
FASCINATING RHYTHMS

VOLUME 1—THE FOUNDATION

Glenn Schaft
Professor of Percussion
Director of Percussion Studies
Youngstown State University
2021 Edition
GlennSchaft.com

You do not have permission to copy, transmit, download, reproduce, broadcast, display,
or publish these materials without prior written consent.

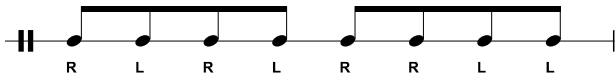
TABLE OF CONTENTS

Notation Key	3
Introduction	4
Using This Book	5
Chapter 1 - Learning and Teaching Rhythm	7
Defining Our Rhythmic Landscape	
A Percussionist's Perspective	
Vocalizing Rhythm	
Counting Meters	
Metronomes and Rhythm Sequencers	
Practicing with Live Musicians and Recorded Music	
Teaching Rhythm: A Global Perspective	
Chapter 2 - Microbeats, Macrobeats, and Tuplets	29
Microbeat Palindromes	
Ping-Pong Microbeats	
Tuplets	
Top Ten Rhythms Timetable	
Chapter 3 - Marching Percussion Pedagogy	39
Eight-On-A-Hand	
Binary and Ternary Accent-Tap Grids	
Timing Exercises	
Chapter 4 - Binary Rhythms	46
Binary Rhythms in Graphic Notation	
Binary Rhythm Patterns	
Chapter 5 - Ternary Rhythms	60
Ternary Rhythms in Graphic Notation	
Ternary Rhythm Patterns	
Bibliography	74
About the Author	77
Endnotes	80
Upcoming	81

Notation Key

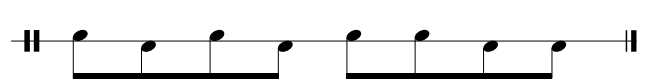
A single line staff is used to notate rhythms and hand patterns, i.e. percussion stickings:

Traditional sticking indications:
Right Hand (R) and Left Hand (L)



Alternatively:

Above line = Right Hand, Below line = Left Hand



In the case of two pitches, the higher pitch is written above the staff line



In the case of three pitches, the middle pitch is notated on the line



Onset - describes an attack point. Onsets describes the total number of onsets in a measure or phrase cycle. In graphic notation onsets are notated as dots "•" and rests as dashes "-".

Partitions and permutations are sequences of numerals. "V" symbol indicates the beginning of a motive or permutation. Here are the four possible onbeat permutations of this two-note motive.



Partitions (P) of 8 microbeats are shown as (P) = 332 to indicate microbeat distances between successive onsets in a rhythm pattern.

P = 332



INTRODUCTION

As students of rhythm in the 21st century we find ourselves in a world of fascinating possibilities yet overwhelming amounts of information. Choosing what information and skills are most relevant are key decisions each of us must make. My goal here was to assemble a collection of rhythm exercises that provide a solid foundation for many diverse musicians and musical styles, and in so doing, I addressed several questions. One, what are the bare essentials we need to know as performers, teachers, composers, and so on? Two, what are the fundamentals that will facilitate our future learning? Three, is there enough rhythmic vocabulary and challenging material included here to sustain our interest over the long term? Four, is there enough rhythmic diversity to help one negotiate a wide variety of musical styles?

Volume 1 - *Coordination For All Musicians*, is designed for anyone seeking to expand their rhythmic horizons, be they professionals, amateurs, performers, students, composers, conductors, improvisers, music educators in elementary, intermediate or high school levels, college and university teachers, teachers in private music academies, aural skills teachers, theory teachers, music fundamentals teachers, music therapists, drum circle facilitators, and of course, drummers and percussionists. Volume 1 addresses the rhythmic foundations for any musician, the standard concepts and vocabulary upon which all more advanced rhythmic explorations emanate and it can be used by beginning through advanced level students.

Volume 2 - *A Global Approach For All Musicians*, addresses various world rhythms and rhythmic concepts from South India, Brazil, Cuba, the middle east, the Balkans, and so on. It is designed for musicians seeking to incorporate and synthesize the riches of these various world rhythms into a cohesive 21st century rhythmic vocabulary.

Diverse musical interactions and syncretism have abounded, especially in the last one-hundred years, and our musical landscape is now truly a global melting pot. By the second decade of the 1900s, western art music began to witness profound rhythmic developments, especially by composers such as Igor Stravinsky, John Cage, Lou Harrison, Henry Cowell, Edgard *Varèse*, Amadeo Roldán, and others. The influx of non-western rhythmic influences on many musics was widespread. The development of percussion ensemble music as a distinct idiom allowed composers to push the rhythmic boundaries. Jazz and other improvised musics incorporated numerous African and Latin American influences from Cuba, the Caribbean, central and south America with many European and American classical elements. Jazz and rock improvisers in the sixties and seventies, such as John Coltrane, the Beatles, and John McLaughlin to name a few, were influenced by North and South Indian classical music. Popular musics such as ragtime, jazz, blues, rock n' roll, gospel, soul, funk, Afro-Cuban, Brazilian, and other Latin American styles had a profound impact on our overall culture and rhythmic landscape. And so on.

As a percussionist, I am drawn to musics from around the world. My rhythmic landscape has been impacted by many musics, most notably: western orchestral music, ballet, opera, chamber music, contemporary 20 and 21st century "new" music, percussion solo and ensemble music, American jazz and other improvised musics, popular musics—indeed any music utilizing the drumset, West African music, Afro-Cuban music, Brazilian music, ballroom dance styles, Broadway show music, American military music, country music, and North and South Indian classical musics. Some of my earliest musical memories are of watching drummers with bands at wedding receptions, “feeling” the deep vibrations of the local high school marching band bass drums and snare drums as they paraded by, and listening to recordings on my parent's stereo system and being especially drawn to the percussion sounds. By my second birthday when I received my first drumset, I was already clearly attracted to percussion. Beating on oatmeal boxes, pots, and pans with wooden spoons was commonplace. By fourth grade when weekly private drum lessons began, I couldn't wait to begin.

The expansion of rhythmical possibilities has been one of the cornerstones of musical developments in the last hundred years, whether through western development or through the borrowing from non-western traditions. Most classical performers, whether in orchestral or ensemble situations, will have to face a piece by Ligeti, Messiaen, Varèse or Xenakis, to mention just a few well-known composers, while improvisers face music influenced by Dave Holland, Steve Coleman, Aka Moon, Weather Report or elements from the Balkans, India, Africa or Cuba. Furthermore, many creators, whether they belong to the classical or jazz worlds, are currently organizing their music not only in terms of pitch content but with rhythmical structures... (Reina, 2013, i)

The simplest things in music are the ones that count. The simplest things are, of course, also the most difficult to achieve and take years of work. Pablo Casals, cellist

USING THIS BOOK

For me, the materials in this book represent a lifetime of rhythmic experience and are a collection of my favorite tools for building rhythmic skills. As a pedagogue I am often expected to prescribe a "method"—systematic order and procedure—describing how certain materials should be studied. While a method will prove helpful for some, others might prefer a more variable approach. For those preferring requiring basic level skill development, I suggest both the general overview and beginning level curriculum found below. For those possessing more musical experience, you will likely prefer the reference source approach; to be consulted whenever you desire new rhythm patterns, a new way to approach familiar patterns, need a rhythmically intensive focus, or are simply in the mood for a brief rhythmic warm-up. This flexible approach accommodates folks at myriad musical levels and is an enjoyable way to improve your overall rhythmic achievement.

I trust you seek a deep understanding of rhythm, and like Howard Gardner, professor of Cognition and Education at Harvard University, I believe that deep understanding emanates from developing multiple perspectives on a particular subject. Doing so takes time, persistence, and the wisdom to frequently revisit familiar material in new or different ways. Whereas, covering too much material can lead to merely superficial understanding. Certainly, we all think and learn differently, so it is wise to approach our subject matter—a rather cohesive set of rhythm skills in this volume—from myriad perspectives.¹

RECOMMENDED RHYTHMIC APPROACHES—AN OVERVIEW

PART ONE

- Chapter 1 - Learning and Teaching Rhythm. This chapter defines the essential terminology, explains how to vocalize rhythm, how to interpret and count meters, how to use a metronome, how to practice, and generally lays the groundwork for the rest of the book.
- Chapter 2 - Macrobeats and Microbeats. This chapter establishes the rhythmic subdivision framework for the entire book. If one skill set should be learned first, this is it. This is also the place to establish strong vocalization skills.

PART TWO

- Chapter 3 - Marching Percussion Pedagogy. This is an ideal place to develop hand/foot/vocal coordination with the most common rhythm patterns you will likely encounter.
- Chapters 4 and 5 - Binary and Ternary Motives. These chapters include a relatively comprehensive collection of rhythm patterns for building a versatile rhythmic vocabulary. Each chapter contains two distinct approaches to learning the same rhythms. First, we use the accent-tap approach (introduced in Chapter 3) to build a strong microbeat foundation and then we address rhythm patterns and rests as they occur in standard musical contexts. Each approach begins with what I call "fundamental motives" – the elemental or essential building blocks of all subsequent rhythm patterns or what I call "compound phrases." Too often, folks begin with compound phrases before mastering the elemental motives.
- Chapter 7 - Coordinating Polyrythms. A simple and straightforward approach to building a solid repertoire of basic polyrhythmic coordination skills.

RECOMMENDED BEGINNING LEVEL CURRICULUM

Chapter 1 - Learning and Teaching Rhythm

- Get Metronome or Metronome App.
- Review Bare Bones Solkattu Syllables Pronunciation
- Learn Counting Meters On Your Hands
- Develop Relative Tempo - Memorize 120 BPM

Chapter 2 - Macrobeats and Microbeats, tap foot or mark time throughout all exercises

- Macrobeat Palindrome in 4, @ 60, 90, and 120 BPM
 - recite rhythms in solkattu, count meter on hands
 - hands play rhythms with alternated sticking, recite solkattu
 - same as previous step, but eliminate solkattu
- Ping-Pong Microbeats - Unolet, Duplet, Triplet, and Quadruplet exercises @ 60 BPM
 - recite rhythms in solkattu, count meter on hands
 - hands play rhythms with alternated sticking, recite solkattu
 - same as previous step, but eliminate solkattu

Chapter 3 - Marching Percussion Pedagogy, mark time throughout all exercises

- Eight-On-A-Hand, ≤120 BPM, memorized
- Binary Accent-Tap Grid, ≤120 BPM, memorized with solkattu
- Ternary Accent-Tap Grid, ≤ 120 BPM, memorized with solkattu
- Timing Exercises, ≤ 120 BPM
 - Fundamental Binary Motives,
 - Binary Comparisons
 - Fundamental Ternary Motives
 - Ternary Comparisons

Chapter 4 - Binary Rhythms, tap foot or mark time throughout all exercises

- Binary Rhythm Patterns, m.m. 1-65

Chapter 5 - Ternary Rhythms, tap foot or mark time throughout all exercises

- Ternary Rhythm Patterns, m.m. 1-33

Chapter 6 - Coordinating Polyrhythms

- Binary Rhythmic Cells, 4 microbeat cycle, m.m. 1-31
- Ternary Rhythmic Cells, 3 & 6 microbeat cycles, m.m. 78-85

CHAPTER 1 - LEARNING AND TEACHING RHYTHM

DEFINING OUR RHYTHMIC LANDSCAPE

RHYTHM

Bob Becker defines rhythm as the perceived organization of elements in time.² David Burrows defines it as linked sound events already configured on other levels: pitch, loudness, timbre, or silence.³ Edwin Gordon defines it as "the flow of movements through time."⁴ Likewise, William Duckworth describes it as "how music flows through time."⁵ One could continue with many other definitions. In fact, *any definition of musical rhythm is complex, changes from culture to culture, and involves the interaction of many rhythmic components or elements.*⁶ As a performer, teacher, and author, I desire a clear and consistent vocabulary with which to understand rhythm and convey it to my students and readers.

For our purposes here, **rhythm is the perceived organization and flow of movements through time.** These movements include onsets (attack points) over a grid of equidistant pulsations that may be sounded or merely audiated (internally perceived but having no external sound).

THREE UNIVERSAL ELEMENTS OF RHYTHM

1. Macrobeats – establish tempo, the speed at which you clap, step, tap your foot, dance, conduct, etc.
2. Microbeats – equal length divisions of a single macrobeat that establish the rhythmic feel.
3. Rhythm Patterns – rhythmic groups formed by variations in the pattern or flow of regular occurring macrobeats and microbeats.

Like Edwin Gordon, believes it necessary to audiate (perceive) all three universal elements of rhythm concurrently and says that macrobeats and microbeats establish a framework or "context" upon which rhythm pattern "content" occurs.⁷ In order to ultimately audiate all three universal elements of rhythm concurrently, I find it necessary to first physically express, via actual physical motions and tapping to make audible sounds, macrobeats, microbeats, and rhythm patterns. Once you can play all three levels of rhythm and literally kinesthetically "feel" the physical motions and aurally actually "hear" the vibrations, audiation then becomes possible. Building such kinesthetic and aural skills is the overarching goal of this book.

BEAT FUNCTIONS

- Onbeat – any macrobeat
- Offbeat – any microbeat whose onset does not occur on a macrobeat
- Downbeat – first macrobeat in a notated measure
- Upbeat – last macrobeat in a notated measure
- Backbeat – typically a quadruple meter phenomenon in which strong, accented responses on the second and fourth macrobeats answer the "front"—first and third—macrobeats. Together, front-beats and backbeats create a strong 4-beat cyclic oscillation that results in four relatively dynamically equal macrobeats, but that differ in other ways. In drumming, an obvious pairing of timbres exists between the front-beats (low pitch bass drum) and backbeats (higher pitch snare drum). Generally, backbeats are a distinct rhythmic layer marked by finger snaps, clapping, stepping, foot tapping, or head bobbing. Backbeats are most commonly heard in jazz, blues, and most American popular music. In jazz, they most often occur on the closed hi-hat whereas in blues and popular musics, usually on the snare drum.

METER

Meter is understood here as a unit of measure in which a group of macrobeats are organized. No hierarchy of strong or weak beats is implied by the bar lines, rather all macro and micro beats are understood to receive equal stress unless dynamic accents are notated. Meter is the framework that helps listeners determine the relative occurrences of rhythm pattern events—onsets, offsets, and rests. Meter may be symmetric (equal length macrobeats) or asymmetric (unequal length macrobeats). In much music, each macrobeat is typically divided into binary (2, 4, 8) or ternary (3, 6) microbeat groups, but divisions may occur at other levels, such as 5, 7, and 9.

MEASURE SIGNATURE

Measure signature is a term used by Edwin Gordon for what is commonly called time signature or meter signature. I prefer Gordon's "measure signature" because it indicates only a notational practice; not time or a meter.⁸ A measure signature contains a pair of numerals; the top number indicates "how many" and the bottom number indicates the "note value referred to" by the top number—a fractional value of a whole note.

- Tempo – (Italian word for time) is indicated by a metronome marking denoting beats per minute, abbreviated BPM.
- Meter – As tempi change from slow to fast within a measure signature such as 4/4, the listener's perception of meter often changes from "in 4", to "in 2", to "in 1" respectively. Likewise, a 3/4 measure signature might be perceived "in 3" or "in 1". A 12/8 measure signature might be perceived as "in 4", "in 3", "in 6", or "in 2". In this sense, measure signatures are enrhythmic. See Chapter 6, World Rhythms.

ONSET

Onsets are elsewhere variously called attack points, timepoints, pulse, beat, or ictus. The notation here indicates onsets but not duration.

ACCENT

As used here, accent is an aspect of rhythm, an onset of relative emphasis via loudness, i.e. a dynamic accent. The counterpart to dynamic accentuation is de-emphasis; in groove-based music nearly inaudible notes are called "ghost notes," whereas in marching percussion soft notes are called "taps."

