

**The Integration of Carnatic Rhythmic Devices into Contemporary  
Jazz Performance: A Framework for Improvisers.**

**A dissertation comprising four CD recordings and exegesis**

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## **Abstract**

This performance-based dissertation explores the application in jazz of five rhythmic devices drawn from the Carnatic music tradition of South India. The study offers a framework for the incorporation into jazz performance, and the double bass in particular, of the five devices. Four CD recordings document the resultant performances by the author, a double bass player. The exegesis offers definitions for each device, and examples of their usage in pre-existing jazz contexts. The exegesis ultimately proposes a detailed methodology that incorporates original exercises intended to reinforce familiarity with the devices, and guidelines for ensemble rehearsal.

## Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

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Lyndon Robert Gray      26 / 10 / 2017

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The musicians who feature on the recordings deserve special mention as the project demanded more than a regular amount of rehearsal and I am forever grateful to have such amazing accompanists. Thanks to: Jason McMahon, Nick Pennington, Angus Mason, Josh Baldwin, Chris Martin, Julian Ferraretto and Pat Thiele. An extra special mention goes to pianist Ed Heddle who not only appears on the recordings but also spent countless hours with me practicing solkattu exercises and mastering some of the more pernicious passages in the repertoire. I would also like to thank my recording engineers, Jarrad Payne and Jamie Mensforth who were generous with their time and produced a splendid audio representation of the project.

I would like to thank my partner Emily Tulloch for her tireless support, sage advice and tolerance of repetitive practice sessions. This thesis would not have been completed without her reassurance during times of mild panic and encouragement over the length of the project. My thanks also to my immediate family and the broader community of musicians who provided a consistent support which buoyed me through the rough moments of the study

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# **PART A**

## **Sound Recordings**

# Track Listing and Information for CDs

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1. “Pentacle” Adrian Sherriff (12:46)  
Lyndon Gray (double bass), Jason McMahon (soprano saxophone), Nick Pennington (guitar), Chris Martin (keyboards), Josh Baldwin (drums), Angus Mason (drums).
2. “Tisra Jati Triputa” Toby Wren (6:27)  
Lyndon Gray (double bass), Nick Pennington (guitar), Angus Mason (drums).
3. “Blues For Palghat Ragu” Toby Wren (7:13)  
Lyndon Gray (double bass), Julian Ferraretto (Violin).
4. “Flood Lines” Toby Wren (5:38)  
Lyndon Gray (double bass), Jason McMahon (alto saxophone), Nick Pennington (guitar), Angus Mason (drums).
5. “Viv’s Bum Dance” John Rodgers (4:53)  
Lyndon Gray (double bass), Chris Martin (keyboards), Josh Baldwin (drums).
6. “The Sacred Cow’s Tail” Sandy Evans (8:19)  
Lyndon Gray (double bass), Jason McMahon (tenor saxophone), Nick Pennington (guitar), Chris Martin (keyboards), Josh Baldwin (drums), Angus Mason (drums).
7. “The Agile Wallaby” Sandy Evans (5:17)  
Lyndon Gray (double bass), Jason McMahon (alto saxophone), Nick Pennington (guitar), Angus Mason (drums).
8. “Tongue and Groove” Tom Chang (6:54)  
Lyndon Gray (double bass), Jason McMahon (alto saxophone), Chris Martin (keyboards), Josh Baldwin (drums).

*All recordings produced at Wizard Tone Studios, Hendon, South Australia, except where noted.*

*Tracks 1, 5, 6 and 8 recorded on 14/2/2015*

*Track 2 recorded on 16/4/2015*

*Tracks 3, 4 and 7 recorded on 3/12/2015*

## CD 2: Standards and Standard Forms

1. “Mora Blues” Lyndon Gray (7:38)  
Lyndon Gray (double bass), Jason McMahon (alto saxophone), Nick Pennington (guitar), Angus Mason (drums).
2. “Evidence” Thelonious Monk (4:59)  
Lyndon Gray (double bass), Jason McMahon (tenor saxophone), Nick Pennington (guitar), Angus Mason (drums).
3. “Khanda Blue Suite” Miles Davis (13:20)
  - So What
  - Freddie Freeloader
  - All BluesLyndon Gray (double bass), Jason McMahon (alto saxophone), Nick Pennington (guitar), Angus Mason (drums).
4. “Central Park West” John Coltrane (5:01)  
Lyndon Gray (double bass), Jason McMahon (alto saxophone), Nick Pennington (guitar), Angus Mason (drums).
5. “Ornithology” Charlie Parker (6:32)  
Lyndon Gray (double bass), Jason McMahon (alto saxophone), Nick Pennington (guitar), Angus Mason (drums).
6. “The Winding Way” Dave Holland (8:17)  
Lyndon Gray (double bass), Nick Pennington (guitar), Angus Mason (drums).
7. “Ornithology” (Live Version) Charlie Parker (7:09)  
Lyndon Gray (double bass), Jason McMahon (alto saxophone), Nick Pennington (guitar), Angus Mason (drums).

*Track 6 recorded on 16/4/2015*

*Tracks 1, 3, and 5 recorded on 12/9/2015*

*Tracks 2 and 4 recorded on 3/12/2015*

*Track 7 recorded on 21/3/2016 at The Wheatsheaf Hotel for Creative Original Music Adelaide*

## CD 3: Original Compositions

1. “Bass Etude in A” Lyndon Gray (2:30)  
Lyndon Gray (double bass).
2. “Ignominy!” Lyndon Gray (8:00)  
Lyndon Gray (double bass), Jason McMahon (tenor saxophone), Nick Pennington (guitar), Angus Mason (drums).
3. “Peripatetic Palanquin” Lyndon Gray, Ed Heddle (4:03)  
Lyndon Gray (double bass), Ed Heddle (piano).
4. “There Are Birds” Lyndon Gray (6:41)  
Lyndon Gray (double bass), Ed Heddle (piano).
5. “Old Knives” Lyndon Gray (8:38)  
Lyndon Gray (double bass), Jason McMahon (tenor saxophone), Nick Pennington (guitar), Angus Mason (drums).
6. “Alabaster” Lyndon Gray (5:28)  
Lyndon Gray (double bass), Ed Heddle (piano).
7. “Bat Tricks” Lyndon Gray (6:56)  
Lyndon Gray (double bass), Jason McMahon (tenor saxophone), Nick Pennington (guitar), Angus Mason (drums).
8. “Heptagram” Lyndon Gray, Ed Heddle (8:38)  
Lyndon Gray (double bass), Ed Heddle (piano).
9. “No Reservations” Jason McMahon (7:07)  
Lyndon Gray (double bass), Jason McMahon (tenor saxophone), Nick Pennington (guitar), Angus Mason (drums).
10. “Good Luck Everybody” Lyndon Gray (7:03)  
Lyndon Gray (double bass), Ed Heddle (piano).
11. “Bass Etude in Em” Lyndon Gray (1:46)  
Lyndon Gray (double bass).

*Tracks 1 and 11 recorded on 16/4/2015*

*Tracks 2, 5, 7 and 9 recorded on 6/7/2016*

*Tracks 3, 4, 6, 8 and 10 on 10-11/10/2016*

## **CD 4: Culmination (Live Concert)**

1. **“1062956 Blues” Lyndon Gray (26:30)**  
Lyndon Gray (double bass), Pat Thiele (trumpet), Jason McMahon (tenor saxophone), Ed Heddle (piano), Nick Pennington (guitar), Angus Mason (drums).
2. **“There Are Birds” (Live Version) Lyndon Gray (7:46)**  
Lyndon Gray (double bass), Ed Heddle (piano) Angus Mason (drums).
3. **“No Moon At All” Redd Evans, David Mann (7:31)**  
Lyndon Gray (double bass), Ed Heddle (piano) Angus Mason (drums).
4. **“Evidence” (Live Version) Thelonious Monk (5:59)**  
Lyndon Gray (double bass), Jason McMahon (tenor saxophone), Nick Pennington (guitar), Angus Mason (drums).
5. **“Mora Blues” (Live Version) Lyndon Gray (9:01)**  
Lyndon Gray (double bass), Pat Thiele (trumpet), Jason McMahon (tenor saxophone), Nick Pennington (guitar), Angus Mason (drums).
6. **“Good Luck Everybody” (Live Version) Lyndon Gray (8:54)**  
Lyndon Gray (double bass), Pat Thiele (trumpet), Jason McMahon (tenor saxophone), Ed Heddle (piano), Nick Pennington (guitar), Angus Mason (drums).

*Tracks 1-6 recorded on 30/1/2017*

# **PART B**

## **Exegesis**

## Introduction

The history of jazz improvisation is marked by a restless search for new sources of inspiration, many of which are cross-cultural in nature. This research project contributes to that search. Just as the early jazz of New Orleans incorporated the African rhythmic sense into the French Quadrille and marching band music (Stearns 1956, p. 73), so, too, have progressive jazz musicians looked to the rich music cultures in South America and European classical music traditions. Still others, including the current author, have turned to the highly developed Indian classical traditions for new approaches to rhythm, melody and harmony. To that end, this performance-based research project explores Indian Carnatic rhythmic devices and applies these to my own performance practice – the results of which can be heard on the four CD recordings included in this submission.

The Western world became widely aware of Indian classical music through the emergence of Ravi Shankar on the world stage. As his profile in the West grew, inquisitive jazz performers sought him out to learn something of his sophisticated music, which is itself representative of northern, Hindustani musical traditions. Early “indo-fusion” experiments focused on the harmonic and timbral aspects of the music (as in John Coltrane’s recordings “India” and “My Favourite Things”), which were successfully woven into the fabric of modal jazz. Those to adopt the rhythmic language of Shankar’s Indian classicism included Don Ellis and John McLaughlin’s groups Mahavishnu Orchestra and Shakti.

