African Bell Meets Indian Math
By Jerry Leake

This article examines the ubiquitous 12/8 "Standard African Bell" from a more Indian-based perspective. We will discover how the groove of African music meets the mathematical principles and drum languages of Indian rhythm systems. This will result in expanded phrases realized as 24/8, 36/8 and 48/8 rhythm cycles.

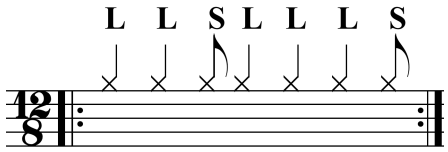
In my experience contemporary combinations of African groove and Indian math produce intricate rhythm puzzles that also compel the listener to feel the urge to "dance." The body reacts first, with multiple listening needed to unlock how the music was created.

Standard African Bell

The Standard African Bell is so named by ethnomusicologists for its application in numerous music styles throughout the world. I have come to know it as the Agbekor Bell for the well-known warrior rhythm "Atsiagbekor" created by the Ewe people of Southern Ghana. The pattern is also used in other Ewe pieces such as Atsia, Agbadza, and Adzogbo. In popular Afro-Cuban styles the same structure is known as the Bembé bell.

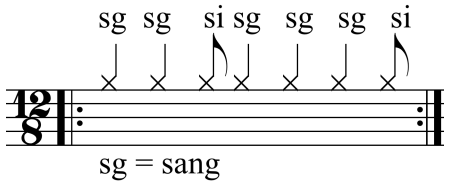
The bell phrase is notated below using long and short syllables to represent the duration of strikes. In 12/8 meter there are twelve 8th notes that occupy one bar. Seven are bell strikes, five are rests. Shown below in example 1 the quarter note equals long strokes, and the 8th represents short. Play the phrase without any underlying pulse to grasp stroke durations. Also speak long and short syllables.

Ex. 1: Bell with Long and Short



A well-known scholar of African music named James Koetting replaced long and short syllables with Sang and Si to create a more musical song-like treatment of stroke durations (example 2). We will use Sang and Si throughout this study.

Ex. 2: Sang and Si Syllables



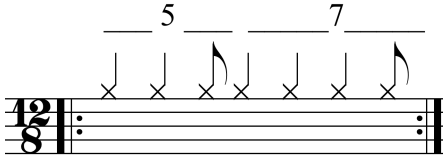
Indian Perspective: 5 + 7

A fascinating and lesser-known aspect of the bell pattern is how it can be broken down into groups of 5 and 7.[1] This is where our Indian perspective comes into play. The South Indian (Carnatic) rhythm system is known for its use of odd rhythm cycles in 5, 7, 9 and so on. Additionally, it is the odd numbers within those groups that are often featured in high levels of syncopation and energy.

If we cycle a group of five numbers—1 2 3 4 5—and accentuate only the odd numbers of that grouping we will highlight: **1 – 3 – 5**. Speak all five numbers aloud while clapping just the odd numbers: **1** 2 **3** 4 **5 1** 2 **3** 4 **5**. The same principle will apply to the group of seven—1 2 3 4 5 6 7. By speaking the series and clapping odd numbers we have these accent points: **1 – 3 – 5 – 7 1 – 3 – 5 – 7.**

Combining the 5 + 7 will bring us back to the original African bell pattern: **1 – 3 – 5 1 – 3 – 5 – 7**. Repeat this many times while counting all numbers and clapping on the odd. Shown below in example 3 is the numeric analysis set to the original notation.

Ex. 3: 5 + 7 analysis



Solkattu Syllables

Next we need to apply Carnatic solkattu syllables for a more thorough Indian perspective. As shown under the notation in example 4 the group of 5 is broken down to 2 + 3. The syllables for 2 are "ta ka" and the syllables for

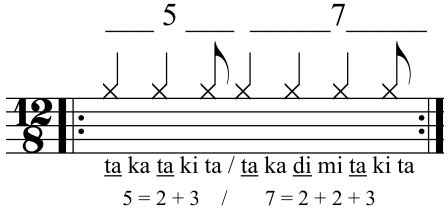
[1] Ethnomusicologist Simha Arom is often credited with the formula (1/2N + 1) + (1/2N – 1), where N is the total number of fast units (12 = 7 + 5, 16 = 9 + 7, 8 = 5 + 3, and so forth).

3 are “ta ki ta” (pronounced ta ki tuh). Cycle the 5 series while clapping odd strokes. Claps are highlighted in bold: **ta** ka **ta** ki **ta / ta** ka **ta** ki **ta**.

