
DAVID PEÑALOSA. *The Clave Matrix: Afro-Cuban Rhythm: Its Principles and Origins.* Redway, California: Bembe Books, 2009. Photos, musical examples, glossary, bibliography, discography, videography, 2 CDs, 288 pp. ISBN: 1-886502-80-3

There has been much recent discussion about the family of asymmetrical *topoi* (to borrow Kofi Agawu's term¹) that behave as generators of both structural and surface level rhythmic relationships and that subtend numerous diasporic West African performance practices. This discussion involves the music theory community,² ethnomusicology,³ and an international network of performing musicians,⁴ and has even forged important dialogs between them.⁵ As we examine them, however, we must ask: just what kind of phenomena are such *topoi*? Are they metric phenomena (this is the reading, mostly refuted in more recent scholarship, offered by an earlier generation of ethnomusicologists—the so-called “additive” model of African rhythm), are they syncopations against a deeper periodic structure, or are they something else entirely, something whose definition is not well-served by the metric/rhythmic vocabulary that has been used historically?

David Peñalosa's new book, *The Clave Matrix: Afro-Cuban Rhythm: Its Principles and Origins*, is a powerful step toward linking these various ways of thinking about clave: what it is, where it comes from, how it behaves, how it influences its musical environment. Part record-straightener, part historical examination, part how-to manual, *The Clave Matrix* is as comprehensive a treatment of “clave music” (Peñalosa's term, about which below) as we have seen, and significantly links scholarly research with practical performance and pedagogical considerations.

Peñalosa is a percussionist and teacher in Humboldt County in Northern California, and a significant part of a rich and vibrant musical culture that has manifested in that part of the world. The current book is the first of a series titled *Unlocking Clave* that explores “clave music,” with volumes on *rumba quinto*, *guaguancó matancero*, *bembé*, and something called “the generative theory of clave music” forthcoming. This last volume will obviously strike a familiar note with music scholars that have absorbed (and sometimes wrestled with) linguistic-based theories of musical process,⁶ and leaves this reviewer intrigued about the continued exploration of parallels between the dialog of diasporic African dance/drum music and human speech.

Peñalosa begins by systematically introducing a small number of key concepts: main beats and secondary beats, *bombo*, *ponche*, and *tresillo*. All of these terms return repeatedly throughout his narrative, subtending what can seem on the surface to be very different performance contexts, and he takes care to explain each term fully and offers clear examples of how they function and, more important, how they interrelate. For example, *bombo* is

typically described as the accented onset that occurs on “1-a” (or the fourth onset of the 16-cycle), while *ponche* refers to the strong “2-and” that suspends into the next half-cycle beginning. Peñalosa relates both *bombo* and *ponche* to their corresponding onsets in *tresillo*, the latter of which is typically described as an ancestral rhythm from which *clave* derives, but which Peñalosa maintains occupies a very important structural role in *clave* music.⁷ We hear two iterations of *tresillo*, coterminous with the duration of one complete cycle, overtly in *danzón*, we hear it abstracted (slightly) in many bass *tumbaos*, and we hear clearly its correspondence to the 3-side of *clave*. But Peñalosa describes the way in which *tresillo* nests into both the 3 and 2 sides of *clave*, and describes the resulting syncopations as primary *bombo* and *ponche* and secondary *bombo* and *ponche*, as shown in Figure 1.

The interrelatedness of these two pairs of expressive rhythmic figures with *tresillo* (with which they line up) and *clave* (in which *bombo* and *ponche* line up with the 3-side but syncopate against the 2-side) begins to describe some of the rhythmic richness of *clave* music. Peñalosa describes this second relationship as “counter-*clave*.” It is heard clearly in *guaguancó habanero*, for example—the *tumbador* *ponche* anticipates the third onset of the 3-side of *rumba* *clave*, and the *segundo*’s second onset demonstrates how the secondary *bombo* nests into the 2-side of *clave*. Figure 2 illustrates how these syncopated, but structurally significant, melody notes derive from the superimposition of *clave* and the primary/secondary *bombo*/*ponche* nexus.