However, despite the calibre of jazz musicians delving into Indian music, Shankar was quoted in 1966 as saying “From what we hear jazz has only borrowed a flavour. I like it, but

truthfully we think it very childish.” (Farrell 1997, p. 189). Hindustani musician Harihar Rao, who collaborated with Ellis to create the Hindustani Jazz Sextet, went a step further by saying in the same year:

I do believe the fusion of Indian music with pop and jazz is possible in a very elemental way. The problem is that our melodic constructions are more sophisticated than anything jazz or pop will be able to think [sic] for a lot more years yet. (Farrell 1997, p. 194)

Rao and Ellis were more generous in their 1965 essay “An Introduction to Indian Music for the Jazz Musician”, in which they established an overlap between the two styles before concluding:

It should now be easy to see the relationship of Indian music and jazz. A good jazz drummer in keeping (for example) the structure of a twelve bar blues in his head while playing various cross rhythms is doing essentially the same thing that an Indian drummer does. The difference lies primarily in the far greater variety and subtlety (not to mention difficulty) of the Indian rhythmic patterns. If you get the idea by now that this article written as a challenge to jazz musicians – you are right. Anyone care to accept? (Ellis, Rao 1965, quoted by Fenlon 2002, p. 29)

This thesis demonstrates the extent to which times have changed since Ellis made that statement.

My interest in Carnatic music, its rhythmic aspects in particular, derives from its influence on a number of contemporary Australian jazz performers, including Toby Wren, Adrian Sherriff, John Rodgers and Sandy Evans. I found the creative output of these artists all bore the mark of a fascinating rhythmic approach which I later discovered had sprung from their personal investigations into the musical traditions of South Indian Carnatic music. In the Western world there has been less exposure to this tradition as many of the prominent Indian artists (such as Shankar, Zakir Hussain and Trilok Gurtu) were trained in the North Indian Hindustani tradition. Carnatic and Hindustani music nevertheless spring from the same root historically and as such have many similar aspects. For example, most Western music enthusiasts will be familiar with the Hindustani percussion instrument, the tabla. Its analogue in the Carnatic world is the two-headed drum, the mrdanga.<sup>1</sup>

Through exploring and analysing the work of Wren, Sherriff, Rodgers and Evans it became clear that there is great potential for the integration of Carnatic rhythmic devices into my own double bass performance. To that end, the research explores a number of broad research thrusts:

- 1) What are the key rhythmic devices of Carnatic music?
- 2) Which Carnatic rhythmic devices in particular have been employed by Toby Wren, Sandy Evans, Adrian Sherriff and John Rodgers in their improvisations and compositions?
- 3) What processes did these artists employ to integrate the rhythmic devices into their improvisation and composition?

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<sup>1</sup> As this thesis focuses on rhythm, the pedagogical and improvisational approach of mrdanga players is a central reference point, especially Karaikudi Mani and Trichy Sankaran.

- 4) What exercises can I devise to apply Carnatic rhythmic devices to double bass that are specific to the instrument and my own playing style?
- 5) What exercises can I devise to apply Carnatic rhythmic devices to a jazz rhythm section?
- 6) Can I condense the results of questions 5) and 6) to create a cohesive method for double bass and rhythm section in the study of Carnatic rhythms in jazz?
- 7) What further explorations can be made with blending jazz and Carnatic rhythmic concepts?

The approach taken – the research methodology – is as follows:

- 1) Research Carnatic rhythmic devices from contemporary literature on the topic and through listening, transcription and analysis of recorded Carnatic music.
- 2) Research Carnatic influenced jazz through listening, transcription and analysis of recordings.
- 3) Record performances of some of these works to illustrate background knowledge of the approaches taken to date (performances include improvisations informed by research).
- 4) Identify rhythmic devices which show potential for new developments.
- 5) Create exercises and frameworks for integration of these devices into my own jazz vocabulary.
- 6) Implement devised methodology through personal and group practice.
- 7) Record performances (including jazz standards and original repertoire) displaying the effect of the implementation on my jazz vocabulary.

- 8) Ultimately, present and explain the methodology as a pedagogical tool in an exegesis accompanying the recordings.

This thesis contains my research into Carnatic rhythm and pre-existing Carnatic-jazz experiments, a description of my original methodology developed over the course of the study and four hours of recorded music resulting from its implementation to my double bass practice. The exercises described in the methodology are intended to be accessible for a trained improvising musician and applicable to a contemporary jazz setting, though they are generally viewed from the perspective of my instrument, the double bass.

The recordings are themed as follows:

#### CD 1: Carnatic Influenced Jazz

This recording presents the work of jazz artists who have explored Carnatic music and woven it into their own work. The double bass improvisations performed drew influence from the original performances of these works.

#### CD 2: Standards and Standard Forms

This recording features jazz pieces which I have arranged to exploit different aspects of the Carnatic rhythmic approach and contain multiple instances of my double bass improvisation. As the prevailing methodology of the thesis is intended to be useable in a regular jazz context, it was necessary to display how the techniques might apply to the classic repertoire, including works by Miles Davis, John Coltrane, Charlie Parker and Thelonious Monk.

### CD 3: Original Compositions

This recording features pieces written for this thesis specifically designed to provide frameworks for improvisation that would facilitate the use of Carnatic devices as well as melodies based on constructed number patterns.

### CD 4: Culmination (Live Concert)

This final recording is in the format of a live concert displaying the effect of the applied process on my double bass performance style as it relates to vocabulary in improvisation. The first half of the performance is comprised of an original long-form piece, followed by a revisiting of pieces from the first three recordings. The improvisations on these later renditions of the material provide an opportunity to observe the progress of my skill level and the degree to which the devices have been internalised.

It was necessary to learn a modicum of the Carnatic phonetic language known as solkattu as this is the standard method of conveying Carnatic rhythmic concepts. This was achieved through the use of two texts, David Nelson's "Solkattu Manual" and Trichy Sankaran's "The Art Of Konnakol" and allowed me to translate examples from syllabic representations to the Western staff. Other more esoteric ideas, like the nuances of nadai, required careful listening to mrdanga improvisations.

## Literature Review

The scope of this thesis required lateral research of both the jazz rhythmic approach and Carnatic music. Texts offering comprehensive descriptions of Carnatic rhythmic devices include David Nelson's PhD thesis *Mrdangam Mind: The Tani Avartanam In Karnatak Music* (1991) and Trichy Sankaran's book *The Rhythmic Principles & Practice of South Indian Drumming* (1994). Both writers later wrote instructional books on the phonetic language of solkattu, Nelson's *Solkattu Manual* (2008) and Sankaran's *The Art Of Konnakol (Solkattu)* (2010). Due to the recent publishing dates of these texts and their complementary nature I chose to use them as my primary source for definitions of Carnatic rhythmic devices. Earlier works, such as Matthew Montfort's *Ancient Traditions - Future Possibilities* (1985) and B. Chaitanya Devas *Indian Music* (1980), offer a broad overview of both Hindustani and Carnatic music including the related harmony and historical context but descriptions of rhythmic approaches were insufficient for the purposes of this thesis.

Several masters and PhD dissertations exist which examine the connection between jazz and Indian music to one degree or another. The most pertinent to this study were Toby Wren's Masters dissertation *The Carnatic jazz experiment: The influence of Carnatic music on my composition and improvisation practice* (2009) and his more recent PhD dissertation *Improvising Culture: Discursive Interculturality as a critical tool, aesthetic, and methodology for intercultural music* (2015). These two texts along with Wren's albums *The Carnatic Jazz Experiment* (2011) and *Rich and Famous* (2012) provided an excellent springboard for my own explorations into Carnatic influenced jazz. Sandy Evans' PhD entitled *Meetings at the table of time: a creative practice enquiry into Carnatic jazz intercultural music* (2014) is a fantastic addition to this area of enquiry documenting her continued exploration of Carnatic influenced jazz. Evans and Wren both cover areas closely

related to this thesis but focus more on the nature of cross cultural collaboration, where this thesis is primarily concerned with providing a methodology for jazz performers with regard to the use of specific rhythmic devices and examples of usage in the context of a jazz ensemble with common instrumentation. Although I acknowledge the work of Wren and others throughout the exegesis, my methodology was developed after observing their work and is applied to my chosen instrument, the double bass, and as such is an original concept.

Other postgraduate texts include Darren Moore's PhD *The Adaptation of Indian Carnatic Rhythmic Structures and Improvisation Methods into Drum Set Language and Performance Practice* (2013) which is centred around jazz drums. Linda Oh's Honours thesis *New Method of Rhythmic Improvisation for the Jazz Bassist: an interdisciplinary study of Dave Holland's rhythmic approach to bass improvisation and North Indian rhythmic patterns* (2005) is notable for being an investigation of Indian music in relation to the double bass, albeit with a focus on the Hindustani rather than the Carnatic tradition. Dissertations related to rhythmic advancement in jazz, such as Marc Hannaford's *Elliott Carter's Rhythmic Language* (2011) and Quentin Angus' *Phrasing and Polyrhythm in Contemporary Jazz Guitar* (2014) were relevant to this study, as were texts exploring the connection between jazz and India in earlier periods, such as Sean Fenlon's DMA dissertation *The Exotic Rhythms of Don Ellis* (2002) and Gerry Farrell's *Indian Music and the West* (1997). As my methodology is something of an instructional manual it also worth highlighting the existence of exercise-based workbooks, notably Pete Lockett's book *Indian Rhythms for Drumset* (2008), which is focused on drums rather than the double bass.

The current study is distinct from many of the above resources, in that it proposes new ways of approaching the five nominated rhythmic devices, rather than being pre-occupied with harmonic aspects of Carnatic music or developing mixed genre ensembles. As such it follows

on from the work of musicians who translated similar ideas to drumming by presenting them on a harmonic instrument, the double bass, and in a common jazz context which creates an entry point for a greater number of performers.

Along with the aforementioned albums of Toby Wren, there are many recordings of Indian influenced improvised music which were observed and digested during the research process for this thesis. Early examples of Indian jazz fusion include Ravi Shankar's *Improvisations* (1962) (featuring Shankar alongside American musicians Bud Shank and Gary Peacock) and John McLaughlin's genre crossing groups Mahavishnu Orchestra and Shakti, with *Shakti with John McLaughlin* (1976) providing an excellent example of an integrated ensemble. This thesis paid particular attention to the collaborations of the Australian Art Orchestra and Karaikudi Mani, which resulted in the two albums *Into The Fire* (1999) and *The Chennai Sessions* (2008), as well as Sandy Evans' Indian influenced jazz albums *Cosmic Waves* (2012) and *Kapture* (2015). Contemporary recordings featuring Indian artists as leaders who incorporate western improvisation elements include Karaikudi Mani's *Amrutham: Fusion For Freedom* (2003) and Rudresh Mahanthappa's *Kinsmen* (2008).

