AFRICAN POLYRHYTHMICS

AND

STEVE REICH'S *DRUMMING:*

Separate but Related Worlds

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Note:  denotes a sounds example; click on the icon to play it. Playback of examples requires QuickTime to be installed on your computer.

Studying Drumming

In the summer 1970 Steve Reich went to Ghana to study drumming. With a travel grant from the Special Projects division of the Institute of International Education, he made his way to Accra in order to study with Gideon Alorworye, the resident master drummer of the Ghana Dance Ensemble. Due to illness he returned from only after five weeks. He spent the following year almost exclusively on the ensemble piece called *Drumming*. At first glance, *Drumming* appears to draw on Reich's non-western musical influences more than any other of his compositions to date. The ensemble of instrumentalists sharing their time between drums, mallet instruments and singing testifies to the composer's attraction African traditions; as does the 12/8 rhythmic cell--reminiscent of an African bell pattern--that accounts for the entire work's material. However, listening to Steve Reich's *Drumming* with an ear that is thirsty for African polyrhythmics is the recipe for misunderstanding and disappointment. The sort of strict polyrhythmics that is found throughout central and west African music is not at all the point of this piece of music. There is a drastic disparity between the complexity of the rhythmic material in traditional African music and the single rhythmic cell present in *Drumming*. Furthermore, the multi-leveled construction of African polyrhythmics often acts as a vehicle for the master drummer to flaunt his command over the pulse: with great ease, he is able to play just a few of milliseconds ahead of the bell pattern, or ever so slightly behind the low drum. This form of interaction is entirely absent from *Drumming*. The comparison begs the question: what did Reich learn by going to Ghana?

Parts of the answer are found in Reich's "Notes on Compositions 1965-1971":

> The answer is *confirmation*. It confirmed my intuition that acoustic instruments could be used to produce music that was genuinely richer in sound than that produced by electronic instruments, as well as confirming my inclination towards percussion. [1]

This passage certainly clarifies his choice of instrumentation in *Drumming,* but more importantly it addresses the problematic comparison of *Drumming* with traditional African music. After his return from Ghana he felt no desire to continue studying African music; he did not wish to become either an African drummer or an ethnomusicologist; neither did he have any interest in composing music in an "African style". After his visit to Ghana, Reich felt anxious to get back to his own work, his own style. With all but one of his "phase" pieces already behind him, it is safe to say the Reich had found his voice prior to travelling to Ghana. What he learned in Ghana did not promote a change in direction, so much as it gave confidence in his voice as well as some ideas about what to do with his techniques. His strengthened sense of confidence led him to expand the size of his operation: his ensemble grew from 5 to 12 people and the scale of the composition reached a new height.

Even before his trip to Africa, Reich's aesthetics as a composer and his views on musical performance strayed from those of most composers of western art music. The most outstanding sign was his decision, in as early as 1963, to play in all of his own compositions. His limitations as a performer focused his composition on the music that was "natural to [his] abilities and inclinations."[2] In the program notes written for a concert at the John F. Kennedy Center for the Performing Arts in Washington D.C in 1974--two years after Ghana--he articulates a generalized view about musical performance that is undoubtedly affected by his exposure to the African tradition.

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[1] Reich, Steve. "Writings about Music". Halifax: The Press of the Nova Scotia College of Art and Design, 1974. p. 58.

[2] Reich, p. 44.

> The pleasure I get from playing is not the pleasure of expressing myself, but of subjugating myself to the music and experiencing the ecstasy that comes from being a part of it. [3]

This sentiment resonates with views like the one expressed by African international pop super star Manu Dibango, in his forward to the book titled *Africa O-Ye*[4]. Here he dissects the very idea of what it means to be an "artist" in Africa. He asserts that in African culture, the inseparability of music from day to day life renders the position of "the artist" as "the creator" totally inapplicable. Similarly, in his chapter on musical types in the book titled *African Music in Ghana*[5], world renown ethnomusicologist J. H. Nwabena Nketia avers that all musical types in Ghana may be classified on a functional basis into three groups: 1) those providing recreational music, 2) those used as "occasional" music (e.g. celebrations and ceremonies) and 3) those used as incidental music (e.g. music to accompany various occupational tasks, story telling sessions, or domestic situations like nursing a baby). Studying African music and experiencing the culture first hand affected Reich's views on the music making process more deeply than it did the specific ways in which he worked with rhythm.