POLYRHYTHM

Generally, polyrhythm describes two or more simultaneous rhythm patterns, regardless of their microbeat base. More specifically, polyrhythm may denote two or more simultaneous rhythms in which each rhythm pattern is based on a different microbeat division level that do not divide into a whole number. In this latter sense, three distinct voices using quarter, eighth, and sixteenth notes respectively, would not be considered polyrhythmic because they share a common denominator - a whole number (four) microbeat base. When describing two or more simultaneous rhythms sharing a common denominator, I usually prefer the broader term "layered". In their drumset book *4-Way Coordination*, Marvin Dahlgren and Elliot Fine distinguish linear and layered coordination as "melodic" and "harmonic," respectively. Others, using standard musicological terminology, call such textures "monophonic" and "polyphonic," respectively.

COMBINATORICS is the branch of mathematics studying the enumeration, combination, and permutation of sets of elements and the mathematical relations that characterize their properties.⁹ In the simplest sense, rhythm may be defined as various numerical or temporal proportions or pattern variations (durations of onsets and rests). The mathematical terms below provide a useful vocabulary for describing how rhythm patterns are structured.

SET – a group of microbeats that forms a musical motive or phrase. Alternatively, the terms motive and phrase may be used; "motive" implies short, single word-like ideas, whereas the "phrase" implies a longer, complete thought, sentence-like structure.

PARTITION – provides the number of ways of writing the integer, as a sum of positive integers, where the order of addends is not considered significant. In this book, a partition (P) denotes a particular grouping of microbeats. Each numeral is understood to represent an onset (attack point) and a duration measured in microbeats. In the graphic notation below, dot (•) indicates an onset and dash (–) a rest (if all onsets sound the same). For example, 4 (items, microbeats, etc.) can be partitioned five distinct ways:

Partition	Graphic Notation	Possible Permutations
P=4	• – – –	4
P=3 + 1	• – – •	4
P=2 + 2	• – • –	2
P=2 + 1 + 1	• – • •	4
P=1 + 1 + 1 + 1	• • • •	1

PERMUTATION – also called an "arrangement order," is a rearrangement of the elements of an ordered list.¹⁰ In pitched music, "mode" is often used to describe orderings of a pitch set; C,D,E,F,G,A,B,C is ionian mode, and the next permutation D,E,F,G,A,B,C,D is dorian mode. Similarly, partition P=4 could be permuted four ways and labeled: mode 1 = •---, mode 2 = -•--, mode 3 = --•-, and mode 4 = ----•. Partitions are typically notated as (P) 211, using no addition (+) symbols, because addends are assumed.

PRIMARY AND COMPLEMENTARY RHYTHMS

Two distinct rhythmic patterns whose composite includes all the microbeats onsets in a measure, but do not share any unison onsets. These may also be described as "interlocking," or "toggle" rhythms.

GROOVE

The term "groove" is widely used in the analysis of American popular and improvised musics and it describes a wide array of musical feelings and elements well beyond the scope of this book. For our purposes, groove consists of four elements described by Mark Abel: highly metronomic time or isochronous pulse, almost continuous syncopation, multi-leveled meter - consistent tempo and the lowest microbeat level., and oftentimes backbeat.¹¹

DISPLACEMENT

Moving a rhythmic motive or phrase to different positions within a meter. Drummers typically use displacement to create rhythmic tension or ambiguity by placing a familiar phrase in an unexpected metric position.

HEMIOLA

3:2 ratios at the metric level; a temporary shift between triple and duple, either three in the space of two in a binary feel or two in the space of three in a ternary feel.

OSTINATO

A short musical pattern (rhythm or melodic) repeated persistently.

A PERCUSSIONIST'S PERSPECTIVE

Since I began contemplating a book about rhythm for all musicians, my primary question has been - what unique perspective might I offer? Hopefully, my experiences as a percussionist, performer, and teacher will lead you to some valuable rhythmic experiences and I sincerely thank you for your interest.

Despite the 'drummer jokes,' we drummers are indeed musicians, but we are also different. For me it is not a matter of denying such differences, but rather embracing them. Meaningful questions include: How do drummers and percussionists approach rhythm? Is their approach different from other musicians? If so, might other musicians benefit from our perspective? And conversely, how might we benefit from theirs?

Percussionists are obviously attracted to rhythm and the timbres/resonances of percussive sounds. In the United States most of us begin on snare drum and/or drumset. In school music programs we also encounter other orchestral and band instruments such as bass drum, cymbals, tambourine, triangle, timpani, percussion keyboards (glockenspiel, xylophone, marimba, vibraphone, chimes), drumset and perhaps some hand drums. Many of us play drumset by ear and in various out-of-school bands, but only some study drumming formally.

Other than the obvious melodic/harmonic parallels between percussion keyboards and piano, clarinet, guitar, trumpet, etc., percussionists largely live in a rhythm-centric world. We study timbre, dynamics, form, and so on, but when one considers the percentage of time we typically dedicate pitch (melody and harmony) versus rhythm, there is clearly a disparity as percussionists explore other elements, especially rhythm, improvisation, and coordination.

To address my question about what unique perspective I might offer, I identified seven characteristics central to my own musical experience and shared by many other percussionists. Of course, it can be dangerous to generalize about others, but doing so unveils "a collection of approaches" to studying rhythm I hope you find beneficial.

SEVEN CHARACTERISTICS OF A PERCUSSIONIST

1. Percussionists love rhythm for its own sake – rhythm is its own musical domain. Percussionists do not always need melody or harmony to make music. We are always tapping on things, playing rhythms against the tick-tock of the automobile turn signal, mechanical clock, and so on. We're constantly finding rhythms and grooves in life around us. Rhythms are musical skills we possess apart from any particular instrument. Percussion instruments represent opportunities to express these skills through an almost unlimited variety of timbres or sounds. Sometimes we wonder why non-percussionists are not as fascinated by such rhythms. Although conversely, I suppose many non-percussionists wonder why percussionists are not as fascinated with melody and harmony.
2. Percussionists love percussive timbres and resonances and how they vibrate in our ears and throughout our bodies; such vibrations are positively addictive, creating actual physiological effects. We enjoy finding sounds and making instruments. Junk yards, curbside trash-day treasures, and do-it-yourself home stores are a percussionist's music store.
3. Percussionists experience rhythm through all four limbs and meanwhile our voice is free to count, recite, chant, or sing. Hand sequences, or stickings, and rhythm patterns are often inextricably linked. Sometimes, we focus on a single timbre such as snare drum—pursuing ambidexterity to help make our hands sound identical. Other times, we study instruments such as drumset, where each limb can produce distinct timbres and rhythm patterns, and together they produce polytimbral and/or polyrhythmic textures.
4. Drumset players live in a world of complex four-limb coordination. For us rhythm is movement through time, movement is physical coordination, and it is all an interconnected dance.
5. Percussionists spend considerable time practicing with metronomes, drum machines, rhythm sequencers, etc. We oftentimes develop rather challenging ways of using such devices.
6. Percussionists, especially those who play popular or improvised musics, spend considerable time playing rhythmic time cycles or grooves with a rhythm or pitch sequencer or audio recordings. Long periods of playing just one or a few rhythm patterns (beats) are considered necessary in order to get really "deep" into the groove. Microtiming nuances—where to place individual notes in the temporal macro-microbeat structure—are important considerations that determine the rhythmic character or "feel."
7. Percussionists love musics from around the world and are proud of their global sensibility. We love to collect and play many instruments.

Considered individually, any one or even several of these seven characteristics might be shared by other musicians, but as a whole, they create a rather unique "percussion perspective."

VOCALIZING RHYTHM

Many musicians recognize the value of vocalizing syllables ("solimization" or "vocables") whether for musical modeling, memory aid, beat function, developing physical coordination, or numeral counting. *Rhythm syllables are beneficial for at least two reasons. First, they provide a vivid way to experience rhythm, especially when used with appropriate rhythmic movement. Second, rhythm syllables facilitate the comprehension and retention of patterns in audiation. They help students build a large vocabulary of rhythm patterns by exemplifying the similarities and differences among patterns.* (Dalby, 2005, 54.)

A syllable system should be used as needed but not unilaterally imposed. Syllables should be easy and enjoyable to recite, simple to memorize, provide precise articulation, musically engaging, and applicable to many styles. For me, vocalizing rhythm is a rewarding way to experience rhythm, whether away from my instruments or in conjunction with them. I do not rely on solimization as a counting system, rather counting is addressed later in this chapter—see "Counting Meters."

Learning any musical instrument requires a unique set of physical skills and a lengthy technical process. Almost every musical instrument also requires a dedicated physical space in which to practice and rehearse for obvious acoustical reasons, so practice accessibility is necessarily limited. But nearly all musicians share one universal instrument, our voice, and virtually unlimited accessibility to rhythmic syllables.

Various solimization systems have been developed in Western music pedagogy since the early nineteenth century to aid in the perception of rhythm including the French Time-Names system, Dalcroze Eurhythmics (good rhythm), American time-value method 1E&A counting, Orff methodology, Kodály syllables, the Edwin Gordon du-ta-de-ta system, Hoffman's Takadimi system, etc. However, none offers the potential I have witnessed in South Indian solkattu syllable recitation.

In my own formal music education, I was taught the American time-value "1E&A," counting system. Beginning weekly private lessons at age eight (fourth grade), my drum teacher required aloud counting throughout all snare drum studies in lessons and individual practice. This expectation continued until tenth grade when the rhythmic complexity and density of the etudes became too difficult to recite with the 1E&A," counting system syllables. Nevertheless, over seven years of aloud counting in every personal practice session and lesson helped me gain considerable rhythmic skills, even if I did not particularly enjoy those particular syllables. Meanwhile I heard jazz singers "scat sing" and their vocabulary seemed far more engaging. Thereafter, whenever I vocally emulated rhythms, grooves, or drumset beats, my improvised syllable language was loosely inspired by scat singing.

The "1-E-&-A" American Counting System includes Arabic numerals and English syllables:

<u>Number of microbeats</u>	<u>Solimization</u>
1	one
2	1-an
3	three-trip- let
4	1-e-an-uh
5	1-2-3-4-5

While 1E&A counting is sometimes adequate, it also has some serious limitations:

1. It is difficult to precisely articulate, especially at faster tempi. Of the dozen or so syllables listed, only several (two, trip) possess a precise consonant onset articulation. Otherwise, most begin with vowels or soft consonants and vague onsets; most notably, beat "one."
2. Many syllables are relatively long sounds even though lighter weight and short duration syllables are generally preferable, especially when chanting precise or fast rhythms.
3. 1E&A counting requires considerable movement of the mouth and jaw muscles and feels cumbersome.
4. Overall, 1E&A lacks any standard vocabulary for reciting microbeat divisions such as 5, 6, 7, 8, 9, and 10. The 1E&A system provides syllables for 1, 2, 3, 4 or only 40% of the 1-10 microbeat divisions. Although, not traditionally a significant part of traditional Western repertory, divisions of 5, 6, 7, 8, 9, and 10 are common in much contemporary and world music. Perhaps we omit these numbers because we perceive them as difficult, but they are merely less familiar. It has been my experience teaching, even younger students, that learning all the divisions from 1-10 is a relatively straightforward process.
5. Counting 1E&A syllables seldom feels musical as they are typically recited in a monotone

manner.

While in college, I discovered Indian classical music, particularly South Indian (Carnatic) konnakol. After hearing my first Carnatic performance I was amazed at the rhythmic virtuosity and each musicians' balance of vocal recitation and instrumental prowess. Thereafter, I sought to incorporate some of their concepts into my own drumset and percussion performance and teaching.

"Solkattu" and "konnakol" are South Indian terms. Solkattu is a Tamil word that means "words bound together."¹² "Sol" means syllable and "kattu" means bunch or group. In short, solkattu is a broad term encompassing a variety of syllables and approaches. Whereas Konnakol refers to the specific performance art of chanting the solkattu syllables while counting the meter (tala) with a series of hand claps, waves, and finger taps which, both accompanied by a drone. "Koni" means 'to recite' and "kol" means 'to rule' or 'to reign'.¹³ "Konnakol is believed by many scholars to be the most comprehensive and most highly developed approach to learning and mastering rhythm."¹⁴ Solkattu syllables historically evolved as phonetic representations, or mnemonic aids, of mridangam sounds, the primary drum of Carnatic classical music, but nowadays outside of traditional Carnatic music, solkattu is used in a more varied manner. The syllables are "bound together" on two structural levels. First, as short combinations, typically 1 to 9 syllables, that form a single motive, such as "ta ki da" or "ta ka di mi." Second, motives are combined into phrases and larger formal patterns within a larger cyclic metric structure or "tala."

Aside from its merits as an individual art form, Konnakol is an integral part of the extensive training required to master the Mridangam - and all percussion instruments - providing the basis for understanding the rhythmic complexities of the Karnatic tradition. Musicians communicate rhythmic ideas to each other using Konnakol and they also use the vocal patterns to practice ideas whilst clapping the talam with their hands. Konnakol is the medium used for giving teaching instructions in percussion lessons, with corrections in lessons given vocally. The student then repeats the syllabus, both in Konnakol and on the drum. It is the basic language for percussion composition, and artists often first conceive ideas in Konnakol, and then transfer the piece to the instruments. (Young, 1998, 12-13.)

For me, probably the most important attribute of solkattu and konnakol is the beauty of rhythm itself—the syllables are conceived and performed as melodic phrases. By simply using your voice, hands, and feet, you can master a profound rhythmic vocabulary that becomes your companion almost anywhere.

Because most solkattu syllables begin with a tip of the tongue, front of the mouth consonant sound, they provide precise articulation onsets, are easy to pronounce, and are fun to chant. Whenever a softer consonant articulation onset is desired, syllables exist for this purpose as well. Pitch contour should mirror the desired rhythmic weight, flow, and phrasing; use higher pitches for emphasis (dynamic accents) and lower pitches for de-emphasis.

I use 1-e-an-ah counting and solkattu for different purposes. In fact, I do not recommend abandoning your present system if it serves your needs. Rather, I hope you will consider adding solkattu syllables to your rhythmic arsenal. I find solkattu vocal recitation superior when modeling rhythm and musicality whereas I find the 1E&A counting system helpful for communicating verbal directions in lessons and rehearsals regarding where something occurs; "your note begins on the "ah" of beat two". Further, many musicians already know the 1E&A system and if not, it is easily learned.

Some folks are hesitant to adopt solkattu because the syllables differ from their past experience, even though solkattu is easy to learn. Before you decide whether or not to adopt solkattu, I hope you will listen to South Indian konnakol performances by master musicians to witness the musical potential of these syllables. Several recommended recordings include: *Vidwan Sri T. H. Subash Chandran, The Artistry of Ghatam and Konnakol. This outstanding instructional DVD includes performances and lessons on South Indian Ghatam (clay pot) and konnakol (vocal percussion) by one of the India's foremost masters of the idiom.* Trichy Sankaran at trichysankaran.com demonstrates konnakol and the traditional South Indian drums – mridangam, and kanjira.

To begin, perhaps use just a handful of syllables until they become comfortable. Groupings of five or more microbeats are built upon additive groupings of 2s, 3s, and 4s.

PRONUNCIATION: **Ta** as in "Tahoe," **Ka, Ta, Da, Ga, Na** short U sound as in "does," **Di, Gi, Ki, Mi, Ti** long E sound as in "deep," **Tum, Dum, Num** double O sound as in "doom," **Di, Gi, Ki, Ni, Mi** short I sound as in "hip." Experiment with various pronunciations to find the best sounds for each rhythm and tempo. Typically, when chanting very fast, I prefer to soften the vowels, as this makes the chanting easier because there is less movement of the mouth and tongue.

BARE BONES SOLKATTU SYLLABLES	
microbeats	syllables
1	ta, din (for long sounds)
2	ta ka
3	ta ki da
4	ta ka di mi
5	3+2 = ta ki da, ta ka / 2+3 = ta ka, ta ki da /
6	2+2+2 = ta ka, ta ka, ta ka / 3+3= ta ki da, ta ki da
7	2+2+3 / 3+2+2 / 2+3+2
8	2+2+2+2
9	3+3+3
10	2+2+2+2+2 / 2+3+2+3

Thereafter, incorporate additional syllables to realize the rhythmic feels and phrasings you desire. I often prefer longer sequences to create longer phrases and better melodic flow. For a four-note motive I typically recite "ta ka di mi, but to create a longer phrase I chant an eight-note motive "ta ka di mi, ta ka ju na." For me, the variation on the last two notes gives the phrase a more interesting lilt. This is an example of using vocables in a personalized creative manner to create musical feelings. The syllables found throughout this book are merely suggested starting points, but it is vital to incorporate whatever syllables you find appropriate. For example, I have included syllables (italics below) from jazz scat singing, West African drumming, beatboxing, and Edwin Gordon's syllable system.

