bells set *P'yŏnjong* in Korea, for court music, from the *Akhak kwebŏm* 樂學軌範 (Guide to the Study of Music), 1493, 6.3b-4b

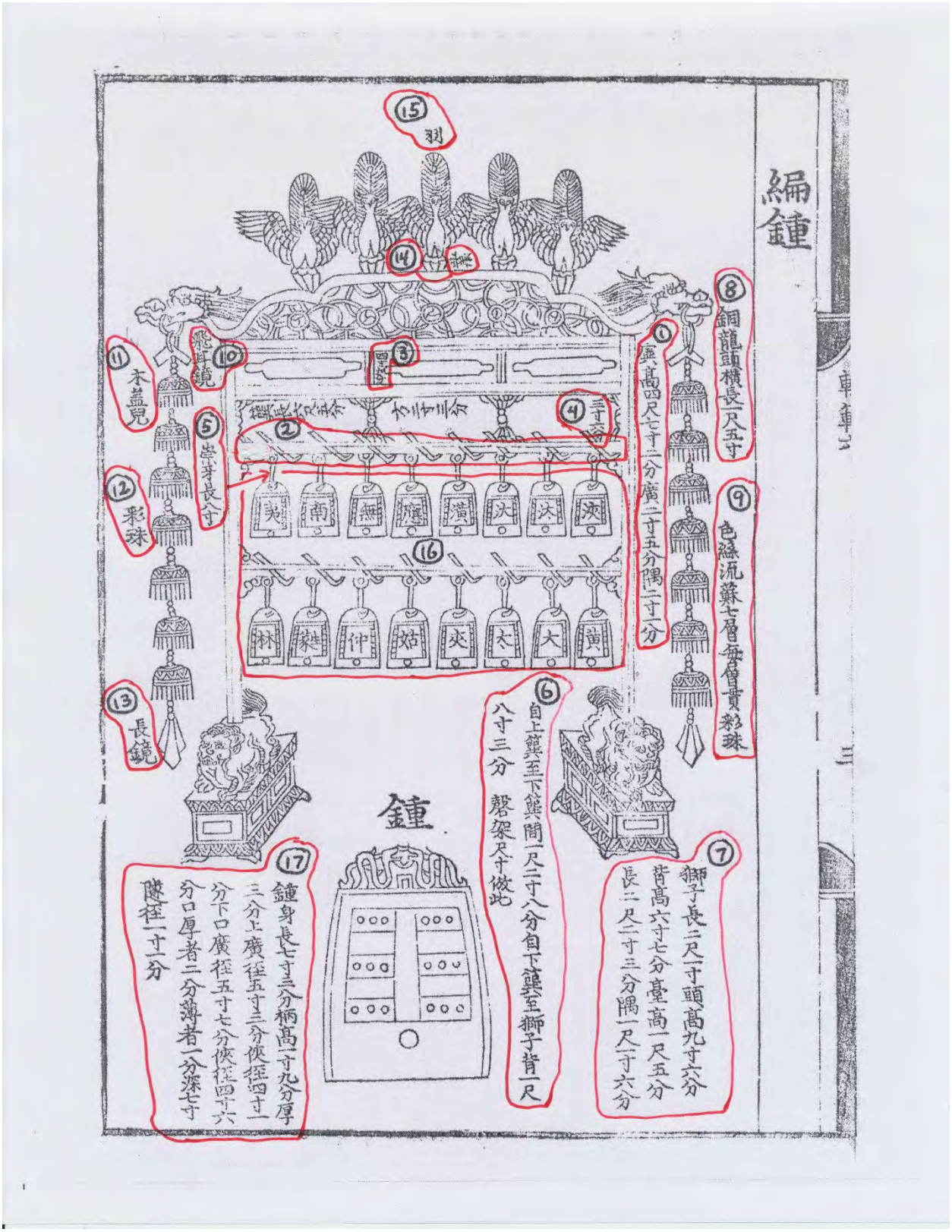
INTRODUCTION:

The *p'yŏnjong* 編鍾 (or 編鐘) (Chinese *bianzhong*) is a set of sixteen tuned bronze bells, arrayed in two rows of eight in a wooden frame, used in various types of Korean court music: *aak* 雅樂 (heptatonic ritual music of Chinese origin), *tangak* 唐樂 (pentatonic "music of Tang," rooted in Chinese music, but much Koreanized), and *hyangak* 鄕樂 (pentatonic native Korean music). The sixteen bells are tuned to the twelve chromatic notes in the octave plus four further chromatic notes in the higher octave. Along with several other musical instruments for *aak* (Ch. *yayue*), a set of finely crafted *p'yŏnjong*/*bianzhong* were gifted by the Chinese emperor Huizong 徽宗 of the Northern Song dynasty to the Koryŏ 高麗 (Korean) king Yejong 睿宗 in 1116, and derivative instruments are still played today in surviving Korean court music.