## Exegesis Structure

The exegesis presents five chapters dedicated to the devices of mora, gopucca/srotovaha, korvai, nadai and koraippu respectively. Each chapter is divided into three sections, “Definition”, “Use In Contemporary Jazz” and “Further Application”. The “Definition” section provides an explanation of the device as described in the literature and offers examples given in standard notation. The “Use In Contemporary Jazz” section then cites examples of the device as observed in the work of jazz artists, accompanied by analysis and transcribed excerpts. The third section “Further Application” details the original approaches devised for the thesis and through examples transcribed from the recordings demonstrates how these processes influenced the music. Also provided in this thesis is an appendix containing notation of the music featured on the CDs and selected transcriptions of my original double bass improvisations.

The rhythmic devices were selected not necessarily in accordance with their importance in Carnatic music but rather because of their potential for integration into the contemporary jazz vocabulary. For example, the central rhythmic principle of Carnatic music, the tala, was only touched on in the pieces “Central Park West” (CD2, Track 4) and “Good Luck Everybody” (CD3, Track 10). I was struck by the asymmetrical beat grouping of misra chapu tala, a seven beat pattern of (1 - 2 - 2 - 2), which is uncommon in jazz, and based the two pieces on this structure:



Figure 1: Beat grouping of misra chapu tala

These pieces now appear among the other recordings as a vestige of the exploration of tala which was overwhelmed by the wealth of potential offered by the other five devices outlined in this exegesis.

The thesis outcomes fall into two main categories:

The **recorded performances** show:

- 1) The effects of the applied methodology on my jazz performance through a new library of phrases created with moras, korvais and gopucca srotovaha technique.
- 2) The effects of the applied methodology (as it relates to the concept of nadai) on my jazz performance through an increased ease of transitioning between different subdivisions and an increased rhythmic vocabulary within the less common subdivisions.
- 3) Improvisations shaped through the structure of solo section forms influenced by Carnatic rhythmic devices, especially the koraippu device.
- 4) A general expansion of my rhythmic vocabulary which developed laterally through the study which is observable in all improvised double bass passages, increasing in complexity over the course of the four CDs.
- 5) The success of integration by presenting this methodology within the context of a regular small jazz ensemble.
- 6) The malleability of the methodology by presenting repertoire consistent with contemporary jazz including originals and arrangements of jazz standards.

The pedagogical framework presents a structured approach to the incorporation of Carnatic rhythmic devices into one's performance practice and ultimately offers the trained improviser a framework to achieve the following:

- 1) Construct phrases for improvisation and composition based on the mora and sub-mora devices.
- 2) Construct phrases for improvisation and composition using the orderly reduction and expansion devices known as gopucca and srotovaha, and applying them to the mora device.
- 3) Construct longer duration phrases to function as bridging sections between sections of differing mood and subdivision through the use of the korvai device.
- 4) Phrase comfortably in the less common subdivisions of khanda nadai (5-to-a-pulse) and misra nadai (7-to-a-pulse) and be able to transition between all subdivisions from 3-to-a-pulse up to 7-to-a-pulse and apply this to the mora device.
- 5) Trade improvised phrases within a framework of orderly reduction with another performer through the use of the koraippu device.

The dissertation sheds new knowledge on the practical application in jazz performance of the rich, globally significant Carnatic music tradition. It does so through the formulation of a specific approach to the integration of the examined rhythmic devices. The framework evolved via a process of transcription, analysis, development and application of exercises through structured rehearsing and finally, lateral incorporation of different devices.

Furthermore, this process was carried out with awareness of the successes of previous Carnatic jazz projects and care was taken to build on those advances where possible.

### **Note on Transcriptions**

All transcriptions contained in the Exegesis and Appendix are by the author. Square brackets and the symbols **x** and **y** are frequently used within transcribed examples to denote note groupings and durations within a larger structure.

## Chapter One: Moras

### Definition

This first chapter explores the ubiquitous mora, a rhythmic device which encapsulates many of the key tenets of the Carnatic rhythmic approach. Master Carnatic percussionist Trichy Sankaran offers the following explanation of the mora structure:

Generally, the repetition of a phrase three times, with pauses occurring between phrases, makes up the structure of a mora. The phrases can be identical or progressively longer or shorter in length. (Sankaran 2010, p. 48)

David Nelson goes one step further in his 1991 dissertation by outlining the formula for constructing moras as follows:

$$X - Y - X - Y - X$$

These phrases are often (though not always) quite short and frequently used to bring about the resolution of a section. A mora is often deployed at a point in the rhythmic framework such that it resolves on a strong pulse, necessitating a degree of forethought and planning. Those familiar with North Indian Hindustani music will recognise a similarity to the tihai device which also involves a threefold repetition (Montfort 1985, p. 108).

Sankaran offers the following as a simple example of the mora structure:

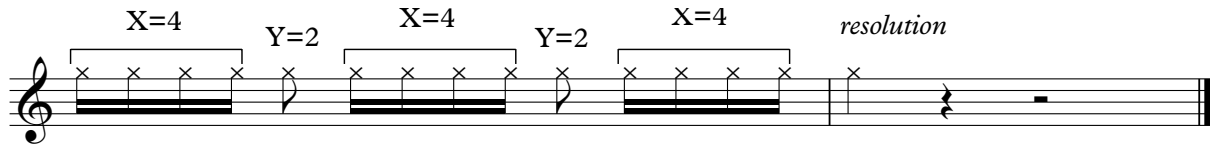


Figure 2: Mora structure

It is also accepted that the Y phrase can have a duration of zero, yielding a second type of mora made up of a simple three-fold repetition (Sankaran 1994, p. 59).

This device can be viewed as a very malleable ratio which can promulgate a wide variety of phrases while still retaining a sense of structure.

### Use in Contemporary Jazz

Several clear examples of the mora device can be observed in the Carnatic influenced jazz of Sherriff, Wren, Rodgers and Evans. The following discussion focuses on two moras present in Evans' piece "The Sacred Cow's Tail" (CD 1, Track 6).<sup>2</sup>

<sup>2</sup> Other works recorded for this thesis involving moras are "Pentacle" (Sherriff), "Tisra Jati Triputa" (Wren), "Flood Lines" (Wren) and "Viv's Bum Dance" (Rodgers), all of which appear on CD1 and are notated in the Appendix.

Figure 3: Mora from "The Sacred Cow's Tail", CD1 Track 6 (0:50)

Here Evans has started with a common length of 4 bars with an underlying sixteenth note subdivision. This mora has an X phrase with a duration of 18 and a Y phrase with a duration of 5. The duration of the entire mora is 64 sixteenth notes which corresponds exactly with the number of sixteenth notes in 4 bars of 4/4 time.

In the same piece we find an example of the second type of mora (the triple repetition):

Figure 4: Mora from "The Sacred Cow's Tail", CD1 Track 6 (1:52)

In this case the mora is comprised of three X phrases each with the duration of 5 sixteenth notes; the mora necessarily commenced on the second sixteenth note of the bar so as to ensure the correct resolution point on beat 1 of the next bar.

## Further Application

To develop a systematic approach for integrating the mora device into jazz vocabulary I began by regarding it as the following ratio:

$$3X + 2Y = \text{phrase duration}$$

(where X is always larger than Y)

To narrow the field of inquiry I compiled a list of phrase durations common to jazz, henceforth known as “target numbers”. Taking into account bar groupings of 2, 4, 6 and 8, time signatures 3/4, 4/4, 5/4, 7/4 and subdivisions of sixteenth notes, triplets and quintuplets my resultant list was:

20, 24, 28, 30, 32, 40, 48, 56, 60, 64, 80

The previously stated formula was then implemented to derive all possible moras for the given target numbers. This resulted in my final “Index of Useful Moras for the Jazz Performer”: 11 groups with a total of 32 individual moras to be permuted and elaborated upon depending on a given situation. As follows:

## Index of Useful Moras for the Jazz Performer:

<i>Duration</i>	<i>Time signature</i>	<i>Subdivision</i>	<i>Total beats</i>
-----------------	-----------------------	--------------------	--------------------

### Group 1

2 bars                      5/4                      Eighth notes                      **20**

X                      Y                      X                      Y                      X

<b>MORA 1a</b>	6	1	6	1	6
----------------	---	---	---	---	---

### Group 2

2 bars                      4/4                      Eighth note triplets                      **24**

Also

2 bars                      3/4                      Sixteenth notes                      **24**

X                      Y                      X                      Y                      X

<b>MORA 2a</b>	8	0	8	0	6
<b>MORA 2b</b>	6	3	6	3	6

### Group 3

1 bar                      7/4                      Sixteenth notes                      **28**

X                      Y                      X                      Y                      X

<b>MORA 3a</b>	8	2	8	2	6
<b>MORA 3b</b>	6	5	6	5	6

### Group 4

2 bars                      5/4                      Eighth note triplets                      **30**

Also

2 bars                      3/4                      Quintuplets                      **30**

X                      Y                      X                      Y                      X

<b>MORA 4a</b>	10	0	10	0	10
<b>MORA 4b</b>	8	3	8	3	8

<i>Duration</i>	<i>Time signature</i>	<i>Subdivision</i>	<i>Total beats</i>
-----------------	-----------------------	--------------------	--------------------

**Group 5**

2 bars                      4/4                      Sixteenth notes                      **32**

	X	Y	X	Y	X
<b>MORA 5a</b>	10	1	10	1	10
<b>MORA 5b</b>	8	4	8	4	8

**Group 6**

2 bars                      5/4                      Sixteenth notes                      **40**

Also

2 bars                      4/4                      Quintuplets                      **40**

	X	Y	X	Y	X
<b>MORA 6a</b>	12	2	12	2	12
<b>MORA 6b</b>	10	5	10	5	10

**Group 7**

4 bars                      4/4                      Eighth note triplets                      **48**

Also

4 bars                      3/4                      Sixteenth notes                      **48**

Also

3 bars                      4/4                      Sixteenth notes                      **48**