NOTES	SOLKATTU SYLLABLE LEXICON
1	long sounds - tha, din, thom, nam, num, tum, <i>du, de, di, ba, be, bi, pi, doh, doom, boom, bop, dat, kow, dow</i> short sounds - ta, di, ki, di, te, ju, jo, da na, gi, <i>dut, dat, ko, pi, ka</i>
2	ta ka / ki ta / te re / di mi / ju na / jo nu / din na / na ku / gi na / di ku <i>di ga / doo bab / doo dah / zu na / za da / ze dum / pi ta / du ka / chi ka / shi ga</i>
3	ta ki da / ta ki ta / ta ki na / din na ka / din na ti / ju na ka / <i>ta pi ta / ka shi ga</i>
4	ta ka di mi / ta ka ju na / ta ka din na / ta ka di ku / ki ta ta ka / te re ki ta
5	ta di ki na thom / ta ka di mi ka 2+3 = ta ka, din na ka / ta ka, ju na ka / ta ka, ta ki ta / 3+2 = ta ki ta, ta ka
6	3+3 = ta ki da, ta ki da / ta ki ta, ta ki ta / din na ka, din na ka / ta ki da, ju na ka 2+2+2 or 2+4 = ta ka, te re, ki ta / 2+2+2 or 2+4= ta ka, di mi, ju na
7	4+3 = ta ka di mi, ju na ka / ta ka di mi, ta ki da / ta ka di mi, din na ka
8	4+4 = ta ka di mi, ta ka ju na / ta ka din na, ki ta ju na / ki ta ta ka, te re ki ta
9	4+5 = ta ka di mi, ta di ki na thom / 3+3+3 = ta ki da, ta ki da, ta ki da
10	5+5 = ta ka din na ka, ta ka ju na ka / ta di ki na thom, ta ka din na ka

MICROBEAT GROUPINGS IN BINARY AND TERNARY METERS

An excellent way to take advantage of solkattu's potential is to vocalize memorized microbeat grouping sequences . I like this approach because it builds a strong sense of audiation, kinesthetic hand-foot-voice coordination, and rhythm pattern memory, all without the visual distraction of reading notation.

Chanting the groupings against a metric structure (macrobeats) and trusting the math to "work-out" on the downbeat without seeing the notation might seem intimidating at first, but will become liberating once you gain some aural and kinesthetic trust. "Playing by ear" is an approach often not emphasized in Western music pedagogy, or sometimes the rhythmic structures we do play by ear are so simple as to not optimally challenge us.

I recommend foot tapping macrobeats, chanting the microbeat groupings with solkattu, and counting the meter on your hands as described below in "Counting Meters." Set the metronome to macrobeats, with a distinct downbeat sound. If foot tapping seems difficult to coordinate with solkattu and counting, try larger macrobeat motions (walking, stepping side to side, or marching) until you trust the math. Thereafter, foot tapping should be easier. Eventually, eliminate the meter counting and play the groupings in unison with solkattu and your hands (alternate sticking), accenting the first note of each microbeat group. Once these groupings are "in your ear and hands" you will have entered a new rhythmic dimension. Memorize each phrase group and play it many times to internalize the feeling. Mastering a few phrases will prove more beneficial than merely surveying a large amount. Use whatever solkattu you prefer.

BINARY METER, 2 MACROBEATS, 8 MICROBEATS			
2222	44	332	233
323 - palindrome	35	53	
BINARY METER, 4 MACROBEATS, 16 MICROBEATS			
34333	33334	33343	33433 -Brazilian clave, palindrome
33424 - son clave	44323	43333	44233
44332	34243 - palindrome	33442-gahu gankogui	34324 - rumba clave
43234 - palindrome	4534	4453	5344
3535	5533	5335	5443
5353	3553	3355	
565 - palindrome	655	556	475
547	574	754	457
745	772	727 - palindrome	277
79	97		
BINARY METER, 5 MACROBEATS, 20 MICROBEATS			
(33)(33)44	6644	44444	5555

BINARY METER, 7 MACROBEATS, 28 MICROBEATS			
555544	6679		
BINARY METER, 8 MACROBEATS, 32 MICROBEATS			
33333338	55553333	993344, (9=2223)	4455554
59567	77774		
BINARY, 12 MACROBEATS, 48 MICROBEATS			
33222,33222,33222,33222 – Bernstein-America theme			
TERNARY METER, 3 MACROBEATS, 9 MICROBEATS			
54	45	72	27
522	252	225	432
234	342	324	2223
2232	2322	3222	
TERNARY METER, 4 MACROBEATS, 12 MICROBEATS			
3333	444	22323 - son clave	23223 - rumba clave
75	57	552	525
255	534	543	435
453	345	354	732
723	372	327	273
237	222222		
TERNARY METER, 5 MACROBEATS, 15 MICROBEATS			
44(43)	447	474	744
33333	333222	3222222	
TERNARY METER, 7 MACROBEATS, 21 MICROBEATS			
5 5 5 6	5565	5655	6555
TERNARY METER, 8 MACROBEATS, 24 MICROBEATS			
55554	5559	7773	9753
5559	7755	7557	996

COUNTING METERS

Solkattu syllables are not a macrobeat (numeral) counting system. For counting metric structures, Indian musicians and their audiences participate in a shared system of hand claps, waves, and finger taps, to maintain the various rhythmic cycles (talas) upon which their music is built and appreciated in live performance. Solkattu may be recited while counting with the hands, but it never replaces counting. For our purposes, if one is practicing rhythm away from their instrument, i.e. foot tapping macrobeats and vocalizing rhythm patterns, counting can be done with the hands. I believe it imperative to work on rhythm away from our instruments so as to build a level of mastery that can be assumed when reintroducing the myriad technical concerns our instruments require. The following counting system accommodates most metric structures you will likely encounter.

While one might use traditional Western conducting beat patterns to count meters, I prefer the precision generated by the sensation of the hands striking each other, as I find these literal "percussions" an integral part of our kinesthetic and aural perception and memory.

HAND COUNTING SYSTEM FOR METERS UP TO 12 MACROBEATS	
<i>Count</i>	<i>Hand Motions – Right hand strikes upturned left hand palm</i>
Beat 1	Clap
Beat 2	R pinky finger
Beat 3	R ring finger
Beat 4	R middle finger
Beat 5	RH back of hand wave
Beat 6	R pinky finger
Beat 7	R ring finger
Beat 8	R middle finger
Beat 9	R forefinger
Beat 10	R thumb
Beat 11	R forefinger
Beat 12	R thumb

METRONOMES AND RHYTHM SEQUENCERS

TEMPO TENDENCIES

Audio record yourself and use a metronome to assess your tempo tendencies by skimming the recording, taking tempo samples from the beginning, middle, and end. If the tempo is consistent, that is a great. If not, listen to the entire recording and determine exactly where the changes occurred and what caused them. Developing consistent "metronomic" time is largely about understanding one's tendencies to deviate, anticipating these, and making effective adjustments. Louder dynamics, long duration notes, and long rests are often associated with rushing. I believe the louder dynamic issue to be a normal human tendency. Rushing associated with long notes or rests is often simply a matter of not audiating or reciting all the microbeats underneath the aural rhythm patterns. Oftentimes very slow tempi tend to rush because we do not audiate or recite enough microbeats to sufficiently anchor the tempo and rhythm patterns. Conversely, we tend to slow down when suddenly playing softer. Very fast tempi tend to drag because we may recite too many microbeats or macrobeats and the musical feel becomes too heavy. For musicians who have developed good time, potential problems are usually averted before they occur and certainly before they become major problems. Some of the suggested practice routines below should help you quickly recover from minor mistakes before they escalate into major mishaps.

TEMPO VERSATILITY

Strive to become technically accurate and relaxed at a given tempo before increasing it. Document all tempi you can play an excerpt, etude, solo, etc. Although your maximums may vary from day to day, long-term progress should trend upward.

TEMPO-TAP METRONOME FUNCTION

Most electronic metronomes have a tempo-tap function with which to tap-enter a steady tempo and receive an averaged digital tempo readout. While this function appears handy for quickly identifying rehearsal tempi or taking tempi from recordings, its main drawback is that the average tempo it calculates is only as accurate as the last few taps the user enters and this often varies considerably. When calculating a tempo, I find it more accurate to play the metronome aloud with the music or recording and adjust BPM's until they coordinate with the music for at least several measures.

PRECISELY ALIGNED ATTACKS

Every musician should be able to play attacks precisely with the metronome click. Although a seemingly obvious expectation, folks sometimes float around and are not exactly with the click. Oftentimes, they do not even recognize this habit and such a "loose" rhythmic habit is especially problematic in an ensemble. One way to overcome this problem is to adjust the metronome volume so it is barely audible when your attacks are precisely synchronized with it; you will actually hear the metronome more when your attacks deviate from it. Another way to overcome this problem is to practice different metronome macrobeat modes as described below.

Metronome Macrobeat Modes

Denotes the ability to perceive various macrobeat tempi and metric placements (rhythmic modes or displacements) of the click while playing music. This multifaceted perception skill is beneficial in several respects. First, each mode makes the music feel different. Second, referencing a slower macrobeat level can help when tempi are fast and/or tend to become heavy and slow down.

In a 4-macrobeat meter you can place met clicks at six places within the meter.

In 4 (quarter note) modes

In 2 (half note) modes

In a 3-macrobeat measure you can place met clicks at eleven places within the meter.

In 3 (quarter note) modes

In 1 (dotted half note) modes

In 2 (dotted quarter note) modes

Most musicians spend considerable time playing onbeats "in 4" and to a lesser degree onbeats "in 2". But I find playing offbeats, whether in 4 or 2, really heightens one's aural and rhythmic skills. I believe certain skills are elusive with just onbeat practicing and likely much of this has to do with simply changing your aural perspective of how/where you hear the time. If one's aural reference is always onbeat oriented, we may simply take it for granted and afford it less attention. At best, onbeats offer only one perspective. Whereas, if you hear the met as offbeats in 4, it is amazing how quickly you realize inaccuracies—rhythms you previously thought were "no problem." Do not hurry from one metronome mode to the other, rather spend enough time playing with each mode until you are really comfortable with these unique perspectives. I trust you will be grateful for your efforts, even if you didn't get through all the modes. In swung eighth note feels, offbeat quarter and half notes will occur on the third microbeat of a triplet group.

ABSOLUTE AND RELATIVE TEMPO

Tempo, the Italian word for time, has two applications. The first, denotes the speed (rate per unit of time) of equal length macrobeats or symmetrical meters. The second, describes unequal length macrobeats or asymmetric meters. Metronome markings or beats per minute (BPM) typically indicate the macrobeat speed, but may sometimes indicate microbeat tempo, as in asymmetric meters, such as 7/8 divided into 3 macrobeats grouped 2+2+3 microbeats.

Absolute tempo - is the ability to recall a specific tempo without reference to a metronome or other source. Similarly, absolute (perfect) pitch is the ability to produce a specific pitch without reference to an external standard. Although I have known a number of musicians who possess absolute pitch, I have not met anyone who possesses absolute tempo. I do, however, know that striving toward this goal by developing a sense of relative tempo is a rather straightforward process that yields many benefits.

DEVELOPING RELATIVE TEMPO

Relative tempo requires a two-step process—memorizing a reference tempo and using it to calculate other tempi.

1. Memorize a familiar melody at 120 BPM which will serve as your "reference tempo." Dance, clap, or conduct the macrobeats while singing the tune, as this assures both aural and kinesthetic recall. While one might choose to memorize almost any tempo ranging from 30-240 BPM, I recommend 120; it is a common marching and walking pace, in the middle of 30-240, a moderate comfortable to play speed, and it can easily be referenced from a watch, clock, computer.

I chose John Phillip Sousa's famous march *The Stars and Stripes Forever*. Having heard it many times as a child and played it many times in school bands and professionally, it was easy to recall. I only need audiate the first few notes of the introduction for an accurate tempo recall. I also believe it is important to step to, dance, clap, or conduct the macrobeats (physically move in some manner) while humming or imagining the tune, as this assures both aural and kinesthetic learning.

The Stars and Stripes Forever

John Phillip Sousa
(1854-1932)

Introduction

First Strain

The image shows two staves of musical notation in treble clef with a key signature of one flat (B-flat). The first staff is labeled 'Introduction' and contains five measures of music. The second staff is labeled 'First Strain' and contains five measures of music. Both staves use a variety of note values including quarter, eighth, and sixteenth notes, along with rests and accidentals.

Alternatively, use another popular song. One advantage of much recorded popular music is that the original artist's recording, i.e. the "definitive" recording, is widely known and always at the same tempo; unlike standard repertoire marches or classical pieces that are performed live (reinterpreted) at various tempi, or have been recorded numerous times, and where a widely acknowledged definitive recording may not exist. Regardless, this Sousa march has

worked well for me but any melody that can be consistently audiated is fine. I did not memorize a particular recording, but merely the melody.¹⁵

When memorizing your reference tempo, I recommend practicing a variety of material for perhaps a half-hour or more, with the metronome only at 120. This establishes aural and kinesthetic familiarity with a single fixed tempo across diverse repertoire. Incorporate this tempo into your warm-up session with scales, arpeggios, or rhythm patterns to memorize 120 BPM. Then take a five or ten-minute break with no tempo or music sounding. When you return, audiate (recall) your 120 BPM reference tune, humming the tune while clapping macrobeats, and check your recall with the metronome. If you deviate significantly from 120 (more than one or two BPM faster or slower, i.e. 118-122BPM), test yourself more frequently. If you are relatively accurate, extend the time between tests, gradually extending this recall interval until you can audiate the tempo days or even weeks later. I commonly work on a particular tempo in my drumset practicing for a number of weeks. Likewise, I used a tuning fork and a similar recall gradual extension process to memorize A-440.

2. Once a reference tempo is memorized and has become consistent from day to day, you may utilize mathematical ratios and common note values to calculate a broad spectrum of tempi as illustrated below.