The group of 7 is built as 2 + 2 + 3. To further enhance the language of the phrase the 2 + 2 series will be spoken as ta ka di mi. Cycle the 7 with claps indicated in bold: **ta** ka **di** mi **ta** ki **ta / ta** ka **di** mi **ta** ki **ta**.

When proficient with 5 and 7 on their own, combine them to render the 12/8 bell with Indian language: **ta** ka **ta** ki **ta ta** ka **di** mi **ta** ki **ta**.

Ex. 4: Solkattu Syllables

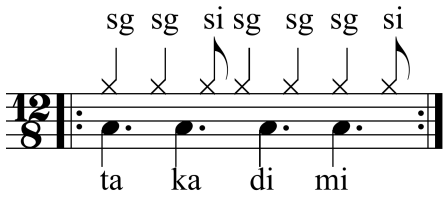


Although we will depart from incorporating solkattu in the examples that follow, the syllables represent an important cultural connection that should always be maintained in the player’s mind. I suggest alternating African sang/si syllables and Indian solkattu to flip a proverbial switch from one perspective to the next. There are no right or wrong ways—strive to do it “all ways!”

Adding the Beat

The beauty of the 12/8 bell pattern is how one can feel the underlying beat in a variety of perspectives: 2, 3, 4, 6. It is the 4-beat (dotted quarter) that establishes the traditional pulse for the accompanying instruments and for much of the dance. Shown below in example 5 is the 12/8 bell played by the strong hand with sang / si syllables, and the 4 played by the weak hand. Alternate between speaking sang / si and ta ka di mi.

Ex. 5: Sang/Si over 4-pulse

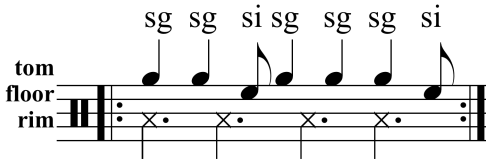


Bell Groove on Toms

Shown below is a somewhat radical approach (and notation) to playing the bell pattern using a mounted tom and floor tom. The goal was to place long strokes (sang) on a high-pitched drum and short strokes (si) on a low-pitched drum to highlight the 5 + 7 contour of the phrase. I also wanted to deviate from a more sustaining cymbal approach for a drier percussion style.

While this "tom groove" is played using the strong hand, the weak hand plays rim clicks on the snare to contrast the potent drum melody. As seen below in example 6, the change in note heads and staff position reflects this unique tonal arrangement on the kit.

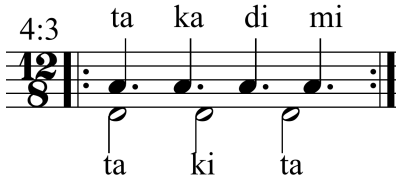
Ex. 6: sang / si = high / low toms



4 : 3

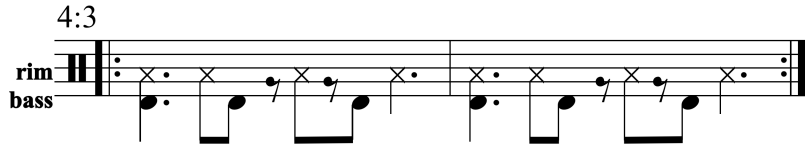
Shown in example 7 is a 4 : 3 polyrhythm represented using solkattu syllables. This phrase will become our snare and bass drum pattern when we bring in the 5+7 tom groove. To feel the 4 : 3 by itself, clap hands to the 4-pulse while tapping the foot to the 3. When the limbs are comfortable alternate spoken syllables to correspond with each "gear" of the polyrhythm.

Ex. 7: 4 over 3 with Indian syllables



Example 8 places the 4 : 3 into the notation that will appear with all remaining examples. In this contemporary approach the bass drum is in the 3-pulse with the 4-pulse set to the snare. Repeat this on drum set many times before moving on.

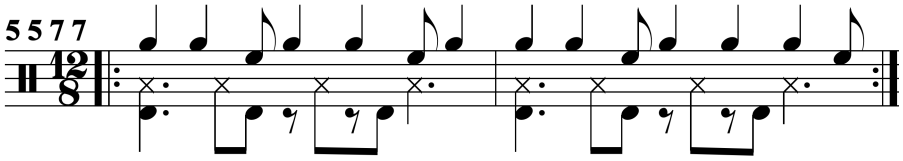
Ex. 8: 4 over 3 (rim click over bass drum)



5 + 7 and 4 : 3

Example 9 sets the stage for the 5 + 7 bell pattern played on toms, and the 4 over 3 on rim click and bass drum. Notice that the strong-hand tom adaptation is beamed up while the interlocking snare and bass groove is beamed down. Separating the notation in this manner reflects a similar division of the mind and limbs.