The printed *Akhak kwebŏm* of 1493 contains drawings and descriptions of many musical instruments, and, typically enough, it depicts the *p'yŏnjong* in a highly detailed drawing, complete with measurements accurate to the magnitude of 1 mm, of the rack holding up the bells—this comprises the vertical posts called *ko* 虡 and the crossbar *sun* 簨—as well as descriptions of its construction, decorations, and even depictions of the two large wooden lions holding it up. The sixteen bells themselves, of quasi-uniform external dimensions but varying in thickness, have their absolute pitches labelled on their front side; the careful drawing of one individual bell is featured, with an accompanying detailed description of its structure.

The drawing is followed by passages from some authoritative earlier documentary sources from China, supplemented by some more practical fifteenth-century Korean instructions on construction and performance technique. (For more information about the *Akhak kwebŏm*, see the *Thinking Music* entry for the Korean flute *kwan*.) As will become evident, the meaning and intent of the textual material is not always clear to a modern reader, partly because well-educated Korean readers of the late fifteenth century would already possess cultural understanding of many historical and musical matters, so that they would not have needed thorough explanation or even source citations. Still, even those experts would have had trouble fully understanding all of it, particularly the passages quoted from much earlier Chinese sources.

[continued next page]


編鍾
鍾
⑮羽
⑭
⑧銅龍頭橫長一尺五寸
⑩飛料鏡
⑪木蓋兒
⑤崇寸長六寸
⑫彩珠
⑬長鏡
⑨色絲流蘇七層每層貫彩珠
⑥自上篾至下篾間一尺二寸八分自下篾至獅子背一尺八寸三分磬架尺寸倣此
⑦獅子長三尺一寸頭高九寸六分背高六寸七分臺高一尺五分長二尺二寸三分闊一尺一寸六分
⑰鍾身長七寸三分柄高一寸九分厚三分上廣徑五寸三分俠徑四寸一分下口廣徑五寸七分俠徑四寸六分口厚者二分薄者一分深七寸隧徑一寸一分

P'yŏnjong 編鍾 [Ch. *bianzhong*]

[Illustration]

1. Height of vertical post (*kŏ* 虡) 4.72 *ch'ŏk* 尺 **[147.5 cm]**; width [of post] 0.25 *ch'ŏk* [7.8 cm]; side 0.21 *ch'ŏk* [6.6 cm].

2. Length of crossbars (*sun* 簨) 189.0 cm; [size of crossbars] 7.2 cm square.

3. [Distance between the top two crossbars] 14.4 cm

4. [Distance between second and third crossbars] 11.3 cm.

5. Length of the hanging hooks ("upwards-pointing teeth," *sunga* 崇牙) 25.0 cm.

6. From the upper [bell-hanging] crossbar to the lower one, 40.0 cm; from the lower crossbar to the lion's back, 57.2 cm. Measurements for the ***p'yŏn'gyŏng*** 編磬 frame are like these.

7. The lions: length, 65.6 cm; height of head, 30.0 cm; height of back, 20.9 cm. Platform: height, 32.8 cm; length, 70.0 cm; width, 36.2 cm.

8. Copper [alloy?] dragon head: lateral length, 46.9 cm.

9. Colored silk tassels in seven levels, with ornamental beads between each level.

10. Flying-ear mirror [the boomerang-shaped object].

11. Wooden carapace.

12. Ornamental beads.

13. Long mirrors.

14. Horizontal ornamental panel above the basic frame (*ŏp* 業)

15. Birdwings [actually, five whole birds].

16. [Order of the hanging bells:]

G#	A	A#	B	c	c#	d	d#
G	F#	F	E	D#	D	C#	C

17. Bell [individual detail]: length of the body, 22.8 cm; height of the mounting handle, 5.9 cm, and its thickness, 0.9 cm; broad diameter of the [oval] top, 16.6 cm; narrow diameter, 12.8 cm; broad diameter of the bottom mouth, 17.8 cm; narrow diameter, 14.4 cm; the mouth on thick ones, 0.6 cm thick, and on thin ones, 0.3 cm; internal depth, 21.9 cm; diameter of the striking circle (*su* 隧), 3.4 cm.

Also written 編鐘 in both China and Korea.