Tempi Ratios

Calculating mathematical ratios from 120 BPM reference tempo

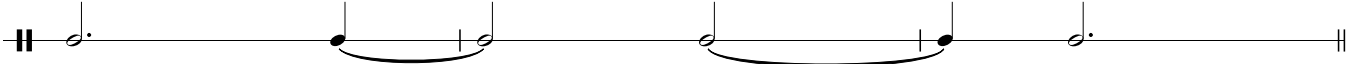
120 bpm = reference tempo, 4 quarter note macrobeats per measure



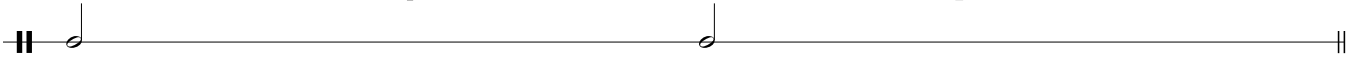
1 whole note in the time of 4 quarter notes, 1:4 = 0.25, 120 x 0.25 = 30 bpm



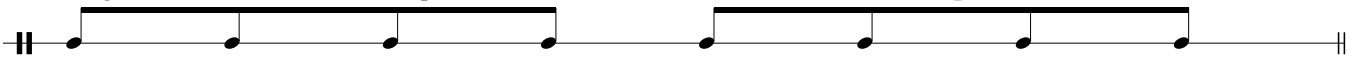
3 dotted half notes in the time of 12 quarter notes, 4:12 or 1:3 = 0.333, 120 x 0.333 = 40 bpm



2 half notes in the time of 4 quarter notes, 2:4 or 1:2 = 0.5, 120 x 0.5 = 60 bpm



8 eighth notes in the time of 4 quarter notes, 8:4 or 2:1 = 2.0, 120 x 2 = 240 bpm



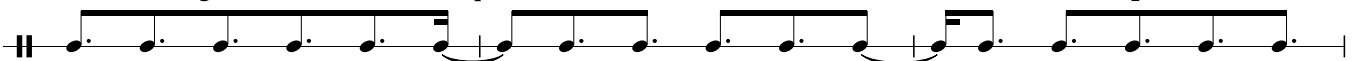
16 sixteenth notes in the time of 4 quarter notes, 16:4 or 4:1 = 4.0, 120 x 4 = 480 bpm



8 dotted quarters in the time of 12 quarter notes, 8:12 or 2:3 = 0.666, 120 x 0.666 = 80 bpm



16 dotted eighths in the time of 12 quarter notes, 16:12, reduced to 4:3, 120 x 1.333 = 160 bpm



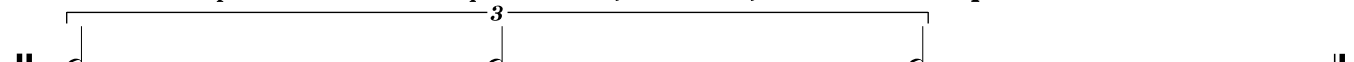
12 eighth note triplets in the time of 4 quarter notes, 12:4 or 3:1 = 3.0, 120 x 3 = 360 bpm



6 quarter note triplets in the time of 4 quarter notes, 6:4 or 3:2 = 1.5, 120 x 1.5 = 180 bpm



3 half note triplets in the time of 4 quarter notes, 3:4 = 0.75, 120 x 0.75 = 90 bpm



<i>Note value in 4/4 meter</i>	TEMPI IN DESCENDING ORDER		
	<i>Ratio (per quarter note)</i>	<i>@120 BPM</i>	<i>@60 BPM</i>
sixteenth note	6:4, 4:1 (0.25)	480	240
eighth note triplet	3:1 (0.333)	360	180
eighth note	8:4, 2:1 (0.50)	240	120
quarter note triplet	6:4, 3:2 (0.666)	180	90
dotted eighth note	16:12, 4:3 (1.333)	160	80
quarter note (reference)	4:4, 1:1 (1.0)	120	60
half note triplet	3:4 (1.666)	90	45
dotted quarter note	8:12, 2:3 (1.5)	80	40
half note	1:2 (2.0)	60	30
dotted half note	4:12, 1:3 (3.0)	40	20
whole note	1:4 (4.0)	30	15

TESTING YOURSELF VIA TEMPO ESTIMATION

After you gain confidence recalling 120 BPM and calculating ratios from it, challenge yourself with a tempo estimation game. When you are about to count-off a tempo, set the metronome with sound and visual off, to the BPM you think you are audiating or tapping. Then turn the sound on to test yourself. Are you within a few clicks of your estimated tempo? If you consistently play this game, you will likely be surprised how accurate you become at making such "educated guesses."

TEMPO RETENTION

A. Reduce your reliance on the metronome by practicing progressively fewer clicks per measure. If beginning with four macrobeats per measure, progress to two, and finally just one per bar. When beginning with three macrobeats per measure, progress to just one. Many electronic metronomes, online, smart phone, and software metronome applications go slow enough to facilitate such practice. See "Rhythm Sequencer and Programming Applications" below.

B. Increase your tempo retention period. Play for several minutes with the metronome to audiate and kinesthetically memorize the tempo, then play several minutes without it. Then, restart the met, continue to play and observe your tendencies. Do you get faster or slower while the met is off? Gradually increase the met-off period until you can accurately maintain a tempo for 30 minutes or more without external reference. Alternatively, after not playing with the met or hearing a tempo for several hours or even overnight, try to recall it by playing for a minute or so before turning it on. This first attempt of the day is usually the most reliable indicator of your tempo retention skill.

TEMPO INCREMENTS:

I have found that if you routinely practice in consistent tempo increments (such as 4 BPM), you can learn to feel the distance between such increments and this sensibility is helpful when estimating tempi other than your reference 120 or ones calculated via the rhythmic ratios. I recommend 4 BPM increments (60, 64, 68, etc.) because they feel just different enough, whereas smaller increments seem more difficult for most people. Considered together, calculating tempo ratios from 120 BPM and the concept of 4 BPM increments provide a versatile relative tempo system.

RHYTHM SEQUENCER AND PROGRAMMING APPLICATIONS

Creating music based on programmed rhythmic cycles is an important part of contemporary musical culture and drummers, composers, rap and hip-hop artists are just a few of the folks that utilize rhythm sequencing applications. Of course, there exist many dedicated hardware electronic devices such as keyboard sequencers and drum machines. Mobile phone and computer software applications offer tremendous diversity of virtual drum machines, electronic metronomes, and rhythm sequencer applications.

- Program Rhythm Pattern Cycles - If I'm practicing Cuban rhythms, I'll often have a son or rumba clave vamp accompaniment. If I'm practicing Brazilian rhythms, I often use a partido alto rhythm and for African rhythms I usually use a bell rhythm or another key pattern. Alternatively, one might use an app such as "the Clave"

where son, rumba, afro, and bossa claves are already pre-programmed and you merely select the clave and set the tempo.

- Program Metric Cycles - Sequencer apps are also useful for programming a metric structure whereby various macrobeats can be left silent, for when you really become serious about reducing your metronome dependency. For example, program a four measure 4/4 phrase but only allow the downbeats of each bar, or every two bars, to sound.
 - A basic online programmable metronome is bestdrumtrainer.com/tt/ where various numbers of measures in a phrase cycle can be set to sound or be silent, ranging from 20-200 BPM. The one drawback is, as of this writing, only equal length beats can be programmed.
 - The mobile metronome app "Time Guru" allows the user to determine a percentage of the metronome macrobeats that will randomly be left silent. The unpredictability of the silent macrobeats is challenging as we quickly realize how dependent we have become on every click of the metronome.
- Several mobile phone applications, available at the Apple App Store, I use are:
 - "Flex Beat Metronome" by Scott and Linda Johnston, all-around mobile metronome app that is easy to use and allows the user to program specific meters and rhythms.
 - "Tempo" and "Tempo Advance," both produced by Frozen Ape Pte. Ltd. These allow the user to program specific meters and rhythms, synthesized or sampled instrumental and electronic sounds, all at a wide range of tempi. "Tempo" is an excellent overall metronome app and "Tempo Advance" adds considerable syncopation and polyrhythmic programming control options in a similar layout.
 - "DM1," by Fingerlab, is a virtual drum machine and is easily programmed.

PRACTICING WITH LIVE MUSICIANS AND RECORDED MUSIC

LIVE PLAYING

Oftentimes the best way to improve your rhythmic skills is simply to spend more time playing with other musicians.

1. Unison playing – any material in this book can be played in unison with two or more people.
2. Split parts – Any of the exercises containing right and left-hand parts, primary and complementary rhythms, or interlocking rhythms can be split between two or more players.
3. Rhythmic canons – two players play the same material but one begins a measure or two later to create a canonic polyrhythmic texture. Canons can be created at various time intervals or with two or more musicians.

PLAY-ALONGS

Playing along with recordings is a fun way to develop rhythmic skills. Having the tempo and rhythmic feel dictated by a particular recording, any music you enjoy, is a great way to build rhythmic sensibility and flexibility. When I grow weary of practicing with the metronome or seek to work on a particular rhythmic feel, I play along to recorded music. You can organize tunes into playlists on your computer with categories such as metric feel (binary or ternary), tempo, or musical style, etc. If I'm practicing classical rhythms I might play-along with a movement from a Mozart symphony, a Bach keyboard suite, or a Beethoven string quartet, to name a few.

SUGGESTED AUDIO RECORDINGS

BINARY OR WORLD RHYTHMS

- "Sore," Diogal, *Acoustic Africa*, four macrobeats per bar, four microbeats per macrobeat, 118 BPM, and contains a great binary groove feel.
- "Say Ladeo," Bobby McFerrin, *Vocabularies*, 94 BPM

12/8 FEELS

- "Sedjedo," Angelique Kidjo, *Acoustic Africa*, 4 macrobeats per bar, 3 microbeats per macro, and a good accompaniment for any 3/8, 6/8, or 12/8 feel rhythm patterns, 134 BPM
- "90 Millas," Gloria Estefan, *90 Millas*, bembé, 125 BPM

3/4

- "Baby," Bobby McFerrin, *Vocabularies*, 180 BPM quarter, 60 dotted half

5/4

- "Ikotofetsky," Rajery, *Sofera*, 3322 grouping feel, 206 BPM

AFRO-POP

3/2 METER FEEL

- "n'fan mot," Jean Luc Ponty, *Tchokola*, Cameroon bikutsi style, in 3, duple feel. Practice with Chapter 6 World Rhythms, 3/2 key patterns

DUPLE

- "Sakka Sakka," Jean Luc Ponty, *Tchokola*, Juju style from Nigeria, 110 BPM, in 4
- "Ye ke ye ke," Jean Luc Ponty, *Tchokola*, Juju style from Nigeria, 123 BPM, in 4
- "Passionate Raindrops," Stevie Wonder, *A Time To Love*, 76 BPM, in 4
- "Fragile," Sting, *Fields Of Gold*, 84 BPM, in 4
- "Mouna Bowa," Jean Luc Ponty, *Tchokola*, 126 BPM, makossa style from Cameroon
-

BRAZILIAN

- "Sambaduro," Sergio Mendes, *Brasiliro*, 91 BPM, partido alto
- "Lua Soberana," Sergio Mendes, *Brasiliro*, 114 BPM, duple pop
- "Brisa Mar," Sabrina Malheiros, *New Morning*, samba-baiao 98 BPM
- "Aguas de Marco," (Waters of March), Elis Regina & Antonio Carlos Jobim, *Elis & Tom*
- "Hologotes," Gal Costa, *Plural*, 1983, partido
- "Um Passo à Fente," Gal Costa, *Hoje*, 2005, partido

REGGAE

- "Natural Mystic," Bob Marley & the Wailers, *Exodus*, slightly swung, 66 BPM
- "Ode to the Doo Da Day," Michael Brecker, *Now You See It, Now You Don't*, 111 BPM, duple

HALF-TIME SHUFFLE

- "Home At Last," Steely Dan, *Aja*
- various feels, duple, "He Ran To The Train," Bobby McFerrin, *Vocabularies*, 142 BPM, modulates from duple 4/4 @ 3:30, to ternary 12/8 @ 3:53 to duple 3/2 @ 4:20, back to duple 4/4 @ 4:40

12/8 BEMBE

- "Elegua con güiro," Los Muñequitos de Mantanzas, *Ito Iban Echu*, 2014
- "Tocororo," Los Muñequitos de Mantanzas, *Óyelo De Nuevo*, 1994, good example of hybrid triple/duple feel
- "Abakua Makonica," Los Muñequitos de Mantanzas, *Vacunao*, 1995
- "Imploración," Los Muñequitos de Mantanzas, *Tambor de Fuego*, 2007
- "Columbia Cubana," Los Muñequitos de Mantanzas, *Rumberos de Corazon—50 Aniversario*, 2003
- "Maria Rafaela," Yoruba Andabo, *El Callejon de los Rumberos*, 1996

RUMBA

- "El Marino," Los Muñequitos de Mantanzas, *Óyelo De Nuevo*, 1994
- "La Rumba Es," Los Muñequitos de Mantanzas, *Tambor de Fuego*, 2007
- "Chino Gua Guao," Los Muñequitos de Mantanzas, *Rumberos de Corazon—50 Aniversario*, 2003
- "Yamuri (Yamori)," Los Muñequitos de Mantanzas, *Guaguancó Matancero - Candela! Cuban Classics Vol. IV*, 2010

TEACHING RHYTHM: A GLOBAL PERSPECTIVE

Rhythm is arguably the most important component of music. In all musics of all cultures, past and present, rhythm is central to musical experience and understanding. Given the enormous diversity of rhythm, perhaps it is no surprise that there is a wide range of opinion about how to teach it. (Dalby, 2005, 54.)

Oftentimes, we expect our students to master only the rhythmic patterns from the repertoire they will perform, but in so doing we may not provide them sufficient rhythmic vocabulary or analytical skills upon which to base successive learning. *An individual understands a concept, skill, theory, or domain of knowledge to the extent that he or she can apply it appropriately in a new situation.* (Gardner, 1999, 119)

Contemporary musicians are frequently expected to possess rhythmic breadth and skills well beyond the scope of previous generations. Nowadays, it is seldom sufficient to study only European symphonic rhythm patterns and meter signatures as they are taught in many conservatories, colleges, high schools, middle schools, elementary school, music stores, and so on.

In the United States, our typical beginning level pedagogical method consists of teaching musical elements—instrumental technique, rhythm, pitch, dynamics, timbre, and notation—all more or less simultaneously. Unfortunately, this method often produces only superficial understanding of each element because students may not develop mastery of foundational aural and motor skills. Perhaps in our effort to cover enough material, we achieve only a superficial familiarity rather than deep understanding. In other words, studying rhythm as its own discipline is analogous to practicing dribbling as a separate skill set instead of just hoping to master it via scrimmages and games.

In higher education, we find incoming freshman music majors who have studied music for years, yet still lack a functional understanding of rhythm—they lack analytical and notation reading skills to effectively and efficiently decipher new rhythmic material, possess limited audiation skills, have weak physical coordination skills, have an over-dependence on notation versus aural memory for rhythm patterns, and lack an effective rhythmic syllable system.

PEDAGOGICAL SUGGESTIONS

1. **Teach aural, motor, and memory skills before notation.** Our beginning level pedagogical methods should emphasize mastery of aural, motor, and memory skills. Oftentimes our insistence on reading musical notation from the outset (a case of voluntarily induced visual interference with the aural and kinesthetic senses) forces us to accept mediocre aural and motor skills. Another important concept in the early learning stages is that larger body movements help facilitate superior learning. The goal is to develop a deep kinesthetic and aural understanding while gradually reducing motions to an appropriate size for playing your chosen instrument. Introduced after aural, motor, and memory skills are learned, little of the notation students encounter will sound or feel new to them, for they are merely affixing visual cues to already learned aural and physical skills. In this approach, notation provides an intellectual understanding that represents another unique and helpful perspective with which to understand rhythm.

2. **Choose mastery over quantity.** Choose a modest amount of material but expect to develop a deep understanding of it. Be careful not to disseminate or cover too much information at the expense of fundamental skill mastery. We must be careful not to hurry students through fundamentals before moving on to “more interesting” (oftentimes for us as teachers) material, for our urgency may cause their deficiencies. *Learning as slowly as possible cultivates the full benefit of plasticity and possibility.*¹⁶ *Slow learning tends to make more indelible long-term memories and converts a greater percentage of initial short-term information to long-term memory.*¹⁷

3. **Know when to separate components.** Mastery of music fundamentals is dependent upon separating individual components at all levels of learning while maintaining an overall balance in our curriculum. Once mastered, individual components may be more effectively combined. Ask yourself, do I allocate dedicated rhythmic studies its fair share of my instructional time?

4. **Master a versatile rhythmic vocabulary.** Most standard beginning level instrumental and vocal method books seldom contain enough rhythmic variety to comprise a sufficient or versatile vocabulary of rhythm patterns and meters for a 21st century musician.

5. **Metronomes should be a central learning tool – not just an occasional accessory.** Every student, regardless of age or proficiency level, should own a metronome and teachers should model using it. Metronomes allow us to create clear assignments with specific tempo markings, allow students to focus on precise standards and self-assessment, facilitate superior achievement, and are a central element of excellent teaching. With the widespread availability of metronome apps and mobile computing devices, every student can easily access a metronome.

6. **Utilize a syllable chanting system.** A chant system should be used as needed but not unilaterally imposed. It must be enjoyable to recite, easy to pronounce, easy to memorize, provide precise rhythmic articulation, musical in its own right, and be applicable to almost any style. See "Vocalizing Rhythm" earlier in this chapter.