Ex. 9: 5+7 bell / 4 over 3
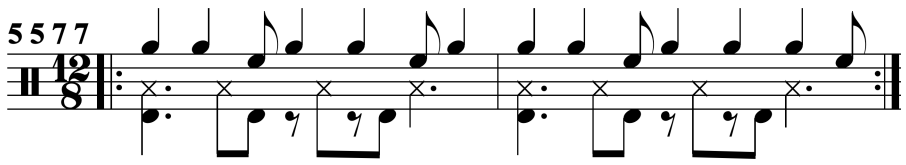


24/8 cycle: 5 5 7 7

Example 10 is where we explore longer phrases to experience Indian-like cycles inside African-inspired grooves.

The previous 5 + 7 analysis of the bell pattern proves that other combinations are possible, such as 7 + 5. Further still, one bar of 5 7 can flow into one bar of 7 5 to become 5 7 7 5. Additional recombining of elements yields even more challenging combinations of 5 5 7 7 and 7 7 5 5.

Although example 10 is set to two bars of 12/8, it actually comprises one cycle of 24/8. 24/8-type time spans are familiar to the people who live within the nation-state of Benin, such as the Fon. Adzogbo is among the better known of these pieces. The 5 5 7 7 tom groove requires two bars to complete its phrase, whereas the 4 : 3 snare and bass phrase is identical in bar 1 and bar 2. Once assimilated into the limbs, recite sang si for high and low drum tones. The spoken language enhances the player's overall experience and brings a deeper awareness of shifting mathematics.

Ex. 10: 24/8 cycle — 5 5 7 7

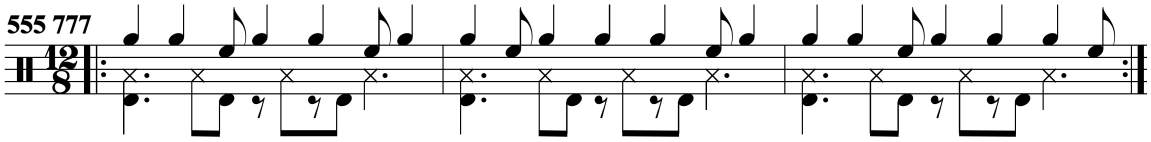


36/8 cycle: 5 5 5 7 7 7

By continuing this model of adding another 5 and 7 to the series we will discover that 5 5 5 7 7 7 can be re-imagined as a 36/8 rhythm cycle. In this treatment the bell cycle requires three bars of 12/8 (36 pulses) to complete the 5 5 5 7 7 7. When comfortable add in sang si and Indian syllables.

Notice in example 11 that a quarter note marks the beginning of each bar. This may prove to be a helpful anchor point for navigating through the longer cycle. These challenging phrases require time and patience to unlock. Before attempting all three parts simultaneously, focus first on paired combinations: bell and bass drum / bell and snare.

Ex. 11: 36/8 cycle — 5 5 5 7 7 7

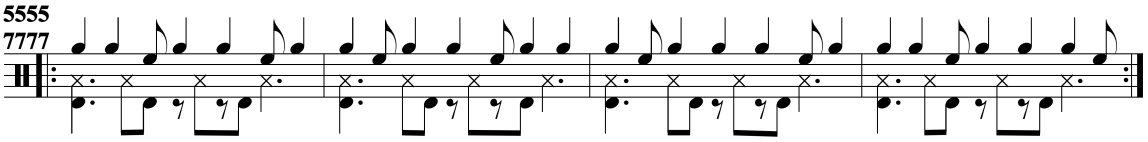


48/8 cycle: 5 5 5 5 7 7 7 7

By continuing this model of adding another 5 and 7 to the series we will discover that 5 5 5 5 7 7 7 7 (four bars of 12/8) becomes a 48/8 cycle[2]. A reliable anchor point is the quarter note that appears on the downbeat of each bar in the 4-bar phrase. However, in this expanded phrase one's awareness of the downbeat will be diminished, if not entirely eliminated.

To assist with all of these examples, refer to the accompanying video. The video also demonstrates other combinations not presented in this article, such as 5 7 7 5 and 7 7 5 5.