Another important concept that Peñalosa introduces early on, and which informs much of his later thesis, is that of the primary and secondary beat cycles that determine how we entrain to 12-cycle periodicities. The 12-cycle is of course unusually rich in cyclic entrainment possibilities, since it can be parsed by 1, 2, 3, 4, and 6 (and even 5 if we consider it in mod 12 space), but two of those cyclic paths, the 3-cycle and 4-cycle, are particularly important from a structural (as well as phenomenological) point of view. The 3-cycle, which divides the 12-cycle into four periodic pulses, corresponds to Peñalosa’s primary beat, while the 4-cycle, which divides the 12-cycle into three pulses, amounts to an important but structurally dependent secondary beat cycle. This dependent relation is based on the fact that the main,

FIGURE 1. Primary and Secondary *bombo* and *ponche* in *son* *clave*.

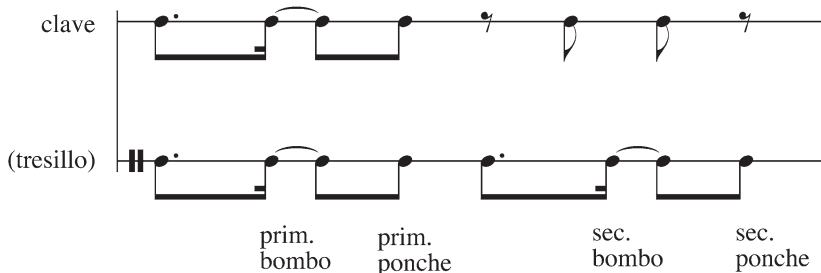


FIGURE 2. Primary and Secondary bombo and ponche in *guaguancó habanero*.

The figure shows three staves of musical notation. The top staff is labeled 'segundo tumbador' and has a '2' above it. The middle staff is labeled 'clave' and the bottom staff is labeled 'tresillo'. Below the tresillo staff, four rhythmic patterns are identified: 'prim. bombo', 'prim. ponche', 'sec. bombo', and 'sec. ponche'. The notation includes various note values, rests, and beams connecting notes across measures.

four-count beat corresponds directly with how the dancers' feet entrain to the music (this is an important point that has been made recently in Agawu 2003 and Stover 2009 as well). When the 3-cycle and 4-cycle are considered together, we get the familiar 3:2 *hemiola* shown in Figure 3a. Note that Figure 3a actually shows a 2-cycle juxtaposed with the 3-cycle, but the 2-cycle clearly represents a metric subdivision of the fundamental 4-cycle structure.

While tresillo has been described as the additive rhythmic figure 3+3+2 (a characterization that has been called into question in recent years), Peñalosa offers convincing support for the refutation of an additive interpretation. He describes tresillo essentially as a stretching of the "3" part of the 3:2 hemiola in order to conform to the metric subdivisions of the 16-cycle interpretation of clave. Figure 3b shows how the relationship between the tresillo rhythm and its surrounding meter behaves as a permutation of the 3:2 hemiola from the 12-cycle. A comparison of the two

FIGURE 3. Mapping of 3:2 hemiola onto tresillo.

Figure 3 consists of two parts, A and B. Part A shows a 3:2 hemiola with two staves of notes. The top staff has three dotted notes and the bottom staff has two dotted notes. A bracket below the bottom staff is labeled '3:2 hemiola'. Part B shows 'tresillo against steady pulse' with two staves. The top staff has four notes and the bottom staff has four notes with beams connecting them. A bracket below the bottom staff is labeled 'tresillo against steady pulse'.

relationships (the 3:2 hemiola in the 12-cycle example, and tresillo against a steady four-count grid in the 16-cycle version) shows clearly their shared derivations.

Nested into this scheme is a third important cyclic entrainment-point, which is the notion of offbeat cycles. Peñalosa describes a significant offbeat cycle that shadows the beat cycle and that serves as a sort of rhythmic foil to the strong metric grounding of the latter. The offbeat cycle is essentially the beat cycle (or often the rhythmic figure that traverses the beat cycle, such as tresillo) rotated to a later position in modular space, and it turns out that many topoi can be divided into syntactical halves that begin with beat entrainment and conclude with offbeat entrainment. This is a tantalizing revelation, as it describes very well some of the theoretic underpinning for the teleological nature of the *topos* itself, which always points forward toward the new cycle-beginning. Elsewhere I describe how topoi (including clave) unfold as progressions of calls and responses, or as ebbs and flows of consonance and dissonance (Zuckermandl refers to a similar phenomenon as the trough and crest of a wave), and Peñalosa seems to be the first author to thoroughly describe the actions of beat cycles moving to offbeat cycles and back as being key to this type of motion.