RECOMMENDED SOURCES FOR READING RHYTHMIC NOTATION

- Whaley, Garwood. *Basics in Rhythm*. Galesville, MD: Meredith Music Pub., 2003. Short, graduated studies for teaching or learning to read rhythms. Exercises cover fundamental rhythms, meters, and mixed meters. Excellent primary reading method for any instrument or voice; my primary reading text.
- Whaley, Garwood. *More Basics in Rhythm*. Galesville, MD: Meredith Music Pub., 2000.
- Bellson, Louis and Gil Breines. *Modern Reading Text in 4/4; for all instruments*. Alfred Pub., 1985.
- VicFirth.com "Educational Resource Library" contains numerous helpful instructional segments, including a speed note reading video game and "webrhythms" for teaching rhythmic reading.

SUPPLEMENTARY TEXTS

- Bellson, Louis and Gil Breines. *Odd Time Reading Text: For All Instruments*. Van Nuys, CA: Alfred Pub. 1985.
- Chaffee, Gary. *Rhythm & Meter Patterns*. Miami, FL: GC Music, 1976. Advanced rhythm etudes.
- Dan Fox. *The Rhythm Bible*. Van Nuys, CA: Alfred. 2002.
- Mick Goodrick, Mitch Haupers. *Factorial Rhythm for all Instruments*. Cambridge, MA: Liquid Harmony Pub. 2003.
- Gary Hess, *Encyclopedia of Reading Rhythms: Text and Workbook for All Instruments*, Milwaukee, WI: Hal Leonard, 1997.
- Newell, David. *The Simple Rhythmician*. San Diego: Neil A. Kjos Music Co. 2007.
- Newell, David. *Teaching Rhythm: New Strategies and Techniques for Success*. San Diego: Neil A. Kjos Music Co., 2008.
- Phillips, Joel, Paul Murphy, Elizabeth West Marvin, and Jane Piper Clendinning. *Sight-Singing, Rhythm-Reading, Improvisation, and Keyboard Skills*. V. 1. New York: W. W. Norton, 2011. 458pgs. Contains an excellent collection of pitch and rhythm etudes.

CHAPTER 2

MACROBEATS, MICROBEATS, AND TUPLETS

This chapter contains a complete vocabulary of macrobeats and microbeats that serve as the framework upon which subsequent rhythm patterns, are built.

Rhythmic mastery requires the ability to simultaneously audiate (mentally perceive) and perform (physically coordinate) the three universal elements of rhythm—macrobeats, microbeats, and rhythm patterns. When performing, a musician is typically not chanting microbeats and may not be physically marking macrobeats, but these two prerequisite levels were necessarily previously mastered so they can now be audiated. This is rhythmic competence! Such skills are also a prerequisite to understanding musical notation and related analytical skills.

The Microbeat Palindrome is one of the first exercises I share with my students. I saw jazz drummer Joe Morello play a similar exercise he called "The Table of Time" in a 1978 drum clinic and it is published in his 1983 book *Master Studies*.

Microbeats are played with the hands via alternated sticking, and the macrobeats are played with foot taps. Although the feet could be tapped in unison while seated, I recommend tapping just one foot as this eliminates potential unison coordination accuracy problems. While alternating sticking, remember that adjacent even number microbeat groups begin on the same hand whereas adjacent odd number groups change hands each macrobeat. Learn to feel this even—same hand or odd—other hand flow as you move through the various even and odd microbeat levels. Chant the appropriate solkattu for each microbeat level; see "Vocalizing Rhythm" in Chapter 1. Initially, it is helpful to accentuate the syllables whose onsets occur on the macrobeats and later reduce these accents until they are no longer necessary.

Of course, it is possible to initially learn the Microbeat Palindrome or Ping-Pong Microbeats with just foot taps and chanting syllables, i.e. no hands. But, if one is going to spend the time, you might as well incorporate the hands on the rhythms immediately to see how it goes. If the stickings make it too difficult, temporarily eliminate the hands to better coordinate the chant and feet, or omit the chant to better coordinate the hands and feet. Oftentimes, just a little more practice with alternating hands suffices. In any case, try to develop enough hand speed so they remain relaxed while tapping faster rhythms. Alternate hand stickings can initially be awkward for non-percussionists because splitting rhythms between two limbs is likely unfamiliar territory and physiologically, the left brain triggers the right hand and the right brain triggers the left hand. Thinking back, most of us likely experienced a similar physical challenge in alternating our feet while learning to walk. Hopefully stickings go more smoothly!

When someone has difficulty coordinating feet, voice, and hands it is usually because they began without macrobeat motions or with motions that are too small (typically short, jerky foot taps) and have not yet developed an adequate kinesthetic sensibility of the larger motions to support the microbeat rhythms built upon them. When I encounter a student having such difficulty with such three-way hand/foot/voice coordination, I go for a walk with them down a long hallway or sidewalk so we can maintain our stride and pace. After we coordinate a moderately-slow walking pace (macrobeats 80-90 BPM), we chant various microbeat division levels (1-6) against this pace. Students are often surprised to discover how much easier this walking/chanting is than seated or standing still foot tapping and chanting. It is not surprising that the automaticity of walking, and its inherently oscillatory right-left motion, makes coordinating vocalized rhythms easier. Once students learn to coordinate the walking pace and chant, adding alternated hands is relatively easy.

Thereafter, I ask them to reflect on the rhythms of their daily conversations while walking down the street. If you transcribed such spoken rhythms against your walking pace, many complex patterns would certainly result. Students soon realize they already possess considerable physical foot-hand coordination but never thought of rhythm as such. I find this approach more helpful than viewing such rhythmic interactions as "difficult." Throughout this entire process, our goal is simply to familiarize ourselves with the fundamental rhythmic coordination between voice, hands, and feet—the three universal elements of rhythm—macrobeats, microbeats, and rhythm patterns.

Microbeat Palindrome - "In 4"

Tap foot on each macrobeat (quarter note). Set metronome downbeat to a different timbre.

Unolet Duplet Triplet

ta ta ka ta ki da

Quadruplet Quintuplet

ta ka di mi ta ka ju na ka

Sextuplet

ta ka di mi ju na

Septuplet

ta ka di mi ju na ka

Octuplet

ta ka di mi ta ka ju na

Nonuplet

ta ki da din na ka ju na ka

Dectuplet

ta ka di mi ju na ta ka di mi

ta ka di mi ju na ta ka di mi

Three staves of rhythmic notation for a drum set. The first staff features four groups of 7 strokes (R, L, R, L) and four groups of 7 strokes (R, L, R, L). The second staff features four groups of 6 strokes (R, L, R, L) and four groups of 5 strokes (R, L, R, L). The third staff features four groups of 3 strokes (R, L, R, L), followed by four groups of 3 strokes (R, L, R, L), and ends with a 3/4 time signature.

Microbeat Palindrome - "In 3"

Eight staves of rhythmic notation for a drum set, forming a palindrome. The first staff starts with a 3/4 time signature and includes a "similie" instruction. The second staff has groups of 6, 6, 6, 7, 7, 7 strokes. The third staff has groups of 9, 9, 9 strokes. The fourth staff has groups of 10, 10, 10, 9, 9, 9 strokes. The fifth staff has groups of 7, 7, 7 strokes. The sixth staff has groups of 6, 6, 6, 5, 5, 5 strokes. The seventh staff has groups of 3, 3, 3 strokes. The eighth staff ends with a 2/4 time signature.

Microbeat Palindrome - "In 2"

TEMPO VERSATILITY - use the metronome throughout all the exercises:

1. Play at 60 BPM until 1-10 microbeat levels are mastered.
2. Introduce other tempi across the typical performance range of 40-180 BPM. At each tempo, use the chart below to identify the fastest feasible microbeat levels. Some folks may chant faster than they can alternate their hands or vice versa. Not surprisingly, but as a drummer, my hands are faster as you can see below, but many Indian percussionists possess equal chant and hand speeds. The suggested tempi may seem overly ambitious, but I encourage you to persevere because such physical dexterity will prove invaluable. Pencil-in your own tempi in the blank cells.

BPM	Hands - Maximum Microbeats per macrobeat	Chant - Maximum Microbeats per macrobeat
40	16	12
50		
60	12	8
70		
80	8-10	6
90		
100	6-7	5
110		
120	5-6	5
130		
140	4-5	4
150		
160	4-5	4
170		
180	4	3

PING-PONG MICROBEATS

Ping-Pong Microbeats describes a call and response exercise whose objective is to quickly and accurately change microbeats levels—a systematic oscillation from a fixed microbeat division level "ping" (call) through the other microbeat levels "pong" (response). This skill is a prerequisite to more complex rhythm patterns.

PRACTICE SUGGESTIONS

- The exercise on the following page include two macrobeats of each microbeat level and is designed so that when alternating hands (sticking), each new microbeat division level will begin with the same hand; i.e. the strong hand. Initially, you may wish to repeat each measure as necessary, but ultimately play as notated, with no repeats.
- After you master this exercise with two beats of each microbeat level, work on it with only one macrobeat of each speed.
- Begin at 60 BPM and eventually from 40-180 BPM.
- Initially, I recommend memorizing these simple numerical sequences, rather than reading the notation:
 1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 1-7, 1-8, 1-7, 1-6, 1-5, 1-4, 1-3, 1-2, 1-1
 2-1, 2-2, 2-3, 2-4, 2-5, 2-6, 2-7, 2-8, 2-7, 2-6, 2-5, 2-4, 2-3, 2-2, 2-1, etc.
- Other beneficial numerical sequences include:
 - Ascending and descending numeral palindromes:
 - All 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1
 - Even 2, 4, 6, 8, 10, 8, 6, 4, 2
 - Odd 1, 3, 5, 7, 9, 7, 5, 3, 1
 - If you are having difficulty with a particular numeral, such as 5, create several “5” intensive exercises:
 - Short sequence focusing on neighboring numerals such as 5-4, 5-6, repeat
 - Long sequence of expanding distances utilizing all divisions - 5-4, 5-6, 5-3, 5-7, 5-2, 5-8, 5-1, 5-9, 5-10.
 - Often other musical games prove helpful—such as phone numbers. For example, using the ten-digit number 563-284-3579, play one macrobeat of each numeral (microbeat division). The quip is that the phone book is the largest rhythm pattern book ever written!

Ping-Pong Microbeats

Play this call and response exercise eight times with a different call speed each time; i.e. first time the call (dash notation) is interpreted as an unolet and the responses as notated. 2nd time = duplet call, 3rd time = triplet call, etc. Tap foot on each macrobeat.

The exercise is written in 4/4 time and consists of eight measures. The notation includes call and response patterns with various groupings:

- Measure 1:** Call (dash notation), Unolet response (quarter note), Call (dash notation), Duplet response (two eighth notes).
- Measure 2:** Call (dash notation), Triplet (three eighth notes), Call (dash notation), Quadruplet (four eighth notes).
- Measure 3:** Call (dash notation), Quintuplet (five eighth notes), Call (dash notation), Sextuplet (six eighth notes).
- Measure 4:** Call (dash notation), Septuplet (seven eighth notes), Call (dash notation), Octuplet (eight eighth notes).
- Measure 5:** Call (dash notation), Septuplet (seven eighth notes), Call (dash notation), Sextuplet (six eighth notes).
- Measure 6:** Call (dash notation), Quintuplet (five eighth notes), Call (dash notation), Quadruplet (four eighth notes).
- Measure 7:** Call (dash notation), Triplet (three eighth notes), Call (dash notation), Duplet (two eighth notes).
- Measure 8:** Call (dash notation), Unolet response (quarter note).

TUPLETS

Tuplets are equal length notes that form an irregular number of divisions of one or two macrobeats. Tuplets are sometimes called irrational rhythms, artificial divisions, or irregular divisions. In a binary feel, the first numeral in the ratio is an odd number—3:2 denotes 3 notes in the space of the usual 2. In a ternary feel, the first numeral in the ratio is an even number—2:3 denotes 2 notes in the space of the usual three.

PRACTICE SUGGESTIONS

- Practice two macrobeat speeds:
 - metronome set to quarter notes - each measure feels "in 2"-the normal rate. Remember to set the downbeat to a different timbre than the second macrobeat.
 - half notes - each measure feels "in 1." Learning to feel the tuplet against the longer half note macrobeat (half-time feel) is typically easier.
- When learning unfamiliar tuplets such as 7:4 eighth notes, accurately internalizing the more familiar divisions on either side (6:4 eighths and 8:8 sixteenths) is helpful. Play 6 and accelerate or "slide" into 7. Next, play 8 then decelerate or "slide" into 7. Often this kinesthetic "feel in the hands" proves an effective way to find the desired tuplet speed.
- When playing any tuplet (across macrobeats) such as 3:2, 5:2, 7:2, 9:2, or 10:2, if you audiate, chant, and stick microbeats twice as fast as the desired ratio you will be able to eventually focus on just the lead (right) hand which is playing the desired rhythm pattern. For example, for 5:2, begin by playing 10:2 with both hands the same dynamic. Then reduce the volume of the weak (left) hand as this will allow you to hear and feel the right hand 5:2 ratio.

The image displays a musical exercise for a 5:2 tuplet in 2/4 time, structured into three horizontal staves:

- Rhythm Pattern:** A single staff showing a 5:2 tuplet of five eighth notes. A bracket above the notes is labeled "5".
- Sticking/Chant:** A staff showing a 10:2 pattern of ten eighth notes. The first five notes are marked with "R" (right hand) and "L" (left hand) underneath. The second five notes are marked with "5" above them. Below the notes are the lyrics: "ta di ki na tom ta di ki na tom".
- Macrobeat:** A staff showing two half notes, each representing a macrobeat in the 2/4 time signature.

Views 1 and 2 illustrate different notational groupings of the ratios 3:2, 9:8, and 5:4. Changing your visual perception and audiation can affect how challenging a tuplet is to execute. For example, reciting a group of 9 as 4+5 is possible, but in most Western style music, I find it easier to think of three groups of 3—a simple triplet base.

	two groups of 3	one group of 9
View 1		
Grouping Rhythm		
View 2		
Grouping Rhythm		

	two groups of 5
View 1	
Grouping Rhythm	
View 2	
Grouping Rhythm	

Top Ten Rhythms Timetable

Duple and Triple Divisions of a 4/4 Measure

Tempi may range from quarter note 40-180 BPM. Repeat each measure as necessary; I recommend starting with 4-bar phrases. Play sequentially through the patterns (ascending) and then back down (descending) to form a rhythmic palindrome. Experiment with various foot ostinati.

Glenn Schaft-2020

2-Half notes 3-Half note triplets 4-Quarter Notes

Hands

Feet

BD HH

4 6-Quarter Note Triplets 8-Eighth Notes 12-Eighth Note Triplets

Hands

Feet

7 16-Sixteenth Notes 24-Sixteenth Note Triplets

Hands

Feet

9 32-Thirty Second Notes

Hands

Feet

10 48-Thirty Second Note Triplets

Hands

Feet

Tuplet Palindrome

Spanning Two Macrobeats

This is the ultimate microbeat rhythm pattern skills test. Repeat each measure as necessary before moving ahead. Use alternated sticking. When playing "in 2," set metronome downbeat to a different timbre than beat two. Slower tempi make the tuplets that cross the second macrobeat (3:2, 5:2, 7:2, and 9:2) more difficult, so I recommend beginning no slower than quarter note = 90-100 bpm. At these tempi and above, feeling each measure "in 1" is easier because the half-note macrobeat is not too slow.

Quarter note = 90+BPM

Felt "in 1" these are the same ratios as the "Microbeat Palindrome's" earlier in this chapter

CHAPTER 3 - MARCHING PERCUSSION PEDAGOGY

Contemporary marching ensembles across the United States utilize a remarkably unified collection of pedagogical methods for technically and rhythmically training their members. I find some of these concepts and exercises valuable in my own playing and teaching and am especially impressed with how marching pedagogues teach many diverse students to relatively quickly achieve a high level of rhythmic competence. Marching exercises are memorized and played many times daily to facilitate physical coordination, technical mastery, and aural/visual uniformity across the ensemble. I would encourage any musician to adapt some of these time-tested exercises for your own purposes.