This paper is a documentation of my study of African polyrhythmics and its possible overlaps with and connections to Steve Reich's *Drumming*. This composition as well as every other piece that follows in Reich's output is written for the concert hall. This very motive makes the aims of the music entirely different than those of traditional African music (which according to sources like Nketia is always functional on some level). Nonetheless, the material in this piece clearly concerns itself with the realm of

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[3] Reich, 44.

[4] Ewens, Graeme. "Africa O-Ye: A Celebration of African Music". London: Guiness Publishing, 1991. p. 6.

[5] Nketia, J. H. Kwabena. "African Music in Ghana". Chicago: Northwestern University Press, 1963. p.

rhythm in a most prevalent fashion. This prevalence, the close proximity of *Drumming's* time of conception to Reich's west African experience, along with my own enthusiastic interest in the music of the continent made the dual focus of this paper a worthwhile pursuit.

DRUMMING

Goals

In1964 Reich helped composer Terry Riley put together the first performance of his *In C.* Using simultaneous repetition of many different melodic patterns, *In C* deals with Riley's observation about the use of repetition:

> I think I was noticing that things didn't sound the same when you heard them more than once. And the more you heard them, the more different they did sound. Even though something was staying the same, it was changing....[6]

This experience motivated Reich to find a new way of working with repetition as a musical technique. The resultant technique of "phasing"[7] took near complete control of his output as a composer for the next 7 years. With the exception of *Four Organs (*1970), every other piece Reich wrote during this period directly dealt with the technique of phasing. These works include *Gonna Rain* (1965), *Come Out* (1966), *Melodica (*1966), *Phase Patterns* (1970), *Violin Phase* (1967), and *Piano Phase* (1967). In addition to being his longest work to date using the phasing technique *Drumming*(1971) was "the final expansion and refinement of the phasing process"[8]. In this piece, Reich introduced

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[6] Terry Riley, quoted in K. Robert Schwarz, Minimalists (1996), 35, acquired from http://www.mta.ca/faculty/arts-letters/music/material/3241-51/readings/composer/riley01.html

[7] See the section titled "Rhythmic complexity via two routes" for a description of the "phasing" technique.

[8] Reich, p. 50.

four new techniques into his language: 1) the gradual substitution of notes for rests (and rests for notes) within a repeating cycle, 2) the gradual changing of timbre while maintaining pitch and rhythm, 3) the simultaneous combination of instruments with differing timbres, and 4) the integration of the human voice into his ensemble as means of doubling exact instrumental sounds. As we shall see through the course of this document, every one of these techniques is used to augment the interesting rhythmic subtleties that the phasing technique produces.

Form

Drumming is made up of four parts. The sections are distinguished by their contrasting instrumentation and joined together by way a gradual shift from one instrumental group to another. The table below shows the instrumentation and approximate length of each section:

	Instrumentation	**Length**
Part 1	4 pairs of tuned bongos	17'-25'
Part 2	3 marimbas, 2 female voices	18'-26'
Part 3	3 glockenspiel piccolo, whistling	11'-16'
Part 4	complete ensemble	10'-19'

The large attached diagram labeled "Formal Development in *Drumming*" outlines the development of the entire piece in complete detail. Although the evolution of each section differs from the others in its details, the general tendency is toward gradual accumulation of players within each section, with interjected periods of phasing where one player speeds up for a period of time in order to advance one quarter note in the rhythmic patters. The scheme for each section is generally as follows: one builds up the

attacks of basic rhythmic pattern (marked "**a"** in the full diagram) one note at a time (i.e. but gradually substituting notes for rests). Another player playing the same pattern then joins him. Once settled, one player phases ahead one quarter note. Vocalists (or piccolo in Part IV) highlight the interlocking interaction between the offset layers by doubling a number of the resultant melodic patterns. More phasing occurs, more doubling follows and the ensemble builds up the number of active players. At the end of each section rests are substituted for notes finally resulting in a single note per rhythmic cycle. The ensemble builds up again by substituting notes for rests and a gradual shift in instrumentation makes the transition to the next part of the piece.