In 16-cycle-based clave music, a direct correspondence between the offbeat cycle and the “displaced tresillo” results when the tresillo rhythm is offset by a single timepoint (or sixteenth note in the examples above). Peñalosa asserts that “the displaced tresillo is the 4/4 correlative of the offbeat-six cycle. The two diametric tresillo patterns correlate with the two diametric six-beat cycles.” (74) This will prove to be an important expressive rhythmic figure in the narrative that follows.

In Chapter 4, Peñalosa begins a close scrutiny of clave itself. He describes clave as a binary structural, with the two syntactic halves that are typically described as the 3-side and 2-side, which exist in an antecedent-consequent relation with one another. Clave is the key that unlocks many of the rhythmic secrets in clave music, but it functions as a different sort of key as well, as the keystone of stonemason work, since “just as a keystone holds an arch in place, the clave pattern holds the rhythm together in Afro-Cuban music.” (88)

The interlocking model of clave with/against tresillo returns in Chapter 4, and Peñalosa carefully describes the resulting field of cometric and contrametric relations that result from the juxtaposition of clave and tresillo. Peñalosa uses the terms “with clave” and “counter-clave” to describe this relation, especially the notion of primary and secondary bombo and ponche, both of which return in this chapter with new and revealing contextualization. This is an excellent illustration of the progressive pedagogical model that Peñalosa offers in *The Clave Matrix*. Descriptions of rhythmic relations and exercises on beat entrainment, put forth as theoretical models earlier in the volume, help reify our understanding of how rhythms and accents

work when they are contextualized later. So by the time Peñalosa starts delving deeply into what clave music is and how it behaves, we already have a thorough understanding of the complex network of rhythmic and metric interactions that inform it.

Secondary bombo, for example, is a *contraclave* phenomenon, since it does not coincide with the structural points of the 2-side of clave. One could argue, if so inclined, that the 2-side of clave is *contra-tresillo* as well: since we accept the secondary bombo as structurally prominent due to its relationship to the tresillo rhythm, we could assert that the 2-side of clave is somehow syncopated against tresillo! Part of the richness of the conversation around clave music is of course that both of the above statements are true, as is the notion that tresillo itself, owing to its syncopation against the four-count metric grid, is to some small degree contrametric (and so, therefore, is the 3-side of clave). So we have the prevailing meter, the paired tresillo rhythms, and clave, all of which syncopate against each other at various times and depending on which stratum one chooses to attend to.

This is an important contribution to the theoretical literature: the notion of being *contraclave* but cometric (or with clave but contrametric, or cometric but *contra-tresillo*, etc.). This starts to point toward a concept that neither theorists nor ethnomusicologists have yet addressed convincingly, which is the notion that clave is not meter, but neither is it a rhythmic construct that is merely syncopated against meter. It is more than meter, but it requires meter for its identity.⁸ Peñalosa has taken some important strides toward a useful definition of what topoi like clave actually are, as determinants of rhythmic and metric organization that are also determined in significant ways by those same rhythmic and metric constructs.

Some of the most important points from the first half of *The Clave Matrix* are summarized in two illustrations on p. 104. These diagrams describe the “three-part rhythmic counterpoint” that results from the superimposition of three structural strata: the four-count primary beat and six-count secondary beat, plus clave, in 12-cycle, standard-pattern-based music, and the four-count primary beat, tresillo, and clave in 4/4 clave music. Peñalosa insists that “to truly be clave-based, the music’s supportive structure has to be an expression of the three-part counterpoint.” (105)

In his supporting commentary, Peñalosa reinforces the teleological nature of clave:

Rhythmic tension is generated in the first half of clave and resolved in the second half. Tension is initiated on primary bombo and resolves on beat four where the main beats and clave coincide. The two cells of clave cycle in a call-and-response or antecedent-and-consequent sequence. The three-side of clave is commonly referred to as “strong” (“fuerte”), “positive,” and “round,” while the two-side is called “weak” (“débil”), “negative,” and “square.” (104)

This is of course an insufficient way to describe how clave behaves in the context of actual musical performance, since it doesn't account for what happens when the end of the cycle points toward the next beginning (and many scholars will question outmoded and masculinized terms like "strong" and "weak"), but it does begin to address clave's auto-dialogic nature.