Marching “warm-up” exercises have a two-fold function, to warm-up the ensemble physically and mentally and to serve as the primary rhythmic and technical training material to prepare members for “show” repertoire. Warm-ups usually include at least three categories: unison rhythms, accent patterns, and timing patterns. All exercises are played while “marking time” i.e. marching-in-place. When marking time, the downbeat begins with the left (weak side) foot; assuming even number measure signatures; but when marching to odd number meters, successive downbeats alternate feet.

Warm-ups typically begin with the famous unison rhythm exercise—“eight-on-a-hand”—a single rhythm and dynamic. It helps establish hand/foot (microbeat/macrobeat) coordination, unified hand technique, ensemble balance, and rhythmic precision throughout the ensemble.

Eight-On-A-Hand

The notation for "Eight-On-A-Hand" is presented in two systems. Each system has two staves: "Hands" and "Mark Time Feet".

System 1 (4/4 time):

- Hands:** A sequence of eight quarter notes. The first four are marked "R" (Right hand) and the last four are marked "L" (Left hand).
- Mark Time Feet:** A sequence of eight quarter notes. The first is marked "L-foot" and the second "R-foot", alternating thereafter.

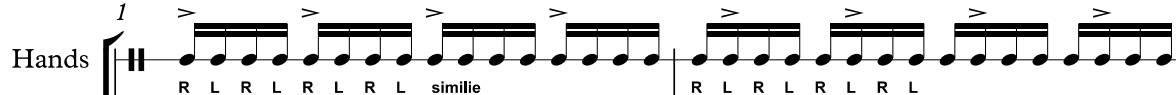
System 2 (3/4 time):

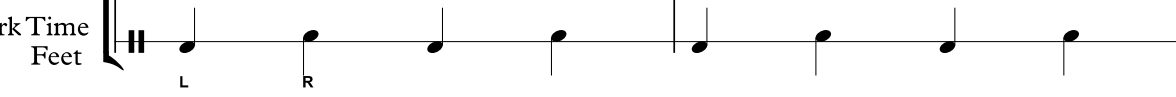
- Hands:** A sequence of eight quarter notes. The first four are marked "R" and the last four are marked "L". The exercise concludes with a final quarter note marked "R".
- Mark Time Feet:** A sequence of eight quarter notes alternating between "L-foot" and "R-foot".

The second pedagogical step is “accent-tap” exercises which introduce binary and ternary rhythm patterns and two dynamic levels— accentuated rhythm patterns over a grid or layer of hand-to-hand “tap” (soft note) motions. This approach builds kinesthetic sticking fluidity and microtiming accuracy via the constant microbeat hand motions. I recommend memorizing these accent-tap grids and practicing them two ways: as written and then omit the taps and just play the accents against your feet marking time.


Binary Accent-Tap Grid

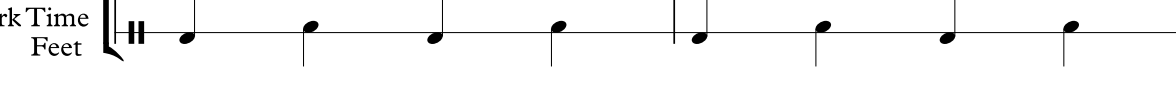
1

Hands  *similie*


Mark Time Feet 

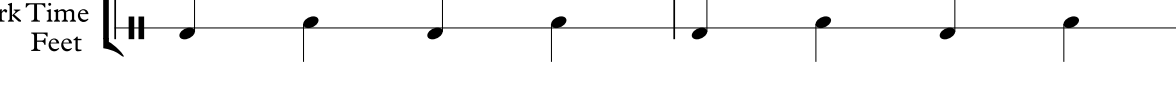
3

Hands 

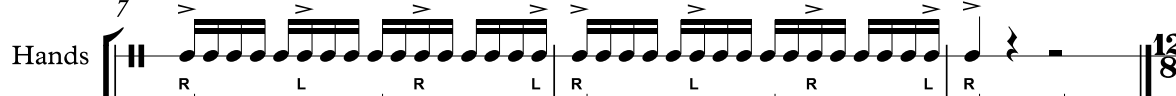
Mark Time Feet 

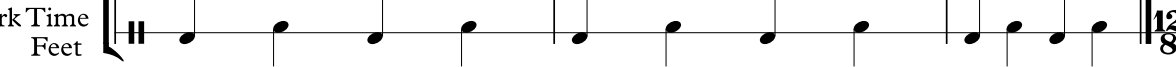
5

Hands 

Mark Time Feet 

7

Hands 

Mark Time Feet 

Ternary Accent-Tap Grid

1

Hands  *similie*

Mark Time Feet 

4

Hands 

Mark Time Feet 

9

Hands 

Mark Time Feet 

12

Hands 

Mark Time Feet 

The third pedagogical step is “timing” or “check pattern” exercises, designed to teach the fundamental binary and ternary rhythm patterns and stickings found in “show” repertoire. Unlike “eight on a hand” or “accent-tap” exercises, timing exercises do not utilize constant hand motions. Nevertheless, the concept of four hand motions per macrobeat is retained in the “right hand lead” sticking system. Paul Rennick describes this approach as “natural stickings.” *To get players to “feel the beat” means exactly that: to feel the beat without playing all the notes in the beat. One thing I’ve found very useful is the application of natural stickings and the use of motion in time. The movement of the sticks can take up time with motion to make things feel and sound more natural. This is probably the reason an exercise like “eight on a hand” seems to come easily to even the youngest players. (Rennick, 2000, 28.)*

As you can see below, when playing "Fundamental Binary Motives" the first and third 16th notes (microbeats) of each macrobeat are played with the right hand and the second and fourth with the left hand (RLRL). Whereas in the "Fundamental Ternary Motives," the sticking cycle must be extended through two macrobeats, a six-microbeat cycle (RLR LRL), to maintain the right-lead motion concept.

The vast majority of people are right hand dominant and our Western military/rudimental drumming tradition is based on a system of right hand dominant sticking patterns. Nonetheless, contemporary percussionists also utilize other sticking approaches. To build ambidexterity, they reverse RH lead stickings to left hand lead, or simply play hand-to-hand "alternate stickings" beginning with either hand. Some percussion pedagogues believe the right-hand lead concept an indispensable part of learning rhythm patterns, especially at beginning levels, while others utilize a more flexible sticking approach. When training students for the rudimental and marching idioms I utilize the right lead approach but also teach a more flexible hand-to-hand approach in order to accommodate odd number microbeat groups (5, 7, 9), more versatile phrasing possibilities, and other musical styles.

This "sticking-based" pedagogical approach is unique to percussionists, but one I find valuable for most any musician. Whenever I encounter a student having difficulty with a rhythm, our first step is to convert the rhythm pattern into an accent-tap exercise. Once learned, we remove the soft taps, are left with just the original accented onsets, and can now determine effective stickings for each particular rhythm pattern.

Insert E

 R L L R R
 ta ka mi ta ka

Insert F

 R L R R
 ta ka ta ka

Insert G

 L R R R
 ka di ta ka

Insert H

 R L R R
 di mi ta ka

Insert I

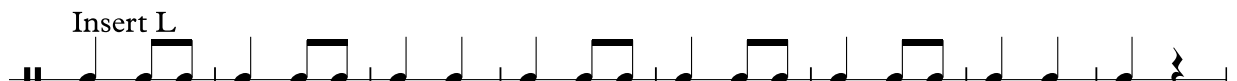
 R L R R
 ta mi ta ka

Insert J

 R R R R
 ta ka ta ka

Insert K

 L L R R
 ka mi ta ka

Insert L

 R R R
 ta ta ka

Insert M

 L R R
 ka ta ka

Insert N

 R R R
 di ta di

Insert O

 L R R
 mi ta ka

Fundamental Ternary Motives

A ta ki da ta ki da

B ta ki ta ki

C ki da ki da

D ta ka ta ka

E ta ki da

F da ta ki

G ta ta

H ki ki

I da da

Ternary Comparisons

Insert a Fundamental Ternary Motive (from above) into the slash notations. Right-lead sticking is indicated, but other stickings may be used as well.

Insert A

R L R L R L R R R
ta ki da ta ki da ta ki da

Insert B

R L L R R R R
ta ki ta ki ta ki da

Insert C

L R R L R R R
ki da ki da ta ki da

Insert D

R R L L R R R
ta ka ta ka ta ki da

Insert E

R R R R R R
ta ki da ta ki da

Insert F

L L L R R R
da ta kita ki da

CHAPTER 4 - BINARY RHYTHMS

Chapters 4 and 5 contain a diverse collection of binary and ternary rhythms in the most common meters (duple, triple, and quadruple) musicians typically encounter. These rhythms represent the standard repertoire across myriad styles such as classical, jazz, rock, popular, many ethnic and folkloric dance styles, and various Latin American styles. These exercises are designed to be practiced various ways, including accent-tap, principal rhythm alone, complementary rhythm alone, or a composite - dominant hand plays principal rhythm and weaker hand plays complementary rhythm. This multi-faceted approach virtually guarantees one will develop a strong rhythmic sensibility.

FUNDAMENTAL MOTIVES

The most elemental rhythm patterns are built on partitions and permutations of four items in a binary feel and three items in a ternary feel. Although these motives may initially appear simple, they are the rhythmic building blocks and it is imperative to build accuracy and considerable tempo range before combining them into compound phrases.

COMPOUND PHRASES

Compound binary phrases are based on 8, 16, and 32 microbeat cycles, whereas compound ternary phrases are based on 6, 9, 12, and 24 microbeat cycles.

GRAPHIC NOTATION

I begin Chapter's 4 and 5 with Fundamental Motives and Compound Phrases in graphic notation because it helps one visualize how the rhythm pattern permutations move through the microbeat cycles.

ACCENT-TAP PATTERNS

Accent-tap exercises are yet another common way percussionist's approach rhythm patterns. When reading rhythm patterns, insert soft taps on all the microbeat rests or non-onsets. Later, eliminate the taps, so only the accents, or onsets, remain. So too, Graphic Notation can be interpreted as accent-tap exercises, i.e. play dots (•) as accents and dashes (–) as soft taps instead of rests.

PRACTICE SUGGESTIONS

1. Always tap the macrobeats with your foot.
2. Play as many repetitions of each measure as necessary to assure mastery.
3. Play (tap) the rhythm patterns on your legs, a table, a cardboard box, an overturned soup kettle or pasta pot, hand drums such as bongos, conga, djembe, or any other object whose resonance you enjoy. Rhythms that may initially appear mono-dimensional, take on a multi-dimensional character by simply moving one hand to a different timbre.
4. Recite solkattu syllables, accentuating the onsets, while counting with your hands as described in "Counting Meters" in Chapter 1.
5. Rhythm Patterns:
 - Play the "Primary" rhythm pattern (dots [•] in graphic notation)
 - Play the "Complement" rhythm pattern (dashes [-] in graphic notation)
 - Combine the Primary (RH) and Complement (LH). Use a distinct sound for each hand, such as a table-top for the primary rhythm and your sternum (breastbone) for the complement.
 - Play a phrase consisting of x primary and x complementary rhythm pattern repetitions.
 - 4 primary reps + 4 complementary reps
 - 3 primary reps + 3 complementary reps
 - 2 primary reps + 2 complementary reps

BINARY RHYTHMS IN GRAPHIC NOTATION

Partition	Permutations (●) = onset, (-) = rest			
P=4	A ● — — —	B — ● — —	C — — ● —	D — — — ●
1+3	E ● ● — —	F — ● ● —	G — — ● ●	H ● — — ●
1+1+2	I ● ● ● —	J — ● ● ●	K ● — ● ●	L ● ● — ●
2+2	M ● — ● —	N — ● — ●		
1+1+1+1	O ● ● ● ●	P - zero onsets — — — —		

P=8	A ● — — — — — — —	B — ● — — — — — —
	C — — ● — — — — —	D — — — ● — — — —
1+7	E ● ● — — — — — —	F — ● ● — — — — —
	G — — ● ● — — — —	H — — — ● ● — — —
1+1+6	I ● ● ● — — — — —	J — ● ● ● — — — —
	K — — ● ● ● — — —	L — — — ● ● ● — —
1+1+1+5	M ● ● ● ● — — — —	N — ● ● ● ● — — —
	O — — ● ● ● ● — —	P — — — ● ● ● ● —

2+6	Q	● — ● — — — — —	R	— ● — ● — — — —
	S	— — ● — ● — — —	T	— — — ● — ● — —
2+2+4	U	● — ● — ● — — —	V	— ● — ● — ● — —
	W	— — ● — ● — ● —	X	— — — ● — ● — ●
2+2+1+3	Y	● — ● — ● ● — —	Z	— ● — ● — ● ● —
	Aa	— — ● — ● — ● ●	Bb	● — — ● — ● — ●
3+1+4	Cc	● — — ● ● — — —	Dd	— ● — — ● ● — —
	Ee	— — ● — — ● ● —	Ff	— — — ● — — ● ●
3+5	Gg	● — — ● — — — —	Hh	— ● — ● — — —
	Ii	— — ● — — ● — —	Jj	— — — ● — — ● —
2+1+5	Kk	● — ● ● — — — —	Ll	— ● — ● ● — — —
	Mm	— — ● — ● ● — —	Nn	— — — ● — ● ● —
1+2+5	Oo	● ● — ● — — — —	Pp	— ● ● — ● — — —
	Qq	— — ● ● — ● — —	Rr	— — — ● ● — ● —

1+2+1+4	Ss ● ● — ● ● — — —	Tt — ● ● — ● ● — —
	Uu — — ● ● — ● ● —	Vv — — — ● ● — ● ●
3+3+2	Ww - tresillo ● — — ● — — ● —	Xx — ● — — ● — — ●
	Yy ● — ● — — ● — —	Zz — ● — ● — — ● —
	Aaa — — ● — ● — — ●	Bbb ● — — ● — ● — —
	Ccc — ● — — ● — ● —	Ddd — — ● — — ● — ●
2+1+2+1+2	Eee - cinquillo ● — ● ● — ● ● —	Fff — ● — ● ● — ● ●
	Ggg ● — ● — ● ● — ●	Hhh ● ● — ● — ● ● —
	Iii — ● ● — ● — ● ●	Jjj ● — ● ● — ● — ●
	Kkk ● ● — ● ● — ● —	Lll — ● ● — ● ● — ●

Binary Rhythm Patterns

4 Microbeat Rhythmic Cell Motives

Elemental binary motives contain partitions and permutations of 4 microbeats, whether onsets or rests. Tap foot on each macrobeat/quarter note. Chant solkattu.