	X	Y	X	Y	X
<b>MORA 7a</b>	16	0	16	0	16
<b>MORA 7b</b>	14	3	14	3	14
<b>MORA 7c</b>	12	6	12	6	12
<b>MORA 7d</b>	10	9	10	9	10

<i>Duration</i>	<i>Time signature</i>	<i>Subdivision</i>	<i>Total beats</i>
-----------------	-----------------------	--------------------	--------------------

**Group 8**

**2 bars**                      **7/4**                      **Sixteenth notes**                      **56**

	X	Y	X	Y	X
<b>MORA 8a</b>	18	1	18	1	18
<b>MORA 8b</b>	16	4	16	4	16
<b>MORA 8c</b>	14	7	14	7	14
<b>MORA 8d</b>	12	10	12	10	12

**Group 9**

**4 bars**                      **3/4**                      **Eighth note triplets**                      **60**

Also

**3 bars**                      **5/4**                      **Sixteenth notes**                      **60**

Also

**3 bars**                      **4/4**                      **Quintuplets**                      **60**

	X	Y	X	Y	X
<b>MORA 9a</b>	20	0	20	0	20
<b>MORA 9b</b>	18	3	18	3	18
<b>MORA 9c</b>	16	6	16	6	16
<b>MORA 9d</b>	14	9	14	9	14

**Group 10**

**4 bars**                      **4/4**                      **Sixteenth notes**                      **64**

	X	Y	X	Y	X
<b>MORA 10a</b>	20	2	20	2	20
<b>MORA 10b</b>	18	5	18	5	18
<b>MORA 10c</b>	16	8	16	8	16
<b>MORA 10d</b>	14	11	14	11	14

**Group 11**

**4 bars**                      **5/4**                      **Sixteenth notes**                      **80**

Also

**4 bars**                      **4/4**                      **Quintuplets**                      **80**

	X	Y	X	Y	X
<b>MORA 11a</b>	26	1	26	1	26
<b>MORA 11b</b>	24	4	24	4	24
<b>MORA 11c</b>	22	7	22	7	22
<b>MORA 11d</b>	20	10	20	10	20
<b>MORA 11e</b>	18	13	18	13	18

If the performer nominates Mora 5a as being useful for the given situation they can proceed as follows. Firstly, here is Mora 5a expressed as sixteenth notes:

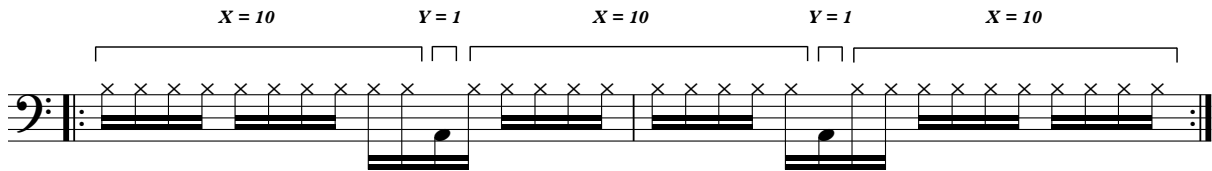


Figure 5: Mora 5a

This mora can then be placed in a harmonic context and the expression of the X phrase can be experimented with:

**Example 1**

Dm<sup>7</sup>

X = 10      Y = 1      X = 10      Y = 1      X = 10

Internal structure of X phrase: 2   4   4      2   4   4      2   4   4

**Example 2**

F<sup>7</sup>

X = 10      Y = 1      X = 10      Y = 1      X = 10

Internal structure of X phrase: 5   5      5   5      5   5      5   5      5   5

Figure 6: Examples of expressions of Mora 5a

Notice the difference in the interpretation of the 10 sixteenth note duration X phrase. In Example 1 the X phrase is constructed internally as [2 - 4 - 4] where Example 2 uses a structure based on a [5 - 5] grouping.

Having constructed the index, I was now able to mine it for improvisational and compositional raw material. The use of the index is repeatedly exhibited on the first two CDs of the thesis, although as it was the first process set in motion within the project there is a detectable influence over the entirety of the recordings. The index is designed to be utilised in the way that the instructional books of educators David Baker and Jerry Coker can be used, and the way that jazz performers approach a book like Slonimsky's *Thesaurus of Scales and Melodic Patterns* (1947).

As this thesis is focused on the expansion of the jazz vocabulary it appears essential to me to address application of the mora device in the context of the twelve bar blues form. For my piece "Mora Blues" (CD2, Track 1) I performed an improvisation influenced by mora-infused practice sessions and involved two moras in the construction of the melody as notated below:

Mora 5b

X = 8                      Y = 4                      X = 8                      Y = 4                      X = 8

Mora 5a

X = 10                      Y = 1                      X = 10                      Y = 1                      X = 10

Figure 7: Mora from "Mora Blues", CD2 Track 1 (1:00)

Both moras (5b and 5a) in the above example have a duration of 32 eighth notes (which in this case corresponds to four bars of eighth notes in 4/4) and therefore are attributed to Group 5 of the index.<sup>3</sup>

The following excerpt is transcribed from my improvisation on the same piece and displays another rendering of Mora 5a this time in an expansion of my own phrase vocabulary:

Mora 5a

Figure 8: Mora from "Mora Blues", CD2 Track 1 (5:20)

For more examples of the use of moras in improvisation we can look to my arrangement of Miles Davis' "All Blues", a part of "Khanda Blue Suite" (CD 2, Track 3) which is based on a 5/4 meter and required me to investigate entries from the index with appropriate target numbers. The following transcribed excerpts of my improvised solo on the piece exhibit interpretations of Mora 4b and Mora 1a respectively:

Mora 4b

Figure 9: Mora from "Khanda Blue Suite", CD2 Track 3 (11:26)

<sup>3</sup> The melody is split between the top and bottom line in the first three bars, but the underlying pattern is still felt in the final performance of the piece.

In the same solo I execute a phrase based on a different target number:

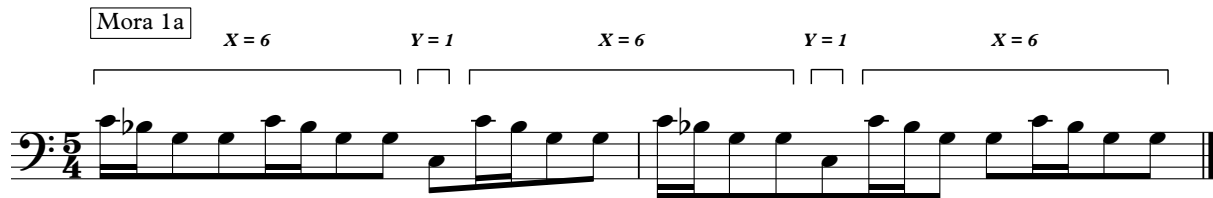


Figure 10: Mora from "Khanda Blue Suite", CD2 Track 3 (11:32)

This mora is derived from target number 20 and corresponds with 2 bars of 5/4. In this instance I have chosen to attach faster ornamental flourishes to the X phrase. This is a more sophisticated interpretation than the previous examples and shows the great potential for invention and elaboration afforded by this approach.

Because of its inherent momentum and defined conclusion, a mora is often used to delineate sections within a piece. Sankaran writes:

The purpose of a mora is to give an ending to an ongoing rhythmic development at intermediate stages, or to conclude a particular rhythmic motif before embarking on another idea. (Sankaran 2010, p. 39)

This has obvious application in the world of contemporary jazz in the common instance where a soloist is required to cue the end of a repeated section in order for the ensemble to move on to the next section. I used this idea in my improvisation on Wren's piece "Tisra Jati Tripata" (CD1, Track 2).

In preparation for the usage of this device, I consulted the Index of Useful Moras for one which would be applicable to the 7/4 meter of the piece. I selected Mora 8a, a structure containing an X phrase which is 18 sixteenth note partials in duration.<sup>4</sup> I made the aesthetic choice to express this X phrase with an internal grouping of [9 - 9]. I then included it in my practice routine by concluding my improvisations with that rhythm but not restricting the note choice. For example, the phrase could begin on any part of the pentatonic scale on which the piece is based, or have an ascending or descending contour depending on where the improvisation has led to up to at that point.

Later in rehearsal I asked the ensemble to be aware that the mora phrase would be used to signal the end of my improvisation and that they should build in intensity so as to bring on a climactic shift to the next section. This approach negates clumsy hand signals or verbal cues which can interrupt a listener's focus. When it came to the recording, I deployed the mora at the end of my second improvisation and it was expressed as follows:

Mora 8a

The image shows two staves of musical notation in 7/4 time, illustrating the Mora 8a structure. The notation consists of eighth notes and quarter notes. Brackets above the notes indicate rhythmic groupings: 'X = 18' spans the first 18 sixteenth-note partials (9 eighth notes), 'Y = 1' spans a single eighth note, and another 'X = 18' spans the final 18 sixteenth-note partials (9 eighth notes). A downward arrow points to the first note of the second 'X' group. The second staff shows a similar structure with 'Y = 1' and 'X = 18' groupings, also with a downward arrow pointing to the first note of the 'X' group.

Figure 11: Mora from "Tisra Jati Tripata", CD1 Track 2 (2:44)

<sup>4</sup> Henceforth the term "partial" is used as a broad term to refer to any constituent part of a larger grouping (i.e. eighth notes, triplets, quintuplets and septuplets) as a way of discussing phrase duration.

As we can see, the mora structure is **18 - 1 - 18 - 1 - 18**. It was a very effective and convenient tool for signalling the end of a section and was kept fresh by not prescribing the note choice.

“Sub-mora” is a term used by Sankaran in *The Art of Konnakkol* to describe a mora containing a nested mora of half the duration. Nelson covers similar material in his dissertation under the heading of “Enfolded and Unfolding moras” (Nelson 1991, p. 55), though he points out that these are his own terms. What is clear is that there exists a treatment of moras whereby a smaller mora is created through the halving of the X and Y phrases and the placement of this newly-created smaller mora is placed midway through the original mora. The effect is one of increasing intensity while still retaining cohesion of material.

Sankaran gives an example of a mora structured **8 - 4 - 8 - 4 - 8**. The sub-mora generated from this larger mora is exactly half the length and begins halfway through the second iteration of the X phrase. Below is a notated example of the original mora followed by the converted mora with nested sub-mora.