A detailed examination of how all of the various rhythmic components of clave music nest into the *clave matrix* follows, with many examples from *batá*, *bembé*, *guajeo*, *son*, and *rumba*. I find one small point of contention in Peñalosa's discussion of "3-2" vs. "2-3" clave; in particular his assertion that folkloric Cuban music is always in "3-2" clave, with its strong structural downbeat, while popular music can be in either "3-2" or "2-3", or switch back and forth through the unfolding of a performance. This last point is of course indisputable: countless popular arrangements rotate the melodic and harmonic grid around clave for dramatic purposes. I assert, though, that folkloric music does the same thing, and quite frequently. In other words, even though folkloric musicians do tend to conceive of one single clave, which begins on that aforementioned strong structural downbeat, there are clearly vocal and instrumental phrases that begin on the second half of the cycle, and those 2-side beginnings are clearly intentional and strategically conceived in service of the dramatic flow of the performance. Even though there is typically no harmony instrument in folkloric music (which is part of Peñalosa's rationale for his assertion about 3-2 vs. 2-3 clave; see pp. 158–168), there are still melodic goals of motion, cadences, and ebbs and flows of directed energies that suggest shiftings of internal phrase beginning-points in precisely the same way, and to the same degree, that harmonic motions do. Interestingly, Peñalosa's example on p. 158 supports the notion of implied harmony through melodic goals: the two downbeat arrival points on "lodo" assert a dependent harmonic relationship of dissonance resolving to consonance, hardly different at all from that found in dominant-tonic motion. Indeed, all of the notated pitches (played in the audio example by a vibraphone) outline a C major chord moving to G7 and then back (the E in the fourth system is a typesetting error—it should be the D a step below).

Regarding the "problem" of reconciling phrase beginnings that start on the 2-side with the notion that there is only one clave in folkloric music, Peñalosa concludes by offering the reader a choice: "it really comes down to whether you choose to use clave or the melodic/harmonic structure as your primary referent." (168) It may seem as if this is simply a matter of terminological felicity, but it is an interesting matter for further consideration: even though performing musicians speak of one clave and don't acknowledge the 3-2 / 2-3 nexus (Peñalosa correctly points out that these terms are, by all estimates, a North American creation), we still must acknowledge the

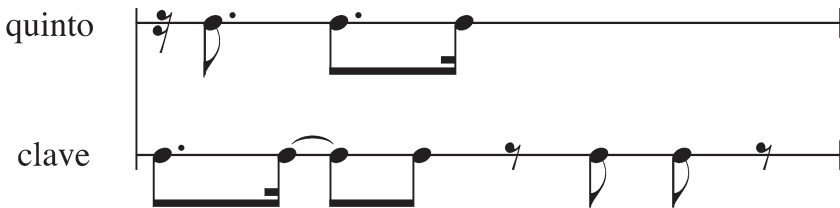
motile nature of phrase structure, since it is such a pervasive practice in both folkloric and popular Afro-Cuban music styles.

Samarotto has suggested the term “shadow meter” to describe the behaviors of long-term metric displacements in 19th-century Western art music, and I think the world of clave music scholarship and performance could stand to adopt a similar term to describe the (sometimes temporary, sometimes long-term) displacement of the phrase beginning-point to the 2-side of clave.⁹

The Clave Matrix is the first book in a series called *Unlocking Clave*, and in chapter 6 Peñalosa introduces the idea of the *lock* and some ways in which the lead instrument in an ensemble (whether it is *quinto*, *caja*, flute, trumpet, etc.) can slide in and out of a locked relationship with clave. The notion of locks is a powerful conceptual tool, and it refers to a rhythmic cell that conforms closely to clave or to a deliberately contraclave (offbeat cycle) figure. A very typical example of the latter, outlining a displaced *tresillo* rhythm, is reproduced in Figure 4. The practice of unlocking and locking clave, then, refers to the lead instrumentalist’s ebb and flow between figures that conform to clave and those that float against it, and the dramatic tension that results is one of the things that propels the music forward and gives it its exciting dynamic energy.