Primary $\frac{1}{4}$ ta ka di mi

Complement $\frac{1}{4}$

5

V 13

V

V 22

1111

Compound Phrases - 8 Microbeat Cycles

Built from the cell motives above

9

$\frac{2}{4}$ VP=8

ta ka di mi ta ka ju na

V 1111112

13

V

V

V

V

17

V 17

V 111113

21

V

V

V

V

25

V 116

11114

V

V

V

V

29

V

V

V

V

33

V 1115

1115

V

V

V

V

37

V 26

V 211112

V

V

V

V

41

V

V 224

V 22112

48

V

49

V

53

V2213

V2312

V

57

V1124

2114 V

V

61

V

65

V 35

V 121112

69

73

V 215

V 31112

77

81

V 1214

V 3113

85

Cuban tresillo modes

89 $\sqrt{332}$ -mode 1-original ∇ ∇ ∇ ∇

332 ∇ ∇ mode 1-original ∇ ∇

21212 (Cuban cinquillo modes)

93 ∇ ∇ ∇ ∇

97 ∇ 314 ∇ ∇ ∇ ∇

∇ 13112 ∇ ∇ ∇ ∇

101 ∇ ∇ ∇ ∇

13112 ∇ ∇ ∇ ∇

105 ∇ 3221 ∇ ∇ ∇ ∇

∇ 1223 ∇ ∇ ∇ ∇

109 ∇ ∇ ∇ ∇

∇ ∇ ∇ ∇

16 Microbeat Cycles

113 44332 44323

115 44233 son clave 33424

117 gahu gankogui 33442 rumba clave 34324

119 √Brazilian (bossa) Clave, 33433, palindrome partido alto 3222322

ta ki da ju na ka ta ka di mi ta ki da ju na ka

121 43234 - palindrome 34243 - palindrome

123 475 754

125 745 745

127 547 457

129 5533 5335

131 3355 3553

133 3535 5353

32 Microbeat Cycles - hemiola patterns

135 33333338

136 331233123317

138 331233123317

140

142

144 V1212121212121214

145

147

149

151

153

993344 (9=2223)

155

157

P=6868

159 4455554

161 55553333

163 77774

165 59567

96755

48 Microbeat Cycle - Bernstein - America theme, played four times (6=3+3) + 6(2+2+2)

167

169

CHAPTER 5 - TERNARY RHYTHMS

TERNARY RHYTHMS IN GRAPHIC NOTATION

Partition	Permutations (●) = onset, (-) = rest		
P=3	A ● - -	B - ● -	C - - ●
1+2	A ● ● -	B - ● ●	C ● - ●
1+1+1	● ● ●	P=zero onsets - - -	

P=6	A ● - - - - -	B - ● - - - -	C - - ● - - -
1+5	A ● ● - - - -	B - ● ● - - -	C - - ● ● - -
	D - - - ● ● -	E - - - - ● ●	F ● - - - - ●
1+1+4	A ● ● ● - - -	B - ● ● ● - -	C - - ● ● ● -
	D - - - ● ● ●	E ● - - - ● ●	F ● ● - - - ●
2+4	A ● - ● - - -	B - ● - ● - -	C - - ● - ● -
	D - - - ● - ●	E ● - - - ● -	F - ● - - - ●
2+1+3	A ● - ● ● - -	B - ● - ● ● -	C - - ● - ● ●
	D ● - - ● - ●	E ● ● - - ● -	F - ● ● - - ●
2+2+2	A ● - ● - ● -	B - ● - ● - ●	

Ternary Rhythm Patterns

Tap foot on dotted-quarter note macrobeat

3 Microbeat Rhythmic Cell Motives

Primary $P = 3$

Complement

Recite "ta ki da"

Compound Phrases - 6 Microbeat Cycles

5 $P = 6$

Recite "ta ki da ju na ka"

10

15

20

25

30

9 Microbeat Cycles

34

37

40

43

46

49

52

V 531

V 111213

55

58

61

V 522

V 111222

64

67

70

V441

V112113

73

76

79

V432

V113112

82

85

88

V 4221

V 11223

91

94

97

V 3222

V 12222

100

103

106

V 3321

V 12123

109

112

12 Microbeat Cycles

115

V 444

V 112112112

118

V 131313

131313

121

V 93

111111114

124 V 921

111111123

127 V 84

1111111122

130 V 822

111111222

133 V 8211

11111124

136 V 831

V 1111 112 13

139 V 75

V 11111121112

142 V741

V111112113

145 V732

V111112122

148 V7311

V11111214

151 V7221

V11111223

154 V642

V111121122

157 633

111121212

160 V6321

V11112123

163 V6222

V11112222

166 V62211

V1111224

169 V552

V111211122

172 V543

V111211212

175 V5421

V11121123

178 V5331

V11121213

181 V5322

V11121222

184 V53211

V1112124

187 V52221

1112223

190 V44431

V11211213

193 V44211

V1121124

196 4332

V11212122

V

V

199 V43311

V1121214

V

V

202 V42222

V1122222

V

V

205 V422211

V112224

V

V

208

Son Clave, asymmetric parts may be perceived as 7 + 5

V22323

V2212212

Rumba clave (a rotation of son clave)
asymmetric parts may be perceived as 5+7

210 V23223

V2122212

24 Microbeat Cycles

213 7773 (7=223)

215 7773 (7=322)

217 7773 (7=232) rumba and son clave

219

221 >9753

223 >5559

225 > 7755

Musical notation for measures 225-226. The top staff features eighth notes with accents (>) and a slur over the first four notes, with the number '7755' above. The bottom staff features eighth notes with accents (>) and a slur over the first four notes. A repeat sign is at the end.

227 > 55554

Musical notation for measures 227-228. The top staff features eighth notes with accents (>) and a slur over the first four notes, with the number '55554' above. The bottom staff features eighth notes with accents (>) and a slur over the first four notes. A repeat sign is at the end.

229 > 996

Musical notation for measures 229-230. The top staff features eighth notes with accents (>) and a slur over the first four notes, with the number '996' above. A dashed line connects the first four notes of the top staff across the bar line. The bottom staff features eighth notes with accents (>) and a slur over the first four notes. A repeat sign is at the end.

231

Musical notation for measures 231-232. The top staff features eighth notes with accents (>) and a slur over the first four notes. The bottom staff features eighth notes with accents (>) and a slur over the first four notes. A repeat sign is at the end.

233

Musical notation for measures 233-234. The top staff features eighth notes with accents (>) and a slur over the first four notes. The bottom staff features eighth notes with accents (>) and a slur over the first four notes. A repeat sign is at the end.

BIBLIOGRAPHY

- Abel, Mark. *Groove: An Aesthetic of Measured Time*. Boston: Brill, 2014. Print. Chapters 2&3 discuss rhythm, meter, groove.
- Barry, Barbara R. *Musical Time: The Sense of Order*, Stuyvesant, NY: Pendragon Press, 1990. Print. Advanced concepts in Western art music.
- Becker, Bob. *Rudimental Arithmetic: A Drummer's Study of Pattern and Rhythm*. Asbury Park, NJ: Keyboard Percussion Publications, 2009. Print. Excellent information on partition and permutations.
- Bellson, Louis and Gil Breines. *Modern Reading Text in 4/4; for all instruments*. Alfred Pub., 1985. Print.
- Bellson, Louis and Gil Breines. *Odd Time Reading Text: For All Instruments*. Alfred Pub., 1985. Print.
- Bonus, Alexander. "The Metronomic Performance Practice: A History of Rhythm, Metronomes, and the Mechanization of Musicality." Electronic Thesis or Dissertation. Case Western Reserve University, 2010. *OhioLINK Electronic Theses and Dissertations Center*. 15 Jan 2016. History of the mechanization of musical time.
- Brink, Emily. "A Look at Edwin E. Gordon's Theories." *Bulletin of the Council for Research in Music Education*, No. 75 (Summer, 1983), 1-13. Critique of Gordon's pre-1983 writings.
- Burrows, David. *Time and the Warm Body: A Musical Perspective on the Construction of Time*. Boston, MA: Brill, 2007. Print. Information on defining rhythm and multiple intelligences.
- Chaffee, Gary. *Rhythm & Meter Patterns*. Miami, FL: GC Music, 1976. Print. Advanced rhythm etudes.
- Corne, Alan. "The Quorn's Drumming World." website <http://www.thequornsdrummingworld.com>, 2016. Accessed 17 Jan 2016. Konnakol video demonstrations. Web.
- Dalby, Bruce. "Toward an Effective Pedagogy for Teaching Rhythm: Gordon and Beyond.", *Music Educators Journal*, September, 2005, 54-60. Excellent article with some improvements on the Gordon system.
- Douglas, Bill, *Vocal Rhythm Etudes*. Boulder, Colorado: <http://www.billdouglas.cc/manuscripts.html>, 1997. Compact Disc recording of 12 "scat-style" syllable solo etudes. Each is recorded at slow and faster tempi. Interesting bridge between South Indian konnakol vocalization and western style rhythm etudes.
- Duckworth, William, *A Creative Approach To Music Fundamentals*, tenth ed. Boston, MA: Schirmer, 2010. Print.
- Epstein, David. *Shaping Time: Music, the Brain, and Performance*. New York: Schirmer. 1995. Print.
- Erskine, Peter. *Time Awareness For All Musicians*. Van Nuys, CA: Alfred, 2005. Print.
- Ester, Don P., John W. Scheib, and Kimberly J. Inks. "Takadimi: A Rhythm System for All Ages." *Music Educators Journal* v93, n2, (November 2006), 60-65. Accessed at <http://library.sc.edu/music/gordon/429.pdf>, 23 Jan 1=2016. Web.
- Gardner, Howard. *Multiple Intelligences: New Horizons*, New York: Basic Books, 2006. Print.
- Gerstin, Julian and Ken Dalluge. *The Musician's Guide to Rhythm*. Self-published., musiciansguidetorhythm.com, 2014. Print.
- Gordon, Edwin E. *Rhythm: Contrasting the Implications of Audiation and Notation*. Chicago: GIA Publications, 2000. Print. Includes a theory of rhythm and its pedagogy.
- Hannum, Thom. "Rhythmic Building Blocks." *Percussive Notes*. Indianapolis, IN: February 2000, 28-32. Check pattern exercises.
- Hannum, Thom, *Championship Concepts for Marching Percussion*, Milwaukee, WI: Hal Leonard Publishing, 1986. Print.
- Hoffman, Richard. www.takadimi.net A solfege system for rhythm. Richard Hoffman, William Pelto, John W. White. "Takadimi: A Beat-Oriented System of Rhythm Pedagogy." *Journal of Music Theory Pedagogy*. vol. 10 (1996) 7 - 30.
- Hoffman, Richard. *The Rhythm Book*. 2nd Ed. Franklin, TN: Harpeth River Publishing, 2009. Belmont University text for advanced high school or college aural skill classes. info@takadimi.net. Designed to teach Western tonal rhythm.
- Houchell, Robert. "A Comprehensive Outline for the Teaching of Rhythmic Reading." *Percussionist*, Vol. 5., No. 4,

- May 1968. 338-48. Web. Accessed at <http://www.pas.org/publications/publications-archive/PercussionistArchives.aspx>. Concepts of instant sound recognition
- Huron, David. *Musical Rhythm: A Glossary of Terms*. Columbus: Ohio State University. Web accessed 10 Jan 2016 at <http://csml.som.ohio-state.edu/Music839D/Notes/glossary.html>.
- Isler, T. *You Can Ta Ka Di Mi This!: Improve and expand your rhythmic sense and precision*. Brooklyn, New York: Gerard and Sarzin Publishing Co, 2005. Print. Rhythm etudes and solkattu syllables.
- Jones, Russell. "A Dialectic Analysis of Selected Contradictions among Definitions of Meter in Music," *Bulletin of the Council for Research in Music Education*, No. 83 (Summer, 1985), 43-56.
- Karpinski, Gary S. *Manual for Ear Training and Sight Singing*. New York: W. W. Norton, 2007. Print. Some helpful definitions.
- Kerrigan, Chuck. *The Key To Drum Polyrythms*. Pacific, MO: Mel Bay, 1983. Print.
- Klyn, Niall. "Working Memory for Rhythm." Electronic Thesis or Dissertation. Ohio State University, 2012. *OhioLINK Electronic Theses and Dissertations Center*. 18 Jan 2016. Thesis - rehearsing the rhythm with the voice and a non-voice instrument reinforces the memory trace of that rhythm may in different ways and thus is more robustly preserved.
- Kramer, Jonathan. *The Time of Music: New Meanings, New Temporalities, New Listening Strategies*, New York: Schirmer. 1988. Print. In-depth analysis of time in Western art music. An excellent overview. Definitions of time, meter, accent, rhythm, vertical and horizontal time senses, etc.
- Leinberger, Dousa, McMillan. 2008. "Everything you need to know about The "1 E & A" Counting System", El Paso, Texas: University of Texas at El Paso, Web accessed 3 Jan 2016 at [utminers, utep.edu/charles/Counting1e&a.pdf](http://utminers.utep.edu/charles/Counting1e&a.pdf).
- Lim, Malcolm. *South Indian Vocalizations in Snare Drumming Pedagogy*. Percussive Notes (August 2005) 28-35. Print.
- London, Justin. *Hearing In Time: Psychological Aspects of Musical Meter. Second Edition*. New York: Oxford University Press, 2012. Print. Excellent review of musical rhythm and meter. Excellent bibliography.
- Madison, Guy. "Experiencing Groove Induced by Music: Consistency and Phenomenology." *Music Perception* 24(2): 201-208, 2006. University of California Press, Web accessed 2/11/16, <http://www.jstor.org/stable/10.1525/mp.2006.24.2.201>
- Mason, Brian S. *Marching Percussion 101: Essential Drumline Warmups, Fundamental techniques for the contemporary marching percussion ensemble*. http://vicfirth.com/education/percussion101/MP101_Exercise_Packet.pdf, Web accessed 2/15/16.
- Moore, Stephen Fred. *The writings of Emile Jaques-Dalcroze: Toward a theory for the performance of musical rhythm*. Bloomington: Indiana University, 1992. Print.
- Morello, Joe. *Master Studies*, Cedar Grove, New Jersey: Modern Drummer Publications, 1983, reprinted 2000. Print.
- Mornell, Adina. *Art in Motion*. Frankfurt am Main, Peter Lang, 2009. Print.
- Moses, Bob. *Drum Wisdom*, Cedar Grove, New Jersey: Modern Drummer Publications, 1984. Print. Presently out of print.
- Newell, David. *The Simple Rhythmician*. San Diego: Neil A. Kjos Music Co., 2007. Print.
- Newell, David. *Teaching Rhythm: New Strategies and Techniques for Success*. San Diego: Neil A. Kjos Music Co., 2008. Print.
- Pesch, Ludwig. *The Oxford Illustrated Companion to South Indian Classical Music* (2nd ed.). New Delhi: Oxford University Press, 1999. Print.
- Phillips, Joel, Paul Murphy, Elizabeth West Marvin, and Jane Piper Clendinning. *Sight-Singing, Rhythm-Reading, Improvisation, and Keyboard Skills*. V. 1. New York: W. W. Norton, 2011. Print. Excellent collection of pitch and rhythm etudes.
- Reina, Rafael, *Karnatic Rhythmical Structure as a source for new thinking in Western Music*. PhD Thesis, Amsterdam, Holland: Amsterdam Conservatoire, Web accessed 5 Feb 2016 at <http://www.rafaelreina-thesis.org/index.html>, 2013.
- Rennick, Paul. "The Importance of Timing Exercises", *Percussive Notes*, Indianapolis, Indiana: V. 38, No. 4, August

- 2000, 28-33. Web accessed at <http://publications.pas.org/Archive/aug00/articles/0008.28-33.pdf>.
- Roholt, Tiger. C. *Groove: A Phenomenology of Rhythmic Nuance*, New York: Bloomsbury, 2014. Print.
- Root, Jena. *Applied Music Fundamentals: Writing, Singing, and Listening*. New York: Oxford University Press, 2014. Print.
- Solomon, Samuel Z. *Advanced Rhythm Studies: for the Percussionist*. Columbus, OH: Bachovich Music Pub., 2009. Print.
- Tuplet notation appendix, polyrhythms.
- Starer, Robert. *Rhythmic Training*. Milwaukee, WI: Hal Leonard, 1969. Print.
- Steenhuisen, Paul. *Irrational Time Signatures*. Web accessed 3/21/16, <http://www.paulsteehuisen.org/irrational-time-signatures.html>.
- Thaut, Michael H. *Rhythm, Music, and the Brain*. New York: Routledge, 2005. Print.
- Toussaint, Godfried T. The Euclidean algorithm generates traditional musical rhythms, in *Proceedings of BRIDGES: Mathematical Connections in Art, Music and Science*, Banff, Canada, 31 July–3 August 2005, 47–56. Web accessed at <http://cgm.cs.mcgill.ca/~godfried/publications/banff.pdf>.
- Vurkac, Mehmet. *NIPS 2015: Thoughts about Sound Cloud, genres, clave tagging, clave gamification, multi-label classification, and perceptual manifolds*. Web post, 2015. Accessed at mehmetvurkac.com.
- Westin, Julian and Ken Dalluge. *The Musician's Guide to Rhythm*. USA, self-published, 2014. Print.
- Whaley, Garwood. *Basics In Rhythm*. Galesville, MD: Meredith Music Pub., 2003. Print.
- Whaley, Garwood. *More Basics In Rhythm*. Galesville, MD: Meredith Music Pub., 2000. Print.
- Yeston, Maury. *The Stratification of Musical Rhythm*. New Haven: Yale University Press, 1976. Print. Discusses rhythmic consonance and dissonance 2:3 ratios.
- Young, Lisa. *Konnakol: The History and Development of Solkattu - the Vocal Syllables of the Mridangam*. thesis, Web accessed at lisayoungmusic.com, 1998.
- Zukofsky, Paul, “Matrix of Embedded Rhythms” Web accessed at <http://www.musicalobservations.com/publications/index.html>, July 200

ABOUT THE AUTHOR

BIO

Glenn Schaft is a drummer and percussionist who has performed and recorded with myriad artists in diverse musical idioms including: classical, new music, ballet, opera, modern dance, jazz and improvised music, pop, rock, blues, funk, fusion, Broadway musicals, Afro-Caribbean, Afro-Cuban, Brazilian, and traditional West African styles.