Common features between Drumming and traditional African music

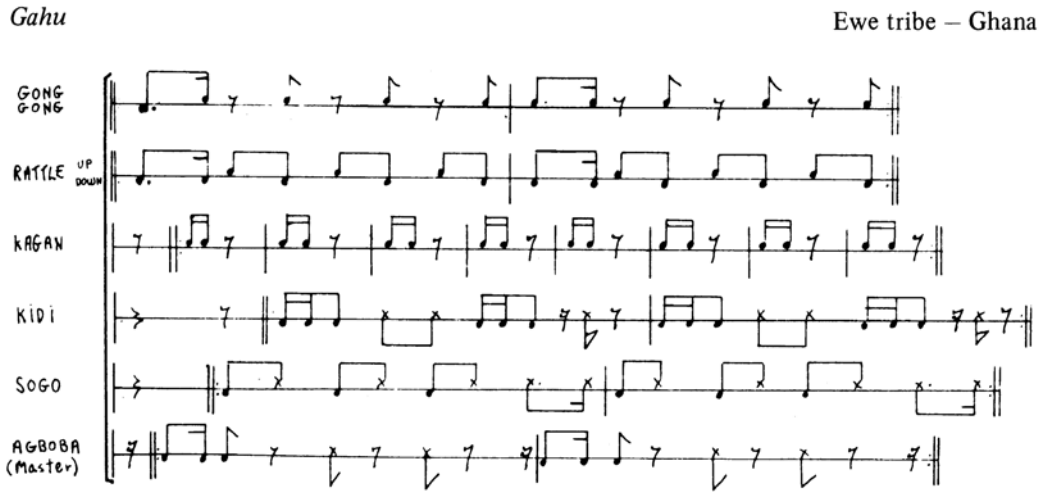
There are four musical features that are shared between the African music that I have studied and Reich's *Drumming*. These features play very important roles in both forms and are worth mentioning.

First is the notion of *pulse* as a central feature in the music. African polyrhythmics and Reich's phase music are both about the interaction between layers of activity. The relationship between these layers is always explored within a language that has a steady minimal temporal unit as a primary feature. In African polyrhythmics, the interest lies in the complex interweaving of rhythmic phrases with different lengths. In Reich's phase music, the highlight is the superimposition of multiple layers of similar rhythmic cells that initially share a common pulse, diverge from one another by changing the pulse, and reconvene by returning to the original pulse. Nonetheless, the presence of a clear steady pulse in all layers is fundamental in the way the music is constructed.

The second important feature is rhythmic *periodicity.* Both musical idioms utilize periodic repetition of a rhythmic cell as the central musical technique. In African polyrhythmics, the asymmetric correspondence of different layers with different periods

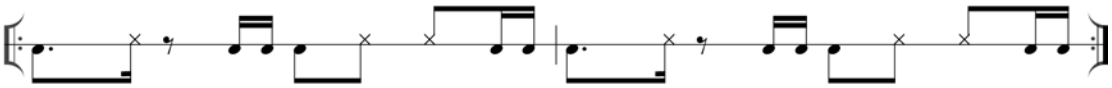
gives life to the music. In Reich's music, simultaneous repetition of a single musical phrase as different rates acts as a vehicle for producing highly complex sonic results.

The third feature is best shown through example. The figure blow shows a transcription of the Ghanaian rhythm *Gahu*, produced by Reich during his stay in the country.



The basic idea in this piece is the periodic repetition of 6 rhythmic cells with different periods but a common pulse. Lines 1 and 2 (*gong gong* and *rattle*) have a period of 8 quarter notes, line 3 (*kagan*) has a period of 1 quarter note, while lines 4 through 6 (*kidi, sogo* and *agboba*) have a period of 4 quarter notes. The manner of notation in lines 3 through 6 of the transcription (the parts for the *kagan*, the *kidi*, the *sogo* and the *agoboba*) shows the feature that I shall label *movable downbeats.* Note that in these parts, the notation begins with rests. This shows Reich's understanding of the fact that in the construction of these rhythms, there is no universal *downbeat:* each layer begins its cell on a different beat of the periodic cycle. The same transcription could be made with no rests at the beginnings of the line by wrapping the material in lines 3 to 6 that come after the double bar of lines 1 and 2 around to the beginning. The *kidi* part for instance would then change from

to



The alternative notation, however, would betray the actual phrase structure of the *kidi* part. The construction of the individual drum parts of a rhythm often has linguistic roots. At times the rhythm of a line explicitly mimics a spoken or sung sentence. Changing the phrase with an offset would not only change the rhythmic feel, it would also affect the balance between the different parts.