In his description of *quinto* locks in Havana-style *rumba columbia* and *guaguancó*, Peñalosa modifies his language, and the notation of his examples, somewhat, stating that “the *quinto* coincides with the third stroke of *rumba clave* . . . , a thematic element consistent with all *quinto* locks.” (198) It is eventually clear that this is what he is getting at, but the early exposition of lock motifs is quite confusing. This is expounded by a notational oddity starting on p. 181: it is not at all clear until one has read much further that the notation of Peñalosa’s Example 6.3 is to be read as four consecutive measures and not as a score in which all parts coincide. With repetition, however, this turns out to be a rather elegant solution to the problem of cyclic representation, but there ought to be a bit more explanation early on. An excellent *guaguancó* example is found on p. 199, which illustrates clearly the value of locks as they relate to *quinto* performance. This is the

FIGURE 4. “Displaced *tresillo*” in *quinto*.



crux of Peñalosa's thesis in this part of the book, and I imagine serves as the primary thesis for the forthcoming volume on quinto improvisation:

Even with constant variation, the repetition of a lock's motif creates an expectation in the listener's mind. Surprise is achieved when the lead departs from the lock, playing phrases that extend over two or more clave cycles. Alternately locked within the basic cycle, breaking free of its confines, and then locking to clave again, the lead expands and contracts the overall rhythm. The potency of the surprise is in direct proportion to the degree of expectation created prior to the change. Each lead drum part requires its own particular balance of expectation and surprise. The goal is to achieve the proper balance when improvising in clave music. (199)

The remainder of *The Clave Matrix* engages various contemporary scholarly vantage points, from both ethnomusicology and theory. Peñalosa criticizes earlier scholars for their failure to identify "main beats" (and by extension, meter) in all topos-based music, which is a topic also taken up in detail by Novotney (1998), Agawu (2003), and Stover (2009). Agawu sums it up most neatly in his description of Ghanaian highlife music:

By articulating the off-beats only of beats 2, 3, and 4 in a 4/4 meter, the *topos* maximizes the energy in the margins and enshrines a potential for movement . . . listeners know where the main beats are and so coordinate foot movement with these unsounded parts of the *topos*. The dancer thus becomes active interpreter, contributing to the implementation of the pattern. Of course, in the case of dance-band highlife, the unsounded parts of the *topos* may be sounded by other instruments or voice; the background is thus activated. Whether the background is assumed or externalized, it remains an indispensable dimension of the music.¹⁰

Peñalosa also engages the vast literature on diatonic bell patterns, isomorphisms between pitch and rhythm domains, the 5-count pattern as the abstract complement of the 7-count pattern, and so on, as well as some of the polymorphic games offered by Wittgenstein and the post-Husserlian phenomenologists.

It is worth mentioning, in conclusion, that *The Clave Matrix* is a beautifully laid out volume, with very attractive musical examples, a textual narrative flow that is easy to follow, crisp photographs of instruments and performers, and many lovely textile patterns that will remind many readers of some of Austerlitz's (2003) descriptions of synesthetic relationships between textile patterns and rhythmic structures in West Africa. It is also important to mention again that this book is, for all of its forays into historical

and scholarly matters, a *practical* book, meant to be *used!* Each chapter concludes with many pages of exercises designed to systematically engender into the student a sense of how clave music works, and how to perform it with facility. These exercises get both hands and both feet working—they are fun and challenging and very rewarding. Because of course music is about doing, and there is no better way to learn than by deeply immersing oneself in the richness of this performing tradition as a performer—as drummer, singer, and dancer.

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Notes

1. Agawu defines *topoi* as “commonplaces rich in associative meaning for cultural insiders” and “short, distinct, and often memorable rhythmic figure(s) of modest duration . . . [that serve as] point(s) of temporal reference.” (Agawu 2003, 73).

2. Some highlights of the engagement of the diatonic properties of the standard pattern and similar *topoi* include Pressing (1983), Jay Rahn (1987), and Clough and Douthett (1991), the last of which formalizes the diatonic collection and all such “maximally individuated” (Rahn’s term) distributions of well-formed collections across even modular spaces.