Original mora:

Mora with sub-mora:

*half duration sub-mora*

Figure 12: Mora converted to sub-mora

An elegant feature of this approach is its subtlety. When you hear the second iteration of the X phrase, it sounds intact when in actuality the latter half of the phrase is the material being used for the smaller sub-mora.

In order to implement this technique in other contexts we need to recognise two conditions which must be met for the sub-mora to be mathematically possible:

1. The X and Y phrases must be divisible by 2
2. The internal structure of X and Y phrases must be accordingly phrased such that the halved phrases can “break off” and be distinct units in the sub-mora

Taking into account these restrictions we reduce the field of suitable moras considerably; only twelve moras from the Index of Useful Moras are in contention. I employed this technique to construct an interlude for my piece "Ignominy!" (CD3, Track 2). The following passage is constructed from Mora 7c from the index, target number 48, structured **12 - 6 - 12 - 6 - 12**. The figure below shows the original mora as it would appear without any treatment.

The figure shows two staves of musical notation in 3/4 time. The first staff has a treble clef and a key signature of one sharp (F#). The second staff has a bass clef and a key signature of one flat (Bb). Brackets above the first staff indicate phrase lengths: X=12 (6+6), Y=6 (3+3), and X=12 (6). Brackets below the second staff indicate phrase lengths: Y=6 (6+3+3) and X=12 (6+6).

Figure 13: Untreated mora from "Ignominy!", CD3 Track 2 (2:38)

Notice the 12 partial X phrase is structured such that it contains two 6 partial phrases (as opposed to an uneven [5 - 7] grouping) such that it can be neatly halved when constructing the sub-mora. The next figure shows the mora now adjusted with the nested half duration sub-mora made up of the latter half of the original X and Y phrases.

The figure consists of two staves of musical notation in 3/4 time. The top staff shows a sequence of notes with brackets above indicating groupings: a 12-measure group (labeled 'X = 12') divided into two 6-measure groups; a 6-measure group (labeled 'Y = 6') divided into two 3-measure groups; and another 12-measure group (labeled 'X = 12') divided into two 6-measure groups. The bottom staff shows a similar sequence with brackets above indicating groupings: a 6-measure group (labeled 'X' = 6'), a 3-measure group (labeled 'Y' = 3'), a 6-measure group (labeled 'X' = 6'), a 3-measure group (labeled 'Y' = 3'), and a 6-measure group (labeled 'X' = 6'). A large bracket below the bottom staff is labeled 'half duration sub-mora'.

Figure 14: Sub-mora from "Ignominy!", CD3 Track 2 (2:38)

In my improvisation on this piece I was able to perform another sub-mora which I had been exploring in my practice sessions. This figure is derived from a mora structured **10 - 4 - 10 - 4 - 10** which is then reshaped to accommodate a half duration sub-mora structured **5 - 2 - 5 - 2 - 5**.

*half duration sub-mora*

Figure 15: Sub-mora from "Ignominy!", CD3 Track 2 (1:33)

This treatment of moras is particularly compelling as the recycling of the core material provides cohesion while simultaneously producing a thrilling effect of propulsion through the short, halved phrases. It also expands the already vast field of possible new phrases accessible through application of the mora device.

There are also applications for this rhythmic device if we consider the ratio of  $X - Y - X - Y - X$  over a greater duration. I developed two applications of this, both of which involve a blues structure as a vehicle. This feels like a natural application as the structure of a 12 bar blues can be seen as three lines of 4 bars which roughly equates to the threefold shape of a mora.

In my piece "Mora Blues" (CD2, Track 1) the solo section was notated with the following suggestion for phrase length:

The figure consists of three musical staves, each representing a 12-bar blues solo structure. The first staff shows a progression of F<sup>7</sup>, B<sup>b7</sup>, and F<sup>7</sup> over the first 12 bars, with a Y phrase of 6 beats starting at bar 13. The second staff shows a progression of B<sup>b7</sup>, F<sup>7</sup>, B<sup>m7</sup>, B<sup>bm7</sup>, and A<sup>m7</sup> over the first 12 bars, with a Y phrase of 6 beats starting at bar 13. The third staff shows a progression of G<sup>m7</sup>, C<sup>7</sup>, F<sup>7</sup>, and F<sup>7</sup> over the first 12 bars, with a Y phrase of 6 beats starting at bar 13. In all cases, the X phrase is 12 beats and the Y phrase is 6 beats.

Figure 16: Solo structure as presented to soloist within arrangement

The above figure shows the entire twelve bar blues form divided up in the ratio of a mora. In this mora (Mora 7c in the Index) we have the number pattern of *12 - 6 - 12 - 6 - 12* applied to beats as opposed to individual beat partials. This gives us an interesting, logical shape to an entire twelve bar blues chorus, not just an individual phrase. In rehearsal, the ensemble decided to use this idea to signal the end of improvising for a given soloist. My own final chorus is notated below; in the spontaneity of the improvisation I expressed the twelve beat phrase as groups of dotted quarter notes and leaving gaps to signify the Y phrase.

X = 12 beats

Y = 6 beats

X = 12 beats

Y = 6 beats

X = 12 beats

into drum solo....

Figure 17: Long phrasing mora from "Mora Blues", CD2 Track 1 (6:00)

I used another application of long form moras on my arrangement of “Freddie Freeloader”, part of “Khanda Blue Suite” (CD2, Track 3). This arrangement of the classic Miles Davis piece reshapes the melody in 5/4 with an underlying “swung eighths” triplet feel.

The musical score is presented in three systems, each with a treble and bass staff. The first system is labeled with 'X = 28' above the treble staff and 'Y = 3' above the bass staff. The second system is labeled with 'X = 28' above the treble staff and 'Y = 3' above the bass staff. The third system is labeled with 'X = 28' above the treble staff. The music is in 5/4 time and features a key signature of two flats. It includes various rhythmic patterns, including triplets and slurs. The first system shows a melodic line in the treble clef and a bass line in the bass clef. The second system continues the melodic line in the treble clef and the bass line in the bass clef. The third system continues the melodic line in the treble clef and the bass line in the bass clef.

Figure 18: Mora from "Khanda Blue Suite", CD2 Track 3 (7:08)

The duration of this mora is 90 triplets and corresponds in this context to 6 bars of 5/4. It is especially of interest as it functions as a displacement exercise similar to those found in the solkattu books by both Sankaran and Nelson. We can see in the above figure that the X phrase begins on the first beat in the first line, then the second triplet on the second line and the third triplet on the third line. The next logical starting point if we follow the pattern is on the beat again. So we can now see that the Y phrase has been positioned such that it has generated all possible starting points for the subsequent X phrases.

## Chapter Two: Gopucca Yati and Srotovaha Yati

### Definition

This chapter examines the general principle of orderly expansion and reduction through the prism of the Carnatic rhythmic devices known as gopucca yati and srotovaha yati. Yati is a term that refers to the general shape or contour of a given phrase of which gopucca and srotovaha are specific types. Nelson's definitions are as follows:

gopucca yati - a rhythmic shape characterized by the orderly reduction of pulse totals of successive phrases.

srotovaha yati - a rhythmic shape in which phrases go from short to long. (Nelson 1991, pp. xiv-xvi)

Sankaran elaborates further and gives insight into the meaning behind the names:

A rhythmic or melodic pattern in which each succeeding phrase becomes shorter and shorter is known as gopucca yati. 'Gopucca' (literally 'cow's tail'), is used as an example to illustrate a pattern of decreasing lengths from the beginning to end. In other words, reduction or diminution. (Sankaran 1994, p. 29)

Srotovaha (lit. 'stream becoming a river', 'moving like a current') is a pattern in which each succeeding phrase becomes longer and longer (i.e., the opposite of gopucca). (Sankaran 1994, p. 30)

Although this simple idea of orderly expansion and reduction is not entirely unique to Carnatic music, it is clear that it has been developed to such a nuanced degree as to become one of the central pillars of the rhythmic approach. It is certainly rare to see such evidence in Western music.<sup>5</sup>

Gopucca and srotovaha are present in even the simplest exercises in Nelson's *Solkattu Manual*. For example, the exercise presented below is built around a mora designed to familiarise the student with displacement and srotavaha phrasing (in *Solkattu Manual* the exercise is presented in phonetic language which I have converted into standard notation below):

The figure shows three staves of musical notation in 3/4 time, representing the Gopucca exercise. The notation is written on a treble clef staff with a 3/4 time signature. The notes are marked with accents (>) and slurs. Above the notes, phonetic labels are provided: "Ta ki ta", "Ta ki ta", "Ta ki ta", "Ta ki ta" (tam), "Ta ki ta", "Ta ki ta", "Ta ki ta", "Ta ki ta" (tam), "Ta ki ta", "Ta ki ta", "Ta ki ta", "Ta ki ta" (tam). The exercise consists of a sequence of rhythmic patterns that gradually reduce in complexity, starting with a full mora and ending with a single note.

Figure 19: Gopucca (orderly reduction)

<sup>5</sup> Quentin Angus discusses augmentation and diminution of groupings in his thesis where he cites a Brazilian exercise from Jose Eduardo Gramani's book *Ritmica* which makes use of "additive" phrases similar to the Carnatic approach. He also includes four excerpts from Gilad Hekselman and Angus' own improvisations which include reduction groupings (Angus, 2008, pp. 62-64).

In this example, we can observe a three note figure (Ta - ki - ta) being repeated with increasingly diminishing durations. That resultant phrase is then repeated three times with gaps separating the reiterations, making the entire passage into a mora (as discussed in Chapter One). Here is the reduction pattern in isolation:

The musical notation shows a treble clef in 3/4 time. The phrase "Ta ki ta" is repeated four times. The first iteration consists of three notes, each with a duration of 4 sixteenth notes. The second iteration consists of three notes, each with a duration of 3 sixteenth notes. The third iteration consists of three notes, each with a duration of 2 sixteenth notes. The fourth iteration consists of three notes, each with a duration of 1 sixteenth note. The notes are marked with 'x' and have decreasing durations. The phrase is labeled "Ta ki ta" (tam) at the end. Below the staff, there are four brackets labeled ④, ③, ②, and ①, indicating the duration of each iteration in terms of sixteenth notes.