Conversions to metric based on one *Yŏngjoch'ŏk* 營造尺 = 31.2 cm. This measuring stick was used for musical instruments and ritual implements. Hereafter, only the converted measurement is given in the translation.

P'yŏn'gyŏng: a closely related set of 16 tuned stone chimes.

8-15: These names and descriptions of ornamental items are somewhat obscure.

[1.] 簨高四尺七寸二分廣二寸五分隅二寸一分
[2.] 簨長六尺五分 方二寸三分
[3.] 四寸六分
[4.] 三寸六分
[5.] 崇牙長八寸
[6.] 自上簨至下簨間一尺 二寸八分自下簨至獅子背一尺八寸三分 磬架尺寸倣此
[7.] 獅子長二尺一寸頭高九寸六分背高六寸七分臺高一尺五分長二尺二寸三分隅一尺一寸六分
[8.] 銅龍頭橫長一尺五寸
[9.] 色絲流蘇七層每層貫彩珠
[10.] 飛耳鏡
[11.] 木盖兒
[12.] 彩珠
[13.] 長鏡
[14.] 業
[15.] 羽
[16.] 夷 南 無 應 潢 汰 汰 浹 林 蕤 仲 姑 夾 太 大 黃
[17.] 鍾
鍾身長七寸三分柄高一寸九分厚三分上廣徑五寸三分俠徑四寸一分下口廣徑五寸七分俠徑四寸六分口厚者二分

薄者一分深七寸隧徑一寸一分

[Authoritative texts:]
The ***Wenxian tongkao*** 文獻通考 [ch. 134] says, "In the '**Xiaoxu**' 小胥 [section of the book ***Zhouli*** 周禮, ch. 6], it says, 'As to the sets of bells and chimes: half is called *to* 堵, and the whole is called *sa* 肆.' The commentary [by **Zheng Xuan** 鄭玄 (127-200 CE)] explains, 'A collected frame of bells or chimes with two [rows of] eight members and situated in a single frame is called *to*; a *to* of bells and a *to* of chimes [together] are called a *sa*.' Now the **Dasheng** 大晟 musical instruments follow the system of earlier times and also use sixteen members, having twelve members as main octave bells [i.e., pitches] and four members as higher-octave bells."

Wenxian tongkao (1319) is a large Chinese encyclopedia, often consulted in Korea on various matters.
Xiaoxu was the name of an official government music position.
Zhouli: Rituals of the Zhou Dynasty (3rd century BCE). Zheng Xuan's commentaries on such Confucian classical texts were standard for many centuries.
Zheng Xuan was one of the earliest and most influential commentators on the ancient Confucian classic texts, still consulted today.
Dasheng refers to a Chinese government institute of the early 12th century under the Song dynasty. In 1116 the emperor sent a present of musical instruments to Korea, including *p'yŏnjong*.

The ***Zhouli jingtu*** 周禮經圖 [17a] quotes the ***Lishu*** 禮書 as saying, "The vertical posts are called *kŏ* 虡, and the horizontal bars are called *sun* 簨. Suspended from the top of the *sun* are hanging hooks [*sunga*]. On top of the *kŏ* is set an *ŏp* 業 [= decorated panel]. On top of the *ŏp* are erected [birds with spread] wings, and at its two extremities (*tan* 端) there are [hanging] jade circlets and wooden fan-shapes (*pyŏksap* 璧翣). The side posts (*kŏ*) are decorated with '**naked creature**' features [*Zhouli*, ch. 12] like 'thick lips and closed mouth, manifest eyes and small ears, large chest and splendid rear, large body, and short elbow. If the sound is big and sonorous' [*Zhouli*, ch. 12], then for a bell it is appropriate to be [decorated] in this fashion."

Zhouli jingtu (ca. 1110) is an illustrated commentary on the *Zhouli*, much used in Korea, but largely forgotten in China. It also contains the entire text here attributed to *Wenxian tongkao*.
Lishu is a large treatise on ritual, written by Chen Xiangdao 陳祥道 (1042-1093).
"**Naked creature**" (including frogs, earthworms, and humans) is one of five traditional animal categories in China. Here, however, this ancient category has been changed to refer to the wooden lions holding up the side posts.