Reich's sensitivity to the idea of beginning a rhythmic cell at different parts of the rhythmic cycle evident throughout *Drumming*. There are countless points in the piece where a player joins the group with a phase-offset version of the basic rhythmic cell (e.g. measures 32, 68, 116). There are also times when Reich consciously toys with the perceived pulse beneath his rhythmic cell by distorting the location of the "downbeat". The example below is taken from measures 16 to 28 of Part I. Notes are gradually replaced with rests, and then vice versa. However, the rhythmic cell is rebuilt in a different order and with a different phase offset. The result is a change in the perceived tempo of the pulse.

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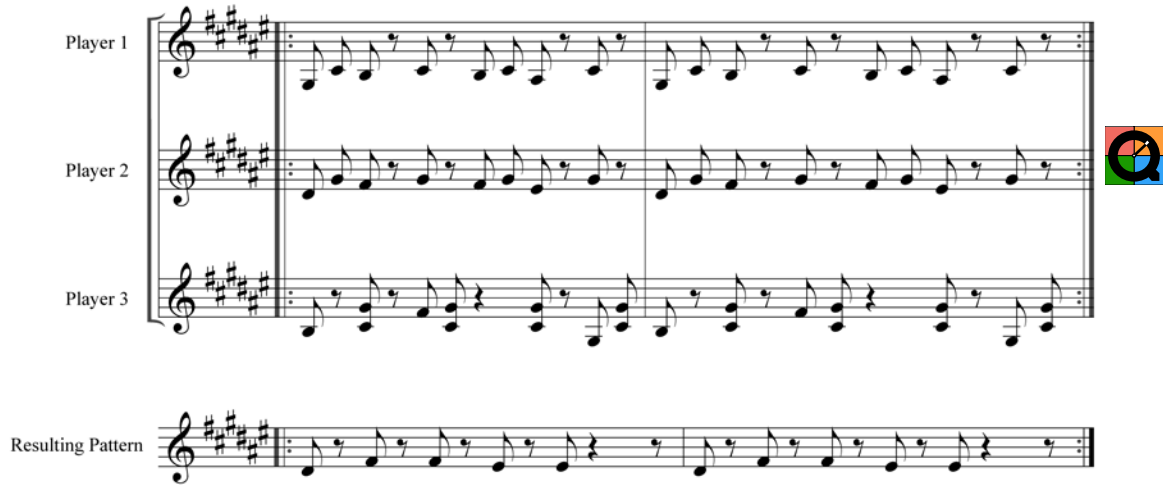
The above three features are all used in combination to produce the final and perhaps most characteristic feature of *Drumming*: *interlocking patterns*. Once again, let's begin with an example:

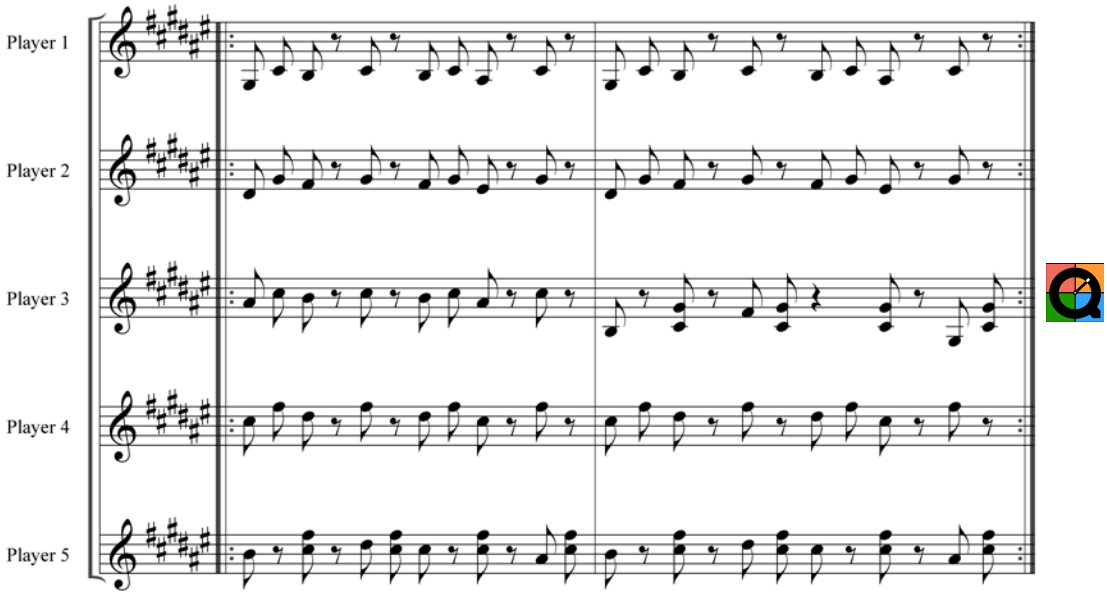
The above excerpt, taken from Banda Linda of the Central African Republic, shows an example of polyphony by way of polyrhythmics, or hocket. The interweaving, overlapping and interlocking of several rhythmic figures located at different pitch levels creates a single line.[9] The result is a whole that is greater than the sum of its constituent parts. The idea is central in *Drumming*. In measure number 11, 13, 53, 55, 60,63,80,87, and122 the composer asks the members of the ensemble to sing, whistle and play (on the piccolo) melodic patterns that result from the interlocking of two or more layers. In line with Reich's interest in gradual transformations in music, the performers usually allow enough time for the pattern to emerge to the surface of the music before the highlight it by doubling it. For example, in measure 53 (shown below), melodic fragments resulting form the interlocking combination of the three marimba parts are brought to the surface by the singers.