Ex. 12: 48/8 cycle — 5 5 5 5 7 7 7 7

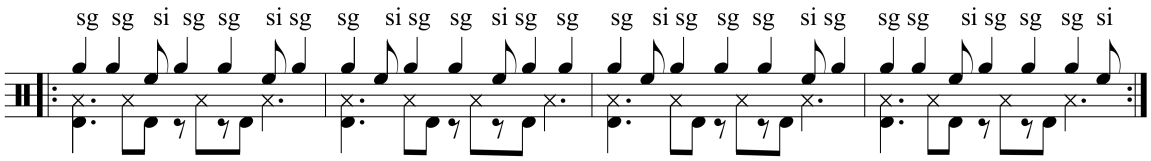


[2] As told to me by ethnomusicologist David Locke, many Shona mbira pieces have compositions within a 48-pulse time span.

48/8 with Sang Si

Shown below in Example 13 are sang si syllables applied to the previous 48/8 phrase. Work on paired combinations before attempting all four parts at once.

Ex. 13: 48/8 cycle & Sang Si



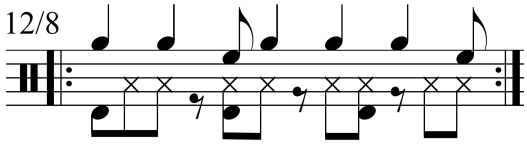
Adding in Kagan

The kagan (or "kaganu") is a small barrel-shaped drum from the Ewe people of Southern Ghana that plays short repeating patterns most often positioned "off-beat" to the underlying beat. In the classic *oom pah pah* waltz phrase, the beat would be the "oom" and the kagan "pah pah." In traditional African music this off-beat pattern can be challenging to maintain, especially at rapid tempos as found in Fast Agbekor.

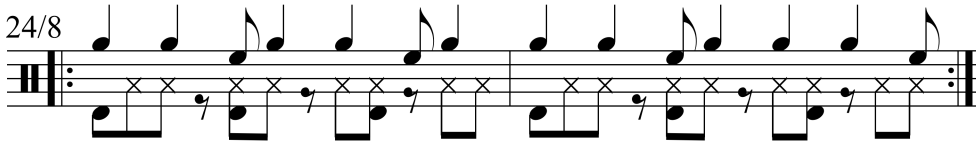
Playing kagan in conjunction with the bell is not as difficult as it may seem, especially for drum set players who are used to combining multiple independent parts. One limb's pattern may, in fact, help to unlock the other. In the examples that follow the kagan phrase is played by the rim click. Before attempting the entire phrase, practice just kagan and bass drum to understand their interlocking gears.

Examples 14-17 apply the kagan to the previous phrases in 12/8, 24/8, 36/8, and 48/8. Use the video link to hear the magic!

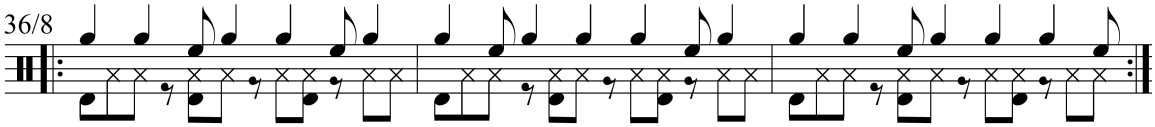
Ex. 14: 12/8 with kagan



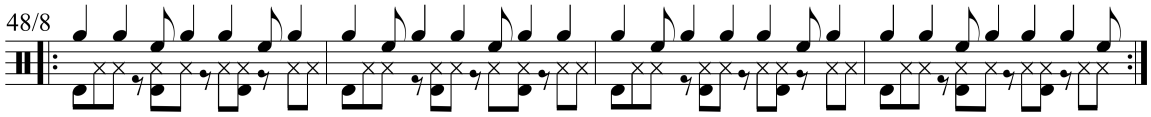
Ex. 15: 24/8 with kagan



Ex. 16: 36/8 with kagan



Ex. 17: 48/8 with kagan



Conclusion

Playing music is difficult and for that we are grateful!

The research of Swedish psychologist Anders Ericsson inspired the popular golden rule that 10,000 hours of dedicated and intensive practice was the magic number to achieve greatness. Even though one can never truly master any art form, a talented and devoted practitioner can come to master their place within it. This is not meant to push serious students away from attempting complex ideas; it merely alleviates the pressure of trying to learn them in a day, a week, or even a year. Focus on process over product, and take small steps every day—one productive hour at a time.

Consider these examples as a sojourn that began with a simple bell pattern that took an epic journey through time, space and possibility.