文獻通考 [*Wenxian tongkao*] 云小胥 [*Xiaoxu*] 凡懸鍾磬半爲堵全爲肆註云鍾磬編縣之二八十六枚而在一虡爲之堵鍾一堵磬一堵爲之肆今大晟 [Dasheng] 樂宗前代制亦用

十六枚以十二枚爲正鍾四枚爲清鐘焉○

周禮圖 [*Zhouli jingtu*] 云禮書 [*Li shu*] 鐘植者爲虡橫者爲簨簨之上有崇牙虡之上設業業之上樹羽而有端有璧璺鐘虡飾以贏屬若厚脣弇口出目短耳大胷耀後大體短肘聲大而宏則於鐘宜是也

[Editorial comment]
The player of the *p'yŏnjong* faces the instrument directly. In *aak* 雅樂, he plays from C (黃鍾) to G [= bottom row] using [the mallet in] his right hand, and from G# to d# using his left hand. In ***sogak*** 俗樂, he plays using both hands, as convenient. (Note: same for *p'yŏn'gyŏng*). In the case of the bells, he hits the striking place (*su* 隧); in the case of the stone chimes, he strikes the hitting place (*ko* 鼓). The mallet is made of animal horn. (Note: the same [kind of] mallet is used for *p'yŏn'gyŏng* 編磬, ***t'ŭkchong*** 特鍾, ***t'ŭkkyŏng*** 特磬, ***t'ak*** 鐲, and ***yo*** 鐃.)

Sogak: music less formal than *aak*, such as *hyangak*.

T'ŭkchong: single large bell in a wooden frame, tuned to C.

T'ŭkkyŏng: single large stone chime in a wooden frame, tuned to C.

T'ak and ***yo***: small hand bells.

Noego: large drum set with six drum heads, in a wooden frame.

The frames of the bells and chimes are made from two-year old wood, either catalpa or oak. The lions or tigers, and the ducks or geese, as well as sculpted items like the dragon or phoenix heads, all use citron wood. The frames used in Sacrificial Rites are made of pure and restrained materials, in nearly the same way as the frame for the ***noego*** drum, and have wooden peacocks, tassels, cord [for threading through the beads and tassels], and multi-colored wooden beads.

Those used in **Royal Audience ceremonies** (*chohoe* 朝會) are necessarily [more] elaborate: the peacocks, dragon, and phoenix heads all use copper, tin, lead, and iron in a mixed casting. As to the tassels, connecting cord, and decorative beads: the bells use multi-colored silk tassels (Note: the Sacrificial Rites use cotton thread), and the chimes use pheasant-tail tassels. (Note: the system for all [the other such] frames is also like this).

Royal Audience ceremonies, when the king met formally with his government officials, were held on a regular schedule and included performance of music.

按編鐘擊者對立雅樂則自黃鍾至林鐘用右手自夷則至清夾鐘用左手俗樂 [*sogak*]則兩手從便擊之 編磬同 鐘則擊隧磬則擊 鼓槌則用角 編磬特鐘 [*t'ŭkchong*] 特磬 [*t'ŭkkyŏng*] 鐲 [*t'ak*] 鐃 [*yo*] 槌同 ○

鐘磬架子用二年木或楸木橡木獅虎鳧鴈及龍鳳頭之屬雕刻板竝用椵木祭享所用純儉質素其制與雷鼓 [*noego*] 架畧同用木孔雀流蘇纓貫着彩木假珠

朝會所用則務令精巧孔雀及龍鳳頭竝用銅鑞鉛鐵交鑄流

蘇纓貫彩珠鍾用色絲流蘇
祭享所用則木綿絲 磬用雉尾流
蘇 凡架子之制倣此

SOURCE:
Akhak kwebŏm 樂學軌範 (Guide to the Study of Music), 1493, 6.3b-4b; translated by Robert Provine. Facsimile reproduction: *Akhak kwebŏm* 樂學軌範 (Seoul: National Gugak Center, 2011), 258-260.

COMMENTARY:
In this musical instrument description, as with numerous other instruments and musical matters, the *Akhak kwebŏm* tells us many details that support an understanding of the music theory underlying court music from the perspective of its practitioners. Nevertheless, and perhaps intentionally, it also refrains from directly stating some important historical and theoretical considerations that need to be teased out from other sources, including extant musical notations. In this commentary, we examine first what the printed description shows on the surface, and second, we search out some of what is unspoken, assumed, or merely implied.