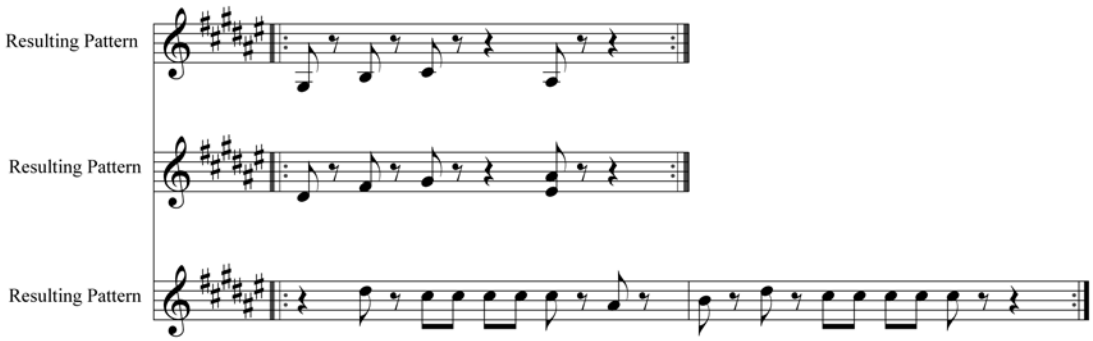


Whereas in the Banda Linda example the improvised variation in the individual lines produces a multitude of resultant lines, Reich composes the individual instrumental lines as invariable, but asks other members of the ensemble to bring out a multitude of possible

[9] Arom, Simha. "African polyphony and polyrhythm". Translated from French by Martin Thom, Barbara Tuckett and Raymond Boyd. Cambridge: Cambridge University Press, 1991. p. 307.

interlocking fragments. This is a significant difference between the two models; in the former, the rhythmic complexity is a result of the complexity of the individual layers. In the latter, the individual layers are simple but the selective highlighting of the different ways in which the layers may be perceived to interact produces endless variety for the listener's ears. The two diagrams below show a section from measure 60 of Part II. With a slightly thicker texture of 5 marimba parts, female voice once again doubles notes from different marimba parts selectively in order to bring the interlocking melodic fragment to the surface. This segment shows the procession of the singers through different melodic fragments, at times with a period of overlap.

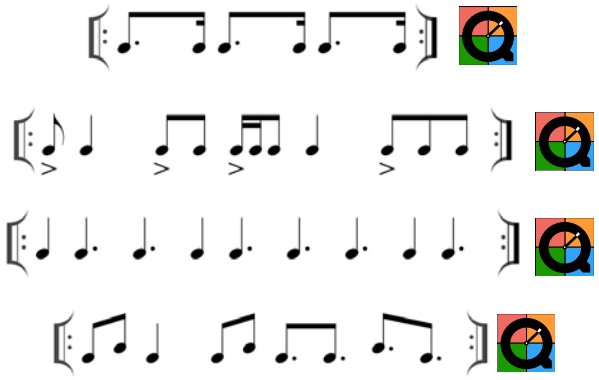




The section titled "Rhythmic complexity via two routes" concentrates on the difference between and the significance of the two mentioned approach to rhythmic complexity.