He is an artist endorser with the Zildjian cymbal company, Vic Firth sticks and mallets, Remo drumheads and world percussion, and an educational consultant with Black Swamp Percussion.

Glenn is Professor of Music and Director of Percussion Studies at Youngstown State University where he teaches applied percussion, directs the Percussion Ensemble, and serves as co/founder and faculty advisor for the Youngstown Percussion Collective. Glenn performs with the YSU Faculty Jazz Group, with whom he twice toured China, performing and teaching at acclaimed conservatories in Beijing, Nanjing, and Hangzhou.

Glenn's recording of Dave Morgan concerto "Reactions for Drumset and Wind Ensemble" with the Youngstown State University Wind Ensemble appears on the disc *Made In Youngstown*, April 2019. Glenn most recent recording, for Dave Morgan's large jazz ensemble project *Blue Is More Than A Color*, was released in 2019. Glenn has also recorded with the Youngstown Percussion Collective, Ron Coulter, John Hollenbeck, Cleveland Chamber Symphony, Scott Wyatt, Amanda Powell, Steve Cipriano, Air Force Band of Mid-America, Youngstown State University Wind Ensemble, Ludwig Master Publications, and myriad jingles.

A member of the Percussive Arts Society, Glenn has served on the Drumset Committee, University Pedagogy Committee, Membership Committee, PASIC Planning Committee, and has presented lectures, panel discussions, and performed at PASIC international conventions throughout the United States.

Glenn earned the Doctor of Musical Arts degree in Performance and Literature at the University of Illinois Champaign-Urbana where he studied with Tom Siwe, the Master of Arts in Performance at Eastern Illinois University where he studied with Johnny Lee Lane, the Bachelor of Music in Performance at Baldwin-Wallace University where he studied with George Kiteley, and completed post-doctoral studies in contemporary music and orchestral percussion at Cleveland State University where he studied with Edwin London, Jay Burnham, and Tom Freer. His principal teachers include Harold Damas, George Kiteley, Johnny Lee Lane, Tom Siwe, and Jay Burnham. Glenn studied orchestral percussion with Tom Freer, drumset with John Riley, Lewis Nash, and John Hollenbeck, Afro-Cuban percussion with Roberto Vizcaino, Fermin Nani, and Santiago Nani at the National School of the Arts in Havana, Cuba, with Giovanni Hidalgo, Horacio Hernandez, Glen Velez, Jamie Haddad, and Trichy Sankaran at the Berklee College of Music World Percussion Festival, drum circle facilitation with Christine Stevens, ethnomusicology with Bruno Nettl, Charles Capwell, Tom Torino, and Larry Gushee, and jazz composition with Alan Horney.

Glenn has recorded and served as executive producer with the Youngstown Percussion Collective, and recorded with Dave Morgan, Ron Coulter, John Hollenbeck, Cleveland Chamber Symphony, Scott Wyatt, Amanda Powell, Steve Cipriano, Air Force Band of Mid-America, Youngstown State University Wind Ensemble, Ludwig Masters Publications, and myriad jingles.

His symphonic and contemporary music credits include conductors such as Giora Bernstein, Jeffery Siegel, Anton Coppola, Edwin London, Gunther Schuller, Paul Martin Zonn, Peter Schickele, aka P.D.Q. Bach, ensembles such as Colorado Music Festival, Skaneateles Chamber Music Festival, "Artist In Residence" at Baldwin-Wallace University with the contemporary/world percussion group BATTU, Cleveland Chamber Symphony, Cleveland Ballet, Ohio Chamber Orchestra, Cleveland Opera, Pittsburgh Symphony Percussion Section, Robert Page Singers, Akron Symphony, Richmond (IN) Symphony, Springfield (IL) Symphony, Youngstown Symphony, Duluth-Superior Symphony, Champaign-Urbana Symphony, Lake Superior Chamber Orchestra, Dance Theater of Harlem, Cleveland Dance Collective, and artists such as Paul Sperry, Julie Newell, Robert Weirich, Robert Van Sice, and Ben Toth.

Glenn's drumset and world music credits include Ruben Alvarez, American Jazz Orchestra, Joe Augustine, Clifford Barnes, Peter Bernstein, Chuck Berry, Sam Blakeslee, Theron Brown, Nick Brignola, Freddie Bryant, Ndugu Chancellor, Sarah Jane Cion, Todd Coolman, Stewart Copeland, Anthony Cox, 1940's Radio Hour Show-U.S. Tour, Todd Coolman, Harold Danko, Peter Dominguez, Paquito D'Rivera, Larry Elgart, Raul Esparza, Dominic Farinacchi, John Fedchock, Five By Design, Brad Goode, Reynaldo

Gonzales, Jeff Grubbs, Chris Hemmingway, Taku Hirano, Laurence Hobgood, Engelbert Humperdink, Randy Johnston, Sean Jones, Mike Kocour, Alison Krauss, Victor Krauss, Ralph Lalama, Mike Lee, Tony Leonardi, Robert Lockwood Jr., Bryan Lynch, Jim McNeely, Hank Marr, Alton Merrell, Tim Miller, Ben Monder, Michael Pagan, Phil Palombi, Ken Peplowski, Billy Porter, Doug Richeson, Chita Rivera, Trichy Sankaran, Jack Shantz, Howie Smith, Michael Spiro, Marvin Stamm, Chip Stephens, Dave Stryker, Michael Stryker, The Texas Tenors, Zvonimir Tot, Alan Vizzutti, Dan Wall, James Weidman, Michael Weiss, Dan Wilson, Mike Wofford, Women of the Phantom, Andrea Zonn, and Youngstown State University Faculty Jazz Group and many others.

Glenn's has presented concerts, clinics, masterclasses, and lectures at the University of Michigan, Indiana University, University of Colorado Boulder, Purdue University, Eastern Illinois University, University of Akron, Ashland University, Kent State University, Kent State Stark, Southern Illinois University, Slippery Rock University, Denison University, Casper College, Ohio Music Education Association Professional Conferences, and the Interlochen School of the Arts. He has adjudicated MENC State Solo and Ensemble Events and Collegiate and High School Jazz Festivals throughout the Midwest. He has taught at the United States Percussion Camp, Illinois Summer Youth Music Camp, Richland Academy Summer Jazz Camp, and the Baldwin Wallace University Summer Music Clinic. His university teaching credits include Eastern Illinois University, the University of Illinois at Champaign-Urbana, Parkland College, Baldwin-Wallace University, University of Minnesota Duluth, Concordia College, Minnesota State University Moorhead, North Dakota State University, and Cuyahoga Community College.

Glenn lives in Poland, Ohio with his wife Sara, a professional violinist and their twin boys Lewis and Karl.

CHRONOLOGY

Glenn was born and raised in Berea, on the west side of Cleveland, and began playing drums at the age of two; the drums a gift from his uncle - a high school band director. Glenn began formal lessons in fourth grade with Cleveland area jazz drummer and vibraphonist Harold Damas, with whom he studied for twelve years. Glenn began performing professionally in tenth grade with the west-side of Cleveland based band "The Fudales" and also began teaching private students while at Berea High School. During high school Glenn studied at the Baldwin-Wallace College Summer Music Clinics with George Kiteley and at the Ludwig Drum Company Summer Percussion Symposiums with Joe Morello, Alan Dawson, Ed Shaughnessy, Leigh Howard Stevens, David Friedman, David Samuels, Al Payson, Charlie Christian, Fred Sanford, Carmine Appice, Marv Dahlgren, Charles Dowd, David Charles, and others.

From 1978-92 Glenn attended Baldwin-Wallace University; Conservatory, studied percussion with George Kiteley, and earned the Bachelor of Music in Percussion Performance. He was the Conservatory's Concerto Competition Co-Winner in 1981, and freelanced in northeast Ohio with local bands, his own jazz quartet, a vib/marimba duo he founded with student colleague Michael Wimberly, and performed with the Tommy Dorsey Band among others.

From 1982-83 Glenn attended Eastern Illinois University, studied percussion with Johnny Lee Lane, jazz composition with Alan Horney, earned the Master of Arts in Percussion Performance, and served as jazz and percussion teaching assistant where he directed jazz ensemble II and a jazz combo, directed the marimba ensemble, taught vibraphone lessons, performed in the percussion ensemble, jazz ensemble I and combo I. Glenn also performed with the Kevin Gainer Quartet which received the "Outstanding Combo" award at the 1983 Notre Dame Collegiate Jazz Festival and 1983 Memphis State University Jazz Festival, and performed professionally throughout Illinois. After graduating from EIU, Glenn did an extensive United States musical tour with the 1940's Radio Hour Show based in Dallas, Texas, recorded an album with the Air Force Band of Mid America, taught at the Eastern Illinois University Summer Jazz Camps, taught private lessons, and played freelance drumset gigs in throughout the Illinois region.

From 1984-86 and 1987-88 Glenn pursued doctoral studies at the University of Illinois at Champaign-Urbana, studied percussion with Tom Siwe, ethnomusicology with Bruno Nettl, Charles Capwell, Larry Gushee, and Tom Torino, and later completed the Doctor of Musical Arts in Percussion Performance and Literature degree in 1993. While in-residence at UI for three years, Glenn was a member of John Garvey's world-renowned Jazz Ensemble I, the Graduate Percussion Group, and the New Music Ensemble. His doctoral thesis entitled "Jazz Drumming 1960-65; Transcriptions and Analysis of Small Group Techniques" and Glenn was invited to present a lecture about his research at the 1993 Percussive Arts Society International Convention in Columbus, OH. Glenn recorded Scott Wyatt's multiple percussion and tape solo *Time Mark* (available at SteveWeissMusic.com), various commercial jingles, and an album with singer/songwriter Nancy Hill. He taught at the UI Summer Youth Music Jazz and Percussion Camps, was adjunct percussion instructor at Parkland College in Champaign, IL, and served as a UI graduate teaching assistant where he

taught jazz improvisation courses. As a freelance artist, Glenn appeared as soloist with the Champaign-Urbana Symphony, performed with the Springfield Symphony, The Rovers - a country-rock band, jazz artists such as Laurence Hobgood, Michael Stryker, Bryan Lynch, Michael Weiss, Brad Kirk, Jeff Helgeson, Kim Richmond, Sean Flanigan, Les Elgart, Larry Elgart, Red Skelton, Engelbert Humperdinck, and at the International Association of Jazz Educator's Convention in Detroit.

In 1986-87 Glenn accepted his first full-time university teaching position as Tri-College Visiting Lecturer at the University of Minnesota-Moorhead, North Dakota State University, and Concordia College, where he taught applied percussion, percussion ensemble, percussion methods, and coached the NDSU Drumline. He also served as principal timpani/percussion with the Fargo-Moorhead Symphony.

From 1988-94 Glenn lived in Lakewood, Ohio as a freelance artist in the Cleveland/northeast Ohio area. He was a member of the world percussion quartet BATTU "artists in-residence" at Baldwin Wallace College. BATTU toured Ohio, Pennsylvania, and Texas and presented hundreds of performances and clinics for Young Audiences of Greater Cleveland. Glenn served as principal and assistant principal percussion with the award-winning Cleveland Chamber Symphony, including myriad world premieres, tours to the Ball State University New Music Festival and Harvard University, and nine compact disc recordings on Gunther Schueller's GM label. Glenn also performed with Cleveland Ballet, Cleveland Opera, Ohio Chamber Orchestra, Colorado Music Festival in Boulder, Robert Page Singers, and appeared as soloist with the Baldwin-Wallace College Conservatory Symphony Orchestra. He performed Cleveland Opera's world premiere of Stewart Copeland's opera *Holy Blood and Crescent Moon* and played with rock & roll legend Chuck Berry. Glenn completed two years of post-doctoral studies at Cleveland State University where he studied contemporary music with Edwin London, served as personnel manager and principal percussion with the New Music Associates - a professional ensemble in-residence at CSU, and studied orchestral percussion with Tom Freer and Jay Burnham of the Cleveland Orchestra. Glenn taught at the Baldwin-Wallace College Preparatory Department, taught timpani and drumset for twelve summers at the United States Percussion Camp, and taught world music at Cuyahoga Community College. In 1994 he was awarded a professional research grant from the Ohio Arts Council to study Afro-Cuban folkloric percussion with Roberto Vizciano, Fermin Nani, and Santiago Nani at the National School of the Arts in Havana, Cuba.

From 1994-96 Glenn served as visiting assistant professor of percussion and jazz studies at the University of Minnesota-Duluth, where he taught applied percussion, percussion ensemble, percussion methods, jazz history, African Roots of American Music, directed big bands and combos, and founded an Afro-Cuban Folkloric Music course and Latin-Jazz Combo. He served as principal timpanist with the Lake Superior Chamber Orchestra, section percussion with the Duluth-Superior Symphony, and performed with jazz artists Anthony Cox, Harvey Weinapple, and Michael Pagan. Glenn received a UMD faculty research grant to study at the Berklee College of Music World Percussion Festival with Giovanni Hidalgo, Horacio Hernandez, Glen Velez, Jamie Haddad, Victor Mendoza, and Trichy Sankaran during the summer of 1995.

Glenn began teaching at Youngstown State University in 1996 where he has built a renowned percussion studies program that has attracted students from around the United States, Europe, Japan, and Brazil.

ENDNOTES

¹ Howard Gardner, *Multiple Intelligences*, 2006. *Frames of Mind*, 1993. *The Disciplined Mind*, 1999.

² Becker, 2009, 4.

³ Burrows, 2007, 85, 98.

⁴ Gordon, 2000, 32.

⁵ Duckworth, 2010, 1.

⁶ Ibid.

⁷ Gordon, 2000, 32.

⁸ Gordon, 2000, 164.

⁹ Accessed 3/23/16 from <http://mathworld.wolfram.com/Combinatorics.html>.

¹⁰ Accessed 3/23/16 from <http://mathworld.wolfram.com/Permutation.html>.

¹¹ Abel 2014, p. 1., p 24

¹² Nelson, 2008, 1.

¹³ Young, 1998, 12.

¹⁴ TricySankaran.com

¹⁵ Interestingly, if one attempted to sing their tempo reference tune in the same key upon each recall, you could eventually memorize a particular pitch from which to audiate various intervals, i.e. relative pitch.

¹⁶ Steve Schick, *The Percussionist's Art*, p.94.

¹⁷ Ibid. 124-5

UPCOMING

VOLUME 2 - A GLOBAL APPROACH FOR ALL MUSICIANS

Chapter x - World Rhythms

West African Bell Rhythm - Metric Perspectives

Polyrhythms - 2 vs. 3 and 3 vs. 4

Key Patterns in Triple Meter - West African Bell and Cuban Clave Rhythms

West African Binary Rhythms

Brazilian Rhythms

Cuban Rhythms

Binary / Ternary Feel Transitions

South Indian Rhythmic Concepts

Chapter x - Quintuplets, Septuplets, and Nonuplets

Quintuplets - Partitions and Permutations of 5, 10 and 20

Septuplets - Partitions and Permutations of 7

Etude - shifting 4 and 3 groupings

Nonuplets - Partitions and Permutations of 9

Chapter 9 - Asymmetric Meters

Mission Impossible - in 5

Your Mission, Should You Choose To Accept It, Is in 7

Kopanitsa - in 11