Respect for Chinese precedent and heritage is shown by quotations from the authoritative Chinese sources that come after the depiction of the instrument, starting from a famous Chinese encyclopedia of the earlier fourteenth century (which, in turn, quotes an ancient source) and from two early twelfth-century sources (one quoting the other) that are close in date to the original 1116 gifts of instruments by the Chinese emperor to the Korean king. Basically, these quotations deal with terminology, giving the names of parts of the instrument, and stating how many bells there should be (16). It is worth noting that if the detailed Korean drawing of 1493 were not present, it would be virtually impossible to translate/explain the special terminology, and as a result the translation here necessarily reflects how the fifteenth-century Korean scholars interpreted the ancient terms. Finally, a commentary by the late-fifteenth-century Korean editors compiling the *Akhak kwebŏm* gives practical details of performance techniques and an expanded specification of the wood and other materials used for making the instrument.

That much is rather straightforward and demonstrates the *Akhak kwebŏm*'s standard format for describing musical instruments, but there is considerably more information that can be gathered from what is not stated.

For example, no earlier source, either Korean or Chinese, contains such a meticulous drawing as the one here. The precise illustration of a single bell, however, is clearly identical to original Dasheng bells surviving in museums today (e.g., in the Forbidden City in Beijing) that were manufactured in early twelfth-century China. It is evident, therefore, that the drawing of the single bell, and indeed the entire instrument, is copied from such an instrument that had survived in Korea until at least the late fifteenth century (but not until today).

Another example of hidden information concerns the number of bells in the set: while the illustration and description are clear that the instrument should have sixteen bells, no justification for the number, other than the cited Chinese sources, is directly stated. In fact, an earlier official

publication of 1415 in Korea had explained that the number should be twelve, and, as one might suspect, quoted a different authoritative Chinese source to support that number. That alternative source, Chen Yang's 陳暘 (1061-1128) *Yueshu* 樂書 (Treatise on Music) of 1103 [ch. 110], is frequently cited and quoted in *Akhak kweböm* elsewhere as a high authority, but not here – the Korean authors simply chose a different source that backed up the sixteen-bell decision they had already made (a tactic of citational flexibility still found in scholarship around the world today).

In brief, the justification for the number sixteen drew on the correlative nature of Korean music theory, based on interpretation of Chinese theoretical ideas, but with a distinctive Korean slant (explained elsewhere in the *Akhak kweböm*). The first three notes (from low to higher) in the *aak* heptatonic (Lydian) modal scale were associated with the human entities Ruler, Minister, and People, with the understanding that lower pitch implied more substance and significance. Ritual melodies needed to be transposed to various keys, again for reasons of pitch correlations to things like seasons and months, and the Korean scholars were concerned that, for example, a melodic transposition of the Ruler note to the pitch A would require a C# for the People note. With only twelve bells, the People's pitch class C# would have to be played in the lower octave, lower in pitch than the Ruler note, and thus disorderly and unacceptable. With sixteen bells, the C# can be played in the higher octave, avoiding such problems of disorder among the humanoid notes in the mode. As the quotations from the authoritative Chinese sources assure us, the *Dasheng* instruments of the early twelfth century also had sixteen bells.

In any case, we are fortunate to have such a splendid description of the *p'yŏnjong* preserved in the *Akhak kweböm*, supplemented by numerous other near-contemporary Korean documents that, with careful study, reveal theoretical and historical concerns that are gently implied or simply omitted in the *Akhak kweböm*. The Korean commentators have shown their scholarship and creativity by reconciling their own musical preferences with several older Chinese sources, arriving ultimately at a beautiful and functional musical instrument.

Rob Provine

FURTHER READING:

Chang Sahun 張師勛. *Han'guk akki taegwan* 韓國樂器大觀 (Korean Musical Instruments). Seoul: Ministry of Culture, 1969.

Falkenhausen, Lothar von. *Suspended Music: Chime-Bells in the Culture of Bronze Age China*. Berkeley and Los Angeles: University of California Press, 1993.

Pak Hŭngsu 朴興秀. *Toryanghyŏng kwa kugak nonch'ong* 度量衡과 國樂論叢 (Essays on Measurements and Korean Music). Seoul, 1980.

Provine, Robert C. *Essays on Sino-Korean Musicology: Early Sources for Korean Ritual Music*. Seoul: Iljisa Publishing Company, 1988).

___. "Music, Measurements, Pitch Survivals, and Bell Shapes in Korea," *World of Music* 49, no. 3 (2007): 13-30.

___. "Patterns of Compilation: Thoughts on Chapter 6 of the *Akhak kweböm*," *Han'guk ŭmaksa hakpo* 韓國音樂史學報 (Journal of the Society for Korean Historico-Musicology) 11 (1993): 511-19.