Figure 20: Gopucca phrase isolated

In the first iteration of the “Ta - ki - ta” phrase the three notes are each 4 sixteenth notes in length. In the second phrase the duration of the notes reduces to 3 sixteenth notes in length, then 2 sixteenths, and finally the third phrase is reduced to 1 sixteenth note for each of the three notes.

In his dissertation *Mrdanga Mind: The tani avartanam in Karnatak music*, Nelson discusses the use of the concepts of gopucca and srotovaha as applied to the topic of Chapter One of this thesis, moras. He writes:

The rules for orderly expansion/contraction of ‘x’ figures are quite straightforward. In general, they may be reduced to the following single rule: For three different values for ‘x’ in a single mora, ‘x<sub>1</sub>’, ‘x<sub>2</sub>’ and ‘x<sub>3</sub>’, the difference in pulses between ‘x<sub>1</sub>’ and ‘x<sub>2</sub>’ must equal the difference in pulses between ‘x<sub>2</sub>’ and ‘x<sub>3</sub>’, as indicated by the following formula.

$$x_1 - x_2 = x_2 - x_3$$

(Nelson 1991, p. 51)

He then gives the following mora as a starting point:

$$5 - (0) - 5 - (0) - 5$$

Next he converts it by adding one to the second X phrase and two to the second rendering it as follows:

$$5 - (0) - 6 - (0) - 7$$

This converted phrase can still be regarded as a mora provided the shape of the initial X phrase is preserved while appearing to have been stretched or elongated.

### **Use in Contemporary Jazz**

New York based guitarist Tom Chang is a currently active performer who has implemented some aspects of Carnatic rhythmic devices in his jazz writing. On CD1 you can find my arrangement of his piece “Tongue and Groove” which contains a very clear rendering of a Carnatic pattern almost identical to the construction of the initial Nelson exercise. In the notation below we can see a phrase of five distinct pitches, each of which are 4 sixteenth notes in duration to begin with. The five note phrase then sheds 1 sixteenth note in each repetition concluding with a rapid single sixteenth note run:

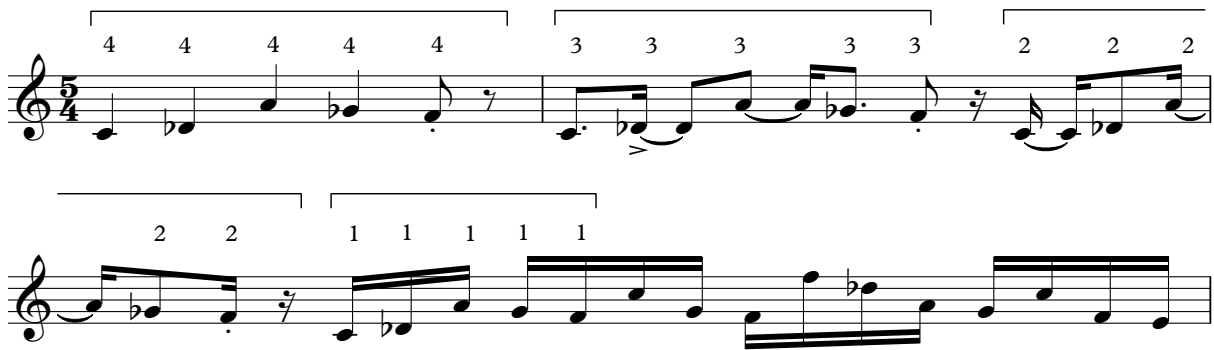


Figure 21: Gopucca phrase from "Tongue and Groove", CD1 Track 8 (0:02)

We can confidently say that this is an example of orderly reduction as the five pitches are consistent, as is the articulation (each individual phrase is written as four long notes and one short one to finish). This clearly gives us the idea of the phrase systematically diminishing in length.<sup>6</sup>

In Wren's piece "Tisra Jati Tripura", we observe several very inventive uses of gopucca in the context of a 7/4 meter. All of the following examples are based on the following specific mathematical phenomenon:

$$1 + 2 + 3 + 4 + 5 + 6 + 7 = 28$$

<sup>6</sup> In *Solkattu Manual* Nelson expands his 3/4 exercise to 5/4, 7/4 and 9/4 by increasing the notes in the initial phrase and adjusting the length of the separating note 'tam'. For example, to convert the phrase to 5/4, he turns 'Ta ki ta' into 'Ta ka Ta ki ta' and changes the 3 partial 'tam' into a 5 partial note. By expanding all of these elements simultaneously and recalibrating our meter to 5/4, the exercise still takes eight bars to play out and resolves on the first beat of the ninth bar. Chang's melody can be seen as an exact match for the first third of this exercise.

The correlation can be made that the sum of numbers 1 to 7 is divisible by 7 and conveniently correspond to two bars of 7/4 with an underlying subdivision of sixteenth notes. The clearest realisation of this appears towards the end of the piece:

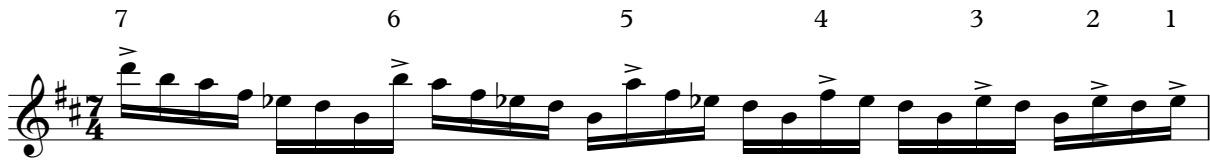


Figure 22: Gopucca phrase from "Tisra Jati Triputa", CD1 Track 2 (5:27)

Here we can see the pattern unambiguously as a sequential reduction of the long 7 partial phrase resulting eventually in a single sixteenth note. The note choice is derived from a process of removing one note at a time from the beginning of the initial seven note pentatonic phrase. This single idea becomes fodder for ensuing variations showing the flexibility of the principle in general. The phrase which follows this first statement of the idea is:

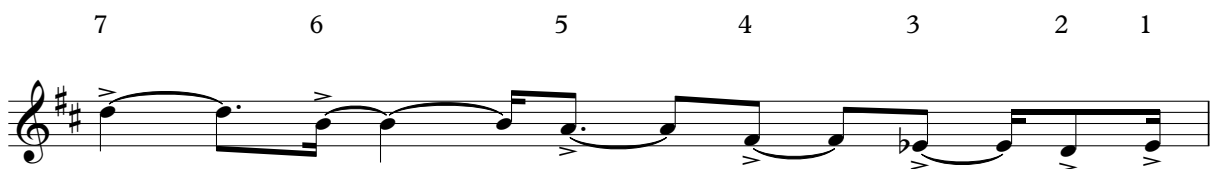


Figure 23: Gopucca phrase from "Tisra Jati Triputa", CD1 Track 2 (5:38)

Here we can see the number pattern firmly in place but this time it has been interpreted as long tones in contrast to the constant sixteenth notes in the first statement. In this example we see the mathematical beauty presenting itself in another way as there are seven notes in the phrase which tangentially recalls the 7/4 meter which underpins the entire piece.

Once the mathematical happenstance of the suitability of this shape to the 7/4 meter has been noted, it can be extrapolated to create phrases with a duration greater than one bar. In the next phrase Wren doubles the pattern by playing two of each of the above notes, repeating them one after the other in a manner seen in the following notation:

7        7            6        6            5        5            4        4            3        3            2        2            1        1

Figure 24: Gopucca phrase from "Tisra Jati Tripata", CD1 Track 2 (5:50)

Looking at the numbers across the top of the staff we can see a very logical shape, but the resultant accents created are exotic and curious. Wren continues with yet further variations on the sequence which, though not discussed here for reasons of brevity, can be observed on the full score in the Appendix.

In all of the given examples the resultant aural impression is that of an underpinning logic that suggests the shape of the phrase as it unfolds and an irresistible snowball effect which drives towards the resolution point. I would also posit that even though the calculations involved may seem overly mathematical and laborious, the notion of a phrase getting progressively shorter is simple to grasp, even for a listener not familiar with this language.

In my research of contemporary jazz musicians, I uncovered several examples gopucca and srotovaha as applied to moras. In Rodgers piece "Viv's Bum Dance" (CD1, Track 5) we can observe the incidence of an expanding mora structured *15 - (0) - 21 - (0) - 27*:

Figure 25: Srotovaha phrase from "Viv's Bum Dance", CD1 Track 5 (4:43)

In the above notation we can see a mora of the second category which meets the conditions of orderly expansion as prescribed by Nelson (the difference between  $X$  and  $X'$  and the difference between  $X'$  and  $X''$  is six in both cases). It is interesting to see the way in which the expansion has been sculpted such that we maintain continuity of the intention of the phrase throughout the stretching process. In this case the main cell is a five note phrase constructed from an arpeggio consisting of a minor third followed by a perfect fourth (we could also regard this as the first inversion of a major chord). Across the repetitions Rodgers transposes the cell purely chromatically lending it cohesion but with added interest and drama. The five note cell is repeated (with constant transposition) three times in the first  $X$  phrase, then expanded to three groups of seven for the  $X'$  phrase and finally three groups of nine for the  $X''$  phrase. The notation below shows the five note cell in isolation and its converted forms as a 7 partial and 9 partial phrase:



Figure 26: Isolated cells showing individual phrases

Notice that the 9 partial phrase has actually been added to: there are two extra notes, but since they are still part of the arpeggio the idea of the phrase is maintained.

The second mora we will look at from this piece shows us another use of this mora treatment with another level of complexity woven in. This time the mora is of the structure **9 - 3 - 12 - 3 - 15** and we should be familiar enough with the process now to see that the phrase construction adheres to the guidelines of orderly expansion perfectly. This mora can be seen as an extension of the mora analysed previously, in that it is based on expanding groups of three repetitions. This time, however, Rodgers has added a Y phrase so we are not looking at a simple triple repetition of the X phrase and the note choice is scalar, not triadic:

The figure shows two staves of musical notation. The first staff contains a sequence of notes with a treble clef and a key signature of one flat (Bb). Above the staff, there are four bracketed groups: the first group is labeled 'X = 9' and contains three groups of three notes each; the second group is labeled 'Y = 3' and contains three notes; the third group is labeled 'X' = 12' and contains three groups of four notes each; the fourth group is labeled 'Y = 3' and contains three notes. The second staff contains a sequence of notes with a treble clef and a key signature of one flat. Above the staff, there is one large bracketed group labeled 'X'' = 15' which contains three groups of five notes each.