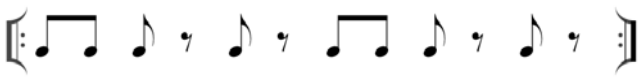
Rhythmic Figures

In his chapter on "Strict Polyrhythmics", Arom describes a nomenclature for categorizing rhythmic figures. He describes the five major categories of *type of mark, equal or unequal duration, morphology, metricity* and *structure*, that are necessary and sufficient for describing any rhythmic figure (any figure has one and only one feature from each category). In the course of his explanation he provides tens of example of figures derived from parts of African rhythms. Studying these examples exposes a major difference between the construction of African polyrhythmics and Reich's phasing music. Appendix I of this paper shows a wide range of examples (provided in notation as well as sound examples) taken from Arom's discussion of rhythmic figures. With such a wide palette of figures, overlapping combinations of these figures produce polyrhythmic relationships, specifically ones with different periods. For example, by combining the following four rhythmic figures:



The following polyrhythmic structure can be constructed: 

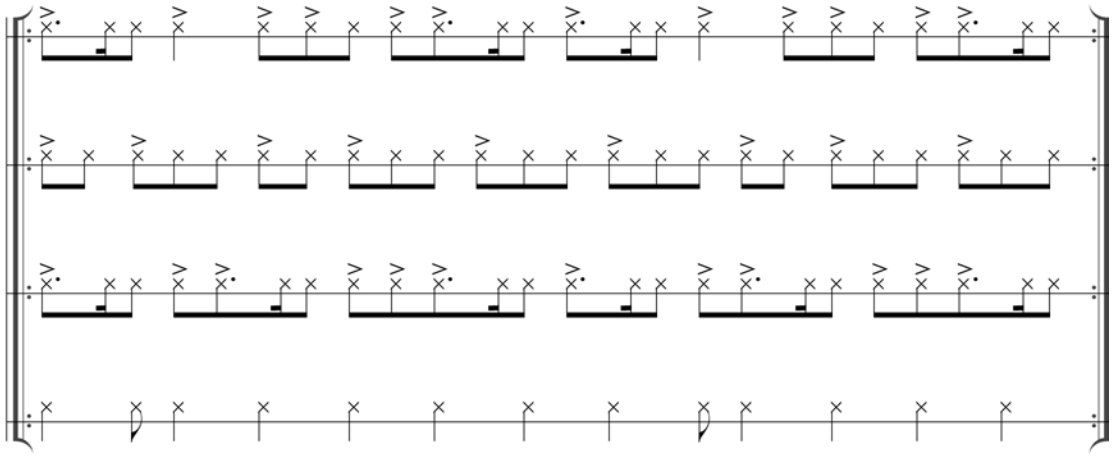
In *Drumming* on the other hand, there is *one* and *only one* rhythmic figure:



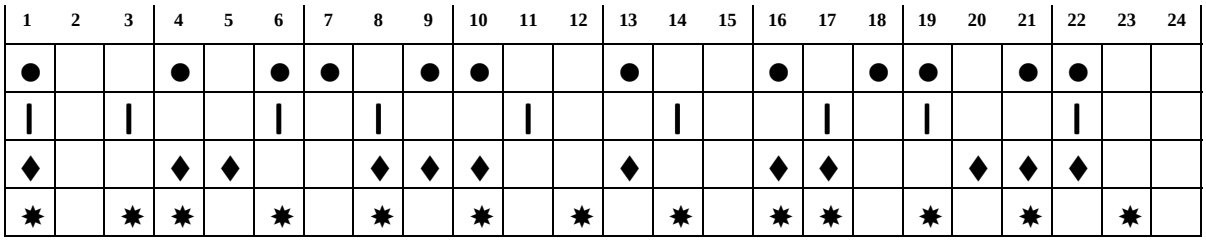
Everything else in the work is derived from phasing or phase-offset derivatives of this rhythmic figure. The disparity between degrees of variety in the two worlds brings up the question of complexity and the possible methods of producing complex rhythmic structures. This is the topic of the next section in this paper.