Yi Hyegu 李惠求. *Sinyŏk Akhak kweböm* 新譯 樂學軌範 (A New Translation of *Akhak kweböm*). Seoul: National Gugak Center, 2000. (Includes complete facsimile

Musical calendars: structuring time and productive cycles in the Bolivian Andes

In many parts of world, it is common to connect musical compositions or genres with specific events or times of year, such as weddings or Christmas. Music can thus serve as a powerful resource for invoking and giving shape to forms of temporal experience. This mode of structuring musical performance, genres, instruments, and tunings in relation to the seasons and the productive year is particularly highly developed among Indigenous *(originario)* communities of the rural Andes, especially in highland Bolivia. Performing certain genres and instruments is often claimed to impact weather patterns, crop growth and the fecundity of domestic animals.

The complexity of this calendrical system, where each instrument has a specific time and context when it should be played, varies locally and regionally. Hans Buechler (1980:358-9) reports that as many as 12 different flute types (notched flutes, duct flutes and panpipes) were rotated through the course of the year in the community of Irpa Chico (30km south of La Paz, Bolivia's capital). Elsewhere, it is common for players to alternate 5 to 7 different instrument types through the course of a year, with flutes often played collectively in consorts with, or without, percussion.

Here we briefly introduce and compare the calendrical use of instruments, genres, and tunings in two different Quechua speaking communities of the Northern Potosí region of Bolivia, situated approximately 160km (100 miles) apart. Fortunato grew up the rural community of Irpi irpi, in the Qayana region, and will focus on the music of his home ethnic group, *ayllu* Chullpa. Henry undertook extended research in the community of Kalankira (Cayanguera) in *ayllu* Macha in the early 1990s, where he retains close friendships. Much of what we describe for these case studies holds true today. However, in other areas and over recent decades, it has become increasingly common for music to be performed outside prescribed seasonal or festive contexts, and for community-level calendrical prohibitions to have been relaxed or abandoned (Hachmeyer 2021:163-4).

Situated in the southern hemisphere, highland Bolivia's rainy growing season (*paray timpu* or 'rainy time' in Quechua) is usually identified with the period between November and March. Its cold dry season (*chirawi* or 'cold time' in Quechua), is expected between April to October. These two periods mark the most significant distinction in the calendrical categorization of musical instruments, genres and associated dances. This applies to both our case studies, and to numerous other rural communities of the Southern Central Andes.

In Fortunato's community people refer to these two halves of the year respectively as *wayñupacha* ('time of *wayñu*) and *kirkipacha* ('time of *kirki'* or "songs"). In Figure 1, Fortunato shows how these two seasons are further subdivided into two-month periods: *wayñupacha* consists of *paraqallariy* ('rain begins'), *chawpipara* ('mid rains) and *paratukuchay* ('rain ends'); whereas *kirkipacha* consists of *qasapacha* ('icy time'), *wayrapacha* (windy time') and *q'uñipacha* ('warming time'). Each two-month period is also associated with specific musical instruments *(charanku* [charango]*, suqusu* [julajula, wauqu], *lawuta* [*pinkillu*]*,* and *qhunqhuta)* as discussed in more detail below. The 'windy' and 'warming' time above, are also sometimes referred to as 'hungry' time, as food and pasture are scarce.

Figure 1: Division of the year into two main musical seasons, and six shorter periods connected with specific musical instruments (ayllu Chullpa), graphic created by Fortunato Quispe

Wayñu refers to music played by consorts of wooden *pinkillu (lawuta)* flutes or sung accompanied by a large *qhunqhuta* guitar during the rainy growing season, typically alongside dance. This is identical in Kalankira, except that a different style of rainy season guitar is used, called *kitarra (guitarra).* In both cases these rainy season guitars are decorated with images of growing crops (Figures 3 and 5). According to Fortunato, rather than just referring to a genre, *wayñu* means 'to move oneself', and he equates joyful dancing bodies to flourishing crops. Elsewhere in rural Bolivia, people describe potatoes 'dancing to the sound of the *pinkillu,* an instrument which is also said to bring joy to the animals' making the sheep and llamas 'jump from side to side' (Quispe 1989:5, in Gutíerrez and Gutíerrez 2017:177). People in Kalankira insisted that *wayñu* is the most joyful music of the year, even if outsiders sometimes perceive the sounds of *pinkillu* flutes as 'mournful' (see Figure 2). In its Spanish spelling, *huayño* or *huayno* (Peru) refers to a range of other genres.

Figure 2: *Pinkillu* flutes or *Lawuta* (from the Spanish *flauta* 'flute') played during visits to homes and fields during the feast of Carnival (February/March), Irpi Irpi community. Photo by Fortunato Laura, 2008.