Figure 27: Srotovaha phrase from "Viv's Bum Dance", CD1 Track 5 (2:50)

In this excerpt Rodgers is using notes from the Bb Phrygian mode systematically expressed through a pattern which climbs the scale degrees sequentially. This is continued in the X' phrase, though with four notes instead of three and eventually expanding to a five note pattern in the X'' phrase. The notation below provides the cells in isolation:

The figure shows three staves of musical notation, each with a treble clef and a key signature of one flat (Bb). The first staff shows a group of three notes with a bracket above it labeled '3'. The second staff shows a group of four notes with a bracket above it labeled '4'. The third staff shows a group of five notes with a bracket above it labeled '5'.

Figure 28: Isolated cells showing individual phrases

Rodgers' innovation here is to continue the scale pattern across the entire mora and not to begin each successive X phrase on the same note. Compared to the first mora we looked at in Figure 7, which features clear repetition of the X phrase, this mora provides a more nuanced interpretation of the underlying number structure and one which incorporates the more usual seven note modes with which western music (and by extension jazz) is constantly grappling.

### Further Application

I found several ways to employ the general principles of gopucca and srotovaha in this thesis. In my arrangement of Charlie Parker's "Ornithology" (CD2, Track 5) I took the following passage with its regular groups of 4 eighth notes and reshaped it with the overarching intention of expansion.

The image shows two musical staves in 4/4 time. The top staff, labeled 'Original', contains a melodic line with four groups of four eighth notes, each group bracketed and labeled with the number '4'. The bottom staff, labeled 'Srotovaha', shows the same melodic line but with the groups expanded: the first group is 4 eighth notes, the second is 5, the third is 6, and the fourth is 7 eighth notes. Each group is bracketed and labeled with its respective count.

Figure 29: Original phrase and converted srotovaha phrase from "Ornithology", CD2 Track 5 (0:53)

The arpeggios were expanded systematically by adding a single eighth note to each four beat phrase. The effect is an enjoyable, unpredictably accented tumble towards the resolution point.

Taking inspiration from Wren’s exploration of the [7 - 6 - 5 - 4 - 3 - 2 - 1] pattern discussed earlier in this chapter, I decided to look for long number patterns which would align with common bar lengths.<sup>7</sup> The following sequence was settled on to construct the melody for my original piece, “Mora Blues” (CD2, Track 1).

3      4      5      6      7      8      9

When the sum of these numbers (42) is divided by 3 the result is 14, which we can relate to fourteen beats with an underlying triplet subdivision (i.e. a jazz swing feel). I notated the phrase, allowed the resultant figures to dictate the time signature changes and decided to have the phrase shrink again after the 9 partial note and play the pattern in reverse. This process yielded the following phrase:

Srotovaha

3      4      5      6      7      8      9

Gopucca

8      7      6      5      4      3

Figure 30: Srotovaha and gopucca phrases from "Mora Blues", CD2 Track 1 (0:20)

This ostinato was used as an introduction and ending to the piece. When performing this section, the accompanying instruments (especially the drummer) could create very interesting

<sup>7</sup> This is essentially the same process as establishing “target numbers” in the Index of Useful Moras discussed in Chapter One.

moments by choosing to play the underlying pulse or to phrase with the expansion and reduction. Whenever the latter option was taken, the effect of the shape was very strong and satisfying. I feel this is very fertile ground for shaping improvisation through a rhythmic framework.

“Mora Blues” then evolves into a regular twelve bar blues in 4/4 at the same tempo. The first eight bars of the melody have been discussed in Chapter One, leaving us with the remaining four bars to analyse in the context of srotovaha. Using the same number pattern as above, a starting point within the four bars was derived such that the pattern would resolve on the first beat of the next bar (which is the beginning of the next twelve bar form). Because the entire pattern is fourteen beats in duration, the pattern has to start on beat two of the first of the four bars. The pitches were altered from the introduction to change the character from mellow to jagged. The phrase is notated below:



Figure 31: Srotovaha phrase from "Mora Blues", CD2 Track 1 (1:09)

In my piece “Ignominy!” (CD3, Track 2), I took this technique a step further and attempted to incorporate scalar movement using Rodgers’ approach as a starting point. I began with a cell comprised of two parts and added to these halves systematically with each repeat. This initial cell can be conceived as a sixteenth note followed by an eighth note. With each successive iteration of the phrase a sixteenth note is added to the first half of the phrase and

an eighth note to the second. This process was repeated three more times resulting in a five-part expansion phrase. The individual phrases can be notated in isolation as follows:

Figure 32: Isolated cells showing individual phrases

If we look at the total sixteenth note duration of each phrase we end up with the following overarching number pattern:

3      6      9      12      15

The phrase in this context appears as follows in the score:

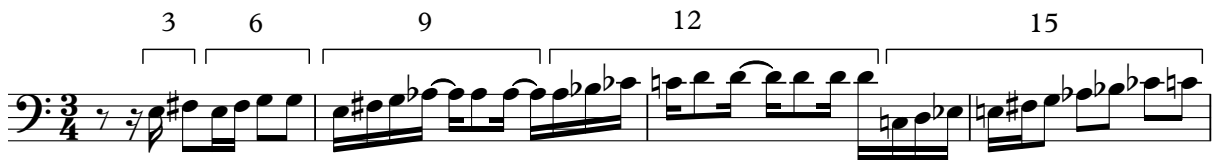


Figure 33: Srotovaha phrase from "Ignominy!", CD3 Track 2 (0:15)

The inspiration of Rodgers can be seen through the scalar contour. In this excerpt I chose not to continually reset the phrase by always dropping back to the same low note. Indeed, between the 9 partial and 12 partial phrase the scale continues to climb, obscuring the pattern slightly.

The same number pattern was interpreted differently again in the next part of the melody.

Here are the constituent parts in isolation:

The image shows five separate musical staves in bass clef, 3/4 time, each showing a different phrase from the main excerpt in isolation. The key signature has one sharp (F#).  
 - The first staff is labeled '3' and shows a triplet of eighth notes.  
 - The second staff is labeled '6' and shows a sixteenth-note triplet followed by a quarter note.  
 - The third staff is labeled '9' and shows a triplet of eighth notes followed by a quarter note.  
 - The fourth staff is labeled '12' and shows a quarter note followed by an eighth-note triplet.  
 - The fifth staff is labeled '15' and shows a quarter note followed by an eighth-note triplet.

Figure 34: Isolated cells showing individual phrases

With this passage the internal structure of each phrase is the same as in the previous example except the first of every pair is represented by a single note where the second features the underlying sixteenth notes fully articulated. Although this results in an altogether different melody, it is of exactly the same duration as the prior example and as such it also commences on the fourth sixteenth note of beat one:



Figure 35: Srotovaha phrase from "Ignominy!", CD3 Track 2 (0:30)

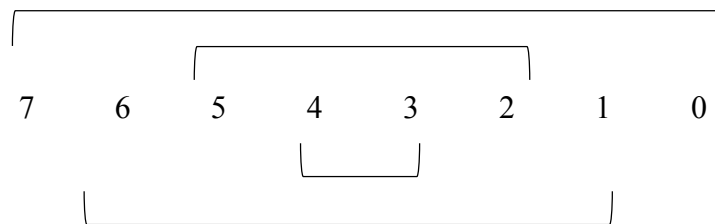
Once again, the line was crafted somewhat organically in terms of the contour while adhering strictly to the underlying grouping. These experiments with gopucca/srotovaha yielded new and interesting melodies in a contemporary jazz context. It was a flexible enough idea to reshape a bebop melody ("Ornithology") and provide exotically rendered ostinatos to improvise around, and was performed by a group with a jazz background and no training in solkattu.

The use of these additive patterns can be difficult to formalise as the mathematics which underpins them is more complicated than some of the other devices analysed in this thesis, and as such I would offer the following guidelines. After selecting an expansion/reduction sequence, the performer or composer should draw correlations between useful numbers for rhythmic contexts in a given repertoire and observe the ways which the expansion or reduction can be interpreted. Even with the same number pattern you can create many different phrases depending on the choice of long and short notes and of course the meta-structure created through the implied harmony of note choices for the phrase.

We can also observe a transferable characteristic of the number sequence that seeds the variations within “Tisra Jati Triputa”:

7      6      5      4      3      2      1

It is a seven note pattern, beginning with a seven note phrase that fits two bars of 7/4. The principle which needs to be underlined is clear when we look at the middle pair of the group, 4 and 3. The sum of this pair is 7. If we proceed to pair up numbers either side of these numbers, we find all pairs add up to 7 (accepting that 7 is paired with a 0).



We can take from this that the following reduction patterns are all divisible by 7:

7      6      5      4      3      2      1      (0) = **28**  
       6      5      4      3      2      1 = **21**  
           5      4      3      2      = **14**

These are useful patterns when contemplating material for 7/4 phrasing, as 28 and 14 can be easily translated into sixteenth notes and 21 can be conceived as triplets and result in whole bars in this context.

We can carry this idea over phrases with 5 and 9 partials as a focus and generate the following strings of numbers:

$$\begin{array}{cccccc} 5 & 4 & 3 & 2 & 1 & (0) = \mathbf{15} \\ & 4 & 3 & 2 & 1 & = \mathbf{10} \end{array}$$

$$\begin{array}{cccccccccc} 9 & 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 & (0) = \mathbf{45} \\ & 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 & = \mathbf{36} \\ & & 7 & 6 & 5 & 4 & 3 & 2 & 1 & = \mathbf{27} \\ & & & 6 & 5 & 4 & 3 & 2 & 1 & = \mathbf{18} \end{array}$$

There is potential to follow the trajectory of this idea to incorporate longer durations in the future.<sup>8</sup>

In my own exploration of gopucca and srotovaha as they relate to moras, I found it useful to rework Nelson's description (outlined earlier in this chapter) as follows. If we begin with a mora which is suitably filling out a useful duration, then we can convert it through a technique of "borrowing" partials from one X phrase to another. For example:

$$\mathbf{6 - 1 - 6 - 1 - 6}$$

can become:

---

<sup>8</sup> I employed orderly expansion in a lateral way when composing "Bat Tricks" (CD3, Track 7) where the melody itself is based on expanding intervals. Full analysis can be found in the Appendix.