3. The literature on *topoi*-related epistemologies goes all the way back to Jones’s landmark study (Jones 1958), and also include significantly, among many others, Kauffman (1980), Koetting (1970), and Nzewi (1997).

4. Michael Spiro’s detailed look at clave entrainment in *guaguancó* (Spiro 2006) is one excellent example of the serious attention that performing musicians have given to explaining the complexities of clave-based music. A long, tangled, and occasionally rather heated discussion about various aspects of clave has been unfolding over the last several years on the Latin Jazz Yahoo Group, a group that includes both scholars and top-tier professional musicians.

5. See, for instance, the recent article by David Temperley (a card-carrying music theorist) in *Ethnomusicology* (Temperley 2000), as well as Stover (2009).

6. Including especially Lerdahl and Jackendoff (1983).

7. One common narrative suggests that clave as found in Cuban popular styles is a syncretism of West African bell patterns (especially the so-called standard pattern) and the *tresillo* rhythm of Iberian folk styles. There is of course some degree of truth to this, but also of course it is grossly over-simplified.

8. This aspect of clave’s identity is addressed in Stover (2009) as well, with the caveat that it is nowhere near a fully-formed theoretical construct yet!

9. Samarotto (1999).

10. Agawu (2003), 130.

Bibliography

- Agawu, Kofi. 2003. *Representing African Music: Postcolonial Notes, Queries, Positions*. New York: Routledge.
- Clough, John and Jack Douthett. 1991. "Maximally Even Sets." *Journal of Music Theory* 35/1-2: 93-173.
- Jones, A.M. 1958. *African Music in Northern Rhodesia and Some Other Places. The Occasional Papers of the Rhodes-Livingstone Museum, no.4*. Livingstone, Zambia: Rhodes-Livingstone Museum.
- Kauffman, Robert. 1980. "African Rhythm: A Reassessment." *Ethnomusicology* 24, no. 3: 393-415.
- Koetting, James. 1970. "Analysis and Notation of West African Drum Ensemble Music." *Selected Reports in Ethnomusicology* 1/3: 115-46.
- Lerdahl, Fred and Ray Jackendoff. 1983. *A Generative Theory of Tonal Music*. Cambridge: MIT Press.
- Novotny, Eugene. 1998. *The 3:2 Relationship as the Foundation of Timelines in West African Musics*. DMA Dissertation, University of Illinois, Urbana-Champaign.
- Nzewi, Meki. 1997. *African Music: Theoretical Content and Creative Continuum: The Culture-Exponent's Definitions*. Olderhausen, Germany: Institut für populärer Musik.
- Pressing, Jeff. 1983. "Cognitive Isomorphisms Between Pitch and Rhythm in World Musics: West Africa, the Balkans and Western Tonality." *Studies in Music* 17: 38-61.
- Rahn, Jay. 1987. "Asymmetrical Ostinatos in Sub-Saharan Music: Time, Pitch, and Cycles Reconsidered." *In Theory Only* 9/7(1987): 23-37.
- Samarotto, Frank. 1999. "Strange Dimensions: Regularity and Irregularity in Deep Levels of Rhythmic Reduction." *Schenker Studies* 2, edited by Carl Schacter and Hedi Siegel. Cambridge: Cambridge University Press, 222-238.
- Spiro, Michael. 2006. *The Conga Drummer's Guidebook*. Petaluma, CA: Sher Music Co.
- Stover, Chris. 2009. *A Theory of Flexible Rhythm Spaces for Diasporic African Music*. PhD Dissertation, University of Washington.
- Temperley, David. 2000. "Meter and Grouping in African Music: A View from Music Theory." *Ethnomusicology* 44: 65-95.
- Zuckermandl, Victor. 1959. *The Sense of Music*. Princeton: Princeton University Press.

ANDREWS, GEORGE REID. 2010. *Blackness in the White Nation: A History of Afro-Uruguay*. Chapel Hill: University of North Carolina Press.

At once brisk and deliberate, sweeping and detailed, George Reid Andrews' *Blackness in the White Nation: A History of Afro-Uruguay* is the first book-length history of the Afro-Uruguayan community available in English. Its singular treatment of this surprisingly neglected topic is balanced by its place within the overall trajectory Andrews' previous work, which