In both Irpi irpi and Kalankira, it is stated that *wayñu* should be silenced and *pinkillu* flutes hidden away during the dry winter months. In Kalankira, Henry was warned that performing *wayñu* out of season would cause the player to sprout 'devil-like' horns; a reference to sprouting potatoes (which should be dormant at this time). During the dry winter months panpipes are played and their sound was said to attract frost. Paired 4 and 3 tube panpipes, made in five sizes, called *julajula, wauqu* or *suqusu,* are played by large groups of men during the harvest feast in May. As they play, the men perform a snaking dance in a single file called *wayli,* creating circular and zigzag formations. According to people in Irpi irpi, the *wayli* dance imitates the characteristic movements of the *tikitiki* bird. In Kalankira *julajulas* are closely associated with ritual fighting *(tinku),* for which the region is well known. Another style of panpipe called *siku*, played by paired 7 and 8 tube instruments alongside drums, is also played in Kalankira. *Sikus* accompany processions and dancing during patronal festivals in September; the lead up to preparing fields for planting.

Like the wind music of the dry winter season, the songs sung at this time to the strumming of the small mandolin-like *charango (charanku)* were claimed to attract the frost. In Kalankira these songs, which are primarily geared to courtship, are called *taki* ('song' in Quechua) and in Irpi irpi *kirki* (possibly derived from *kirkinchu* or 'armadillo', from which pre-1980s charangos were commonly constructed). Young unmarried women are the main singers, and their performances are typically flirtatious and playful, as they assert female independence and agency, while exhibiting immense artistry as oral poets. The constant stream of words of these dry season songs, albeit full of word play, humour and poetic device, is sometimes compared to 'chattering'. It is notable that the favoured style of *charango* used by men to accompany *takis* in Kalankira was conventionally decorated with parrots (see figure 3), which were said to 'talk constantly' (Stobart 2006:77-79).

Figure 3: A dry season charango decorated with a parrot image (top) and a rainy season *kitarra,* decorated with images of growing crops around the bridge (below), as played in Kalankira.

In contrast with the "chattering" *taki* songs of the dry winter months, which are often structured in 6-syllable couplets, rainy season *wayñu* songs do not tend to follow a set poetic metre or phrase length. They are usually more extended compositions, which must be

renewed each year; the creation of which is often connected with chthonic forces of the inner earth, especially the *sirinus (sirenas)*. Even though mainly sung by women, *wayñu* lyrics usually take a man's perspective and present women as the objects of male desire, stressing their beauty often alongside references to flowers and plants (which also decorate rainy season guitars, see Figures 3 and 5). In addition to calendrical differences in poetics, musical structure and instrument construction, a range of different tunings are used through the course of the year, as shown for the case of Kalankira in Figure 4.

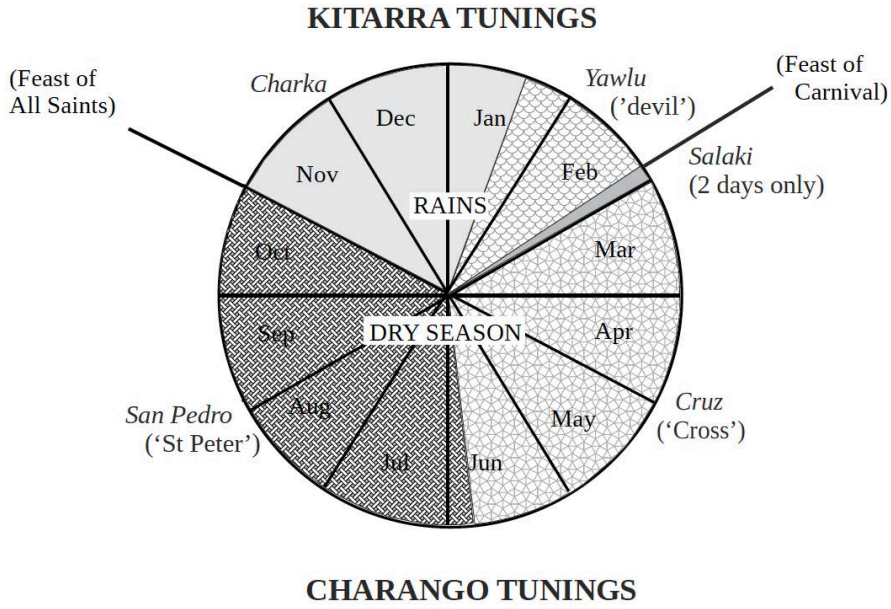


Figure 4: Alternation of guitar types and tunings in Kalankira (Stobart 2006).