Rhythmic complexity via two routes

In the realm of rhythm, I wish to distinguish between two types of complexity. *Compositional complexity* is my umbrella term for sophistication that results from the calculated interplay between rhythmic layers. In this framework, the individual layers are delicately composed to interact with other layers in rhythmically interesting ways. The example below is a transcription of the rhythm *Mò.kòndì* taken from Arom.



This rhythm has four parts, each with a different configuration of accents. The diagram below shows the alignment of the accent patterns in the rhythm by reducing the rhythm to its bare bones. Note that the period for the top three lines is 12 beats, while that of the 4th line is 24. The result is an interweaving pattern with a high degree of irregularity, resulting from the contrasting nature of its constituent layers.



I shall label the second type *perceptual complexity*. Here rhythmic complexity is produced by imposing a simplistic process onto layers of similar rhythmic figures. The result is a high degree of complexity that is unpredictable on the microscopic level (as opposed to the predetermined nature of the interaction between layers in the first type). This technique is at the heart of Reich's "phase music". The excerpt below, taken from the transition from measures 14 to measure 15 of the first part of *Drumming* shows this complexity in its most exposed form:

With one player keeping a steady pulse and three other players phasing, the results a highly complex composite accent patters.

Drumming is Reich's most sophisticated work that utilizes the phasing technique as the main ingredient. The power of this technique lies in its ability to produce highly complex interactions between layers of activity through a process that is easy to implement in an ensemble. Furthermore, the wide range of possibilities in the instantaneous rate relationship between layers can generate an endless set sonic sum. In Drumming, Reich augments this technique with a number of compositional decisions that amplify the perceptual results of the phasing interactions significantly. Unlike the previous phasing pieces, here he takes explicit control of timbre space by expanding the instrumentation and making specific orchestrational decisions. By using resonant instruments like marimbas and glockenspiels, and by doubling the instrumental parts (up

to 9 simultaneous marimba parts), the texture is thickened to the point where rhythmic interest is no longer limited to the interplay of attacks; complex polyrhythmic interactions occur in the domains of tone color. The excerpt below, taken from measure 63 of part two shows how the resonance of 9 marimba parts produces a constantly changing hum that is loaded with rhythmic subtleties.

Furthermore, by incessantly doubling interlocking melodic patterns with voices and piccolos for 45 minutes, Reich trains the listener's ear to hear these patterns even when members of the ensemble are note reinforcing them. By the time part IV arrives, so many melodic fragments have been song and played that even the un-reinforced sound of the full ensemble sounds replete with interlocking patters and shimmer on the surface:

This result is in effect the ultimate success of the second route to rhythmic complexity. The building blocks are extremely simple, but the manner in which they are introduced, combined and interpreted results in a highly mutable domain of rhythmic material, capable of endless variation all inside the listeners auditory system.

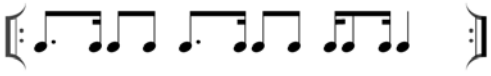
CONCLUSION

A joint study of African polyrhythmics and Steve Reich's *Drumming* brings to light the value of two very different compositional techniques. By creating tightly composed polyrhythmic structures, the composer takes full responsibility for producing interesting interplay between rhythmic layers. Alternatively, by composing a *setting* in which clean-cut rhythmic counterpoint is undermined, the composer can bring the realms of timbre and tone color into rhythmic consideration. Rhythmic interactions in timbre

space often occur much slower time scale, thereby adding a new level of interest to the music. Another feature that adds richness to Reich's technique its ability to provide a wide range of possible modes of listening. During the high mayhem of a phasing period, it is quite difficult to listen analytically to the rhythmic interaction between layers; there is simply too much going on. This forces my ear to step back and pay more attention to the timbral interactions or simply the passing of time. As "60s" as it sounds, I appreciate this greatly.

APPENDIX I

This appendix shows a highly reduced version of Arom's discussion of "the constituent features of rhythmic figures"[10]. What this appendix adds to the original source is MIDI realizations of every example. In my attempt to truly digest Arom's classifications, I found these sonic realizations indispensable. For instance, the subtleties of the discussion of metricity (the relationship of the rhythmic figure to the pulse) can only be understood through listening to the figures with the underlying pulse being sounded on a different instrument, *at a fast and steady tempo*.