A different set of tunings, sub genres, and dance traditions, as well as contrasting forms of guitar construction, are found in Irpi irpi. Also, in this region—and several other central and northerly parts of Northern Potosí—it has become common since the 1980s to downplay seasonal conventions by combining the dry season *charango (charanku)* with the rainy season *qhunqhuta* guitar in *wayñu* songs. (In part this was motivated by the introduction of NGO-sponsored competitive music festivals). Since the 2000s instruments are increasingly constructed with machine head tuners, rather than wooden tuning pegs. This facilitates playing in large ensembles of *qhunqhutas* and *charangos*, often joined by a Spanish guitar, played purely melodically and doubling the women's vocal line (see Figure 5).

Figure 5: A Spanish guitar (left), charango (centre) and qhuqhuta (right) as played together in consort in Irpi irpi. These recent models include machine head tuners, and the charango incorporates high-pitched drones *(uñita).* The modern style of qhunqhuta continues to be decorated with growing crops. Photo by Fortunato Laura.

The seasonal alternation of instruments has often been interpreted as a strategy to order the unpredictable atmospheric conditions of the arid high Andean environment, on which the livelihoods of agriculturalists and herders critically depend. While exceptions abound, a few generalised patterns have been identified regarding the seasonal use of musical instrument types. For example, duct flutes (e.g. *pinkillus*, *mohoseños* and *tarkas*) tend to predominate in the rainy season, whereas notched flutes (e.g. *kena-kena, choquela, pusi p'iya)* and panpipes (e.g. *sikuri, jula jula, ayarichi, qantu)* are more typical of the dry winter months. Based on this taxonomy, various scholars have developed hypotheses to explain why particular instruments are connected respectively with the dry winter months or the rains. For example, Raimund Schramm suggests that the canes used to construct notched flutes and panpipes grow on riverbanks in the tropical lowlands and are thus conceptually 'low' and 'damp'. By contrast, he relates the *tarka* and *pinkillu* duct flutes of the rains to materials from higher altitudes, characterising them as conceptually 'high' and 'dry' (1992:327-28). Thomas Solomon takes a different approach, pointing out that the cane or bamboo instruments of the dry season are naturally hollow, and this 'lack of internal substance in the material of the instruments seems to be iconic of the inability of the land to produce during the dry season'. By contrast he interprets the pithy centre the *sauco* branches used to construct *pinkillu* flutes, as 'iconic of the moist conditions and plant growth of the rainy season' (1997:185-86).

While these interpretations are thought provoking, as soon as we move outside Northern Potosí, neat seasonal distinctions between construction materials become problematic (Schramm's study encompasses the entire Aymara region). For example, *musiñu (mohoseño)* flutes and numerous other forms of *pinkillu* of La Paz and Oruro Departments - all instruments of the rains and associated with crop growth - are made from cane or bamboo. Given the diversity and unequal distribution of knowledge, people's creativity in finding new meanings, and the ways identity is marked by cultural difference, we should hardly expect calendrical music and dance performance to conform to a single, widely accepted and contradiction-free system or theory. Even though Irpi irpi and Kalankira are relatively nearby geographically and share many musical traits, there are also striking differences in local meanings, instrument construction, tunings, and performance practice. This highlights the danger of over-generalising theory and the need for collaborative ethnographic methods.

Fortunato Laura and Henry Stobart

References

Buechler, Hans. 1980. *The Masked Media: Aymara Fiestas and Social Interaction in the Bolivian Highlands*. The Hague: Mouton

Hachmeyer, Sebastian. 2021. *Musical Bamboos: Flute Making, Natural Resources, and Sustainability in the Bolivian Andes*. PhD thesis. Royal Holloway University of London.

Laura Colque, Fortunato and Juan Marchena Fernández. 2024. *Por las huellas del Yachaq. La sabiduría Chullpa desde la memoria de los etnomédicos. Potosí, Bolivia. 1979-2019*. Rome: Roma TrE-Press and Seville: Enredars.

Schramm, Raimund (1992). "Ist'apxam! – Escuchen! Tradiciones musical y oral aymaras." In *La Cosmovision Aymara*. Eds. H. van den Berg & N. Schiffers. La Paz: Hisbol & UCB.

Solomon, Thomas. 1997. *Mountains of Song: Musical Construction of Ecology, Place, and Identity in the Bolivian Andes*. PhD thesis. University of Texas at Austin.

Stobart, Henry. 2006. *Music and the Poetics of Production in the Bolivian Andes.* Aldershot: Ashgate.