Example 10		
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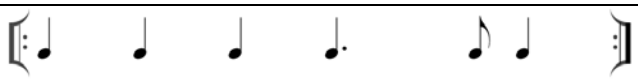
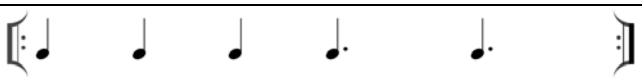
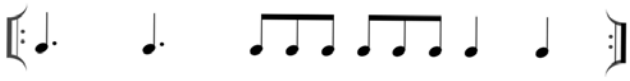
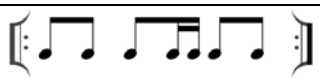
Example 12		
Example 13a		

[10] Arom, 233.

Example 13b		
Example 20a		
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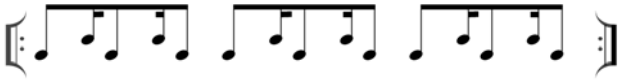
Example 20d		
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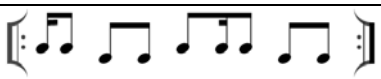
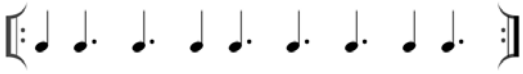
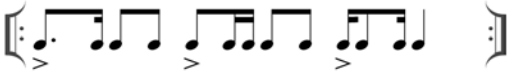
Example 21e		
Example 21h		
Example 22a		
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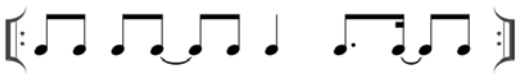
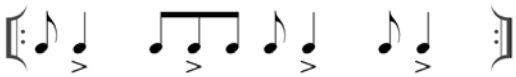
Example 23b		

Example 24a		
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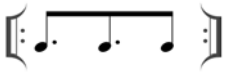
Example 25d		
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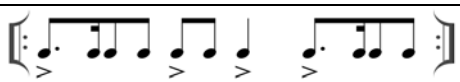
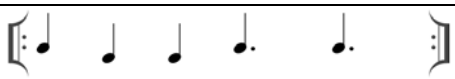
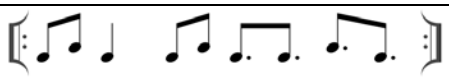
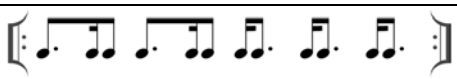
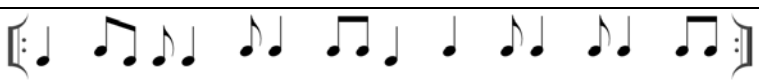
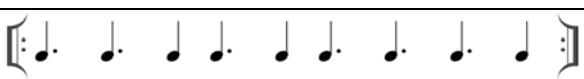
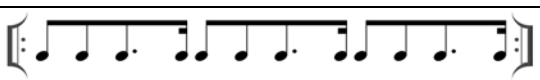
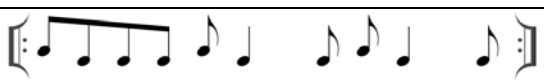
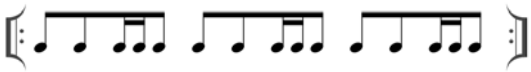
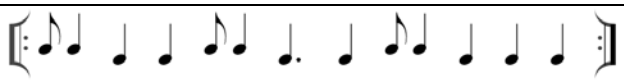
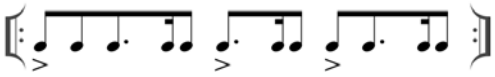
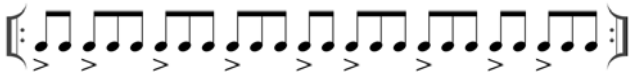
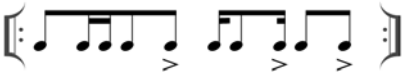
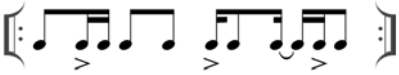
Example 26a		
Example 26b		
Example 26d		
Example 26f		
Example 27a		
Example 27d		
Example 27f		
Example 27h		
Example 28		
Example 29b		

Example 29d		
Example 29f		
Example 30a		
Example 30b		
Example 30c		
Example 32		
Example 34		
Example 35		
Example 36		
Example 39		
Example 40		

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