*5 - 1 - 6 - 1 - 7*

The treatment can be summed up by stating that the first X phrase has relinquished one of its partials which has been added to the last X phrase (the central X phrase remains unchanged). This slight change of perspective facilitates an opportunity for the performer to take an existing phrase and reimagine it in a way that incorporates expansion (or reduction) yet maintains the same duration.

With this process in mind, I decided to addend my Index of Useful Moras by giving an example of a converted mora for each entry. For example, following the regular examples of Mora 5b, the index offers another interpretation using the expansion technique.



Figure 36: *Srotovaha* applied to mora

In this example Mora 5b has been remodelled from its initial shape of *8 - 1 - 8 - 1 - 8* to a converted version structured *7 - 1 - 8 - 1 - 9*. This process opened up an entirely new catalogue of phrases to be introduced to the jazz vocabulary as fodder for my improvisation.

When preparing for improvisation on Sherriff's "Pentacle" (CD1), I selected a mora that would be suitable for the 5/8 meter of the piece. Mora 6a has a target number of 40 (which equates to four 5/8 bars with an underlying sixteenth note subdivision) and a structure of *12 - 2 - 12 - 2 - 12*. The permutation that I listed in the Index of Useful Moras borrows 3 partials

from  $X''$  and adds it to  $X$  resulting in a reduction design of  $15 - 2 - 12 - 2 - 9$ . I chose to interpret this as three groups of three pitches which diminish by one sixteenth note with each repetition of  $X$  as we can see from the following excerpt:

The musical notation consists of two staves in 5/8 time. The first staff shows three groups of three notes, each with a '5' above it, and a bracket above labeled  $X = 15$ . The second staff shows two groups of three notes, each with a '3' above it, and a bracket above labeled  $X'' = 9$ . There are also brackets labeled  $Y = 2$  above the first and second groups of notes in both staves.

Figure 37: Srotovaha mora from "Pentacle", CD1 Track 1 (4:19)

When preparing for improvising on my 5/4 arrangement of "All Blues" (part of "Khanda Blue Suite") (CD2 Track 3) I reshaped Mora 1a (the shortest mora in the index with a target number of 20, structured  $6 - 1 - 6 - 1 - 6$ ) into an expansion phrase by taking 3 eighth notes from  $X$  and adding them to  $X''$ . This created the following phrase, which I feel has an oblique shape but is nonetheless sweet and joyous when heard in context.

The musical notation shows a single staff in 5/4 time with five groups of notes: a group of three notes with  $X = 3$  above, a single note with  $Y = 1$  above, a group of six notes with  $X' = 6$  above, a single note with  $Y = 1$  above, and a group of nine notes with  $X'' = 9$  above. Brackets connect these groups to form a single expansion phrase.

Figure 38: Srotovaha mora from "Khanda Blue Suite", CD2 Track 3 (11:17)

Finally, in my improvisation on "Tisra Jati Tripura" I executed the following passage containing an expansion mora:

Figure 39: Two identical moras followed by related srotovaha mora from "Tisra Jati Triputa", CD1 Track 2 (1:01)

In this excerpt I chose to set up the expectation of the expansion mora by first playing two versions of the original untreated mora. This initial mora is structured 7 - (0) - 7 - (0) - 7 which is then converted to 5 - (0) - 7 - (0) - 9 through the borrowing technique.<sup>9</sup>

This interrogation of the gopucca yati and srotovaha yati has yielded exciting possibilities for phrase structure. The common practices of stacking up sequentially increasing and decreasing groupings have been elucidated and examples of how they might be integrated into a jazz context have been given. This particular rhythmic device was also immediately intertwined with the topic of Chapter One, the mora. As we progress through the chapters of the exegesis this weaving together of the devices will continue, each one colliding with, affecting and enhancing the last.

<sup>9</sup> It is possible to view the first five bars of this passage as a mora in itself, where the mora that we are analyzing makes up the X phrase of a larger mora. This is what Nelson describes as a "compound mora" (Nelson 1991, p. 53).

## Chapter Three: Korvai

### Definition

This chapter explores the large cadential device known as a korvai. The word korvai is a Tamil word meaning “strung together” and usually consists of two parts (Sankaran 1994, p. 63). Nelson describes to this “Two-part korvai” as consisting of a first section derived from some form of orderly reduction, expansion or repetition and a second section comprised of a mora (Nelson 1991, p. 69).<sup>10</sup> The overall duration of the korvai should be related to the piece which is being performed (i.e. an amount that corresponds to the length of a section).

Nelson gives a basic example of a korvai in phonetic solkattu which I have represented in standard notation below as sixteenth notes (Nelson 1994, p. 70):

The figure shows two musical staves representing a simple korvai. The first staff, labeled 'section one (orderly reduction)', contains three groups of notes with durations of 4, 5, and 6 notes respectively, followed by a final note. The notes are 'ta', 'tam', 'ta', 'ka', 'tam', 'ta', 'ki', 'ta', 'tam', and 'ta'. The second staff, labeled 'section two (mora)', contains three groups of notes with durations of X=5, Y=1, and X=5 notes respectively. The notes are 'din', 'gi', 'na', 'tom', 'ta', 'din', 'gi', 'na', 'tom', 'ta', 'di', 'gi', 'na', 'tom'.

Figure 40: Simple korvai

<sup>10</sup> Nelson gives an excellent overview of the broader use of the term “korvai” in his dissertation including structures more complex than the “two-part” design (Nelson 1991, p. 69).

Here we can see section one with a duration of 15 sixteenth notes comprised of three phrases of increasing length [4 - 5 - 6] followed by section two, a 17 partial mora designed to round out the entire korvai to be the length of two bars of 4/4. This korvai is particularly short but serves as a simple illustration of the underlying principle.

As with the mora device, a korvai is often used as section marker (Nelson 1991, p. 89) and can quite commonly be played in several different subdivisions consecutively (Sankaran 1994, p. 63). Because of this treatment it can be an excellent bridging tool to modulate from one subdivision to another (Nelson 1991, p. 91).

### **Use in Contemporary Jazz**

In my research I discovered several instances of korvais in the work of Sandy Evans (“The Sacred Cow’s Tail”) and Toby Wren.<sup>11</sup>

In Wren’s piece “Blues for Palghat Ragu”, the korvai structure is employed to reshape the target number of 96 in myriad ways (in this the target number relates to six bar sections in 4/4, containing 96 sixteenth notes). In this piece Wren presents us with three korvais of this duration (and another of eight bars in length) as well as three other expansion designs which are also of the same length.<sup>12</sup> Wren based all interludes on korvais created by percussionist Palghat Ragu, to whom the piece is dedicated. They are all based on the same chord progression and are used as interludes between sections of improvisation. My version of the

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<sup>11</sup> The korvai from Evans’ piece can be found with accompanying analysis on the score for “The Sacred Cow’s Tail” provided in the Appendix. This short korvai is repeated three times which is a common way to perform this rhythmic device in the Carnatic tradition (Sankaran, 1994, p. 63).

<sup>12</sup> Only three korvais from this piece are analysed here in the exegesis but full analysis of all korvais is provided on the score for “Blues for Palghat Ragu” in the Appendix.

piece was performed as a duet with violinist Julian Ferraretto and can be found on CD2. The first korvai of the piece is notated below:

12 2 8 2 12

section one (*orderly expansion*)

2 8 2 12

2 + 2

2 X = 8 Y = 2 X = 8 Y = 2 X = 8

section two (*mora*)

Figure 41: Korvai from "Blues For Palghat Raghu", CD1 Track 3 (0:49)

For clarity, the expanding part of section one is demarcated with a box to distinguish it from the stable part of the design. This structure can be also conceptualised in a number diagram as follows:

$$\begin{array}{r}
 12 (2) 8 (2) \\
 2 \quad 12 (2) 8 (2) \\
 2 \quad 2 \quad 12 (2) \mathbf{8 - 2 - 8 - 2 - 8} = \mathbf{96}
 \end{array}$$

(N.B. for all korvai diagrams henceforth I will distinguish the mora with the use of bold italics.)

When viewed in this manner the elegant shape of the phrase is more easily recognisable and I found over time that it was useful to see these number diagrams alongside the standard notation when preparing the material.

It should be observed how the number pattern has been realised in terms of phrases. For example, there are several different occurrences of the number 2 in the pattern but they are not all rendered the same: neither are they completely random. There are three distinct interpretations of the 2 duration: one is a quarter note low B, one is a quarter note high E and the last one is expressed as 2 sixteenth note Ds. This is key to understanding how to expand on the raw material of a number diagram, which can at first appear too clinical.

One very pleasing aspect of this korvai is the way that the material used in section one is recycled in section two. We can see from the notation that the 8 (2) part of the first line later takes on the role of the first X and Y phrases in the concluding mora. For that reason we can understand why the phrase is written out as 8 (2) and not simply 10: it needs to be seen to be broken into its constituent parts to construct the mora.

Another 96 partial korvai from “Blues for Palghat Ragu” and its corresponding number diagram is presented below:



25

20

15

10

5

...which equals 75, leaving the remaining 21 partials of the total 96 to be crafted into a mora. This korvai has a simpler structure in many ways as the mora is completely separate from the first section and does not share the tail end of the concluding phrase to use as its X phrase as we saw in the first two korvais. The mora is a simple repetition of a 7 partial phrase and as such we recognise it as belonging to Sankaran's second group of classification.

The last korvai we will look at from this piece is the aforementioned 128 partial korvai which spans 8 bars of 4/4, still with an underlying sixteenth note subdivision. It is notated below accompanied by a corresponding number diagram:

section one (*orderly expansion*)

section two (*mora*)

Figure 43: Korvai from "Blues For Palghat Raghu", CD1 Track 3 (1:18)

$$\begin{array}{r}
 12 (3) \\
 4 \quad 2 \quad 12 (3) \\
 4, 4 \quad 2, 2 \quad 12 (3) \\
 12^{(4,4,4)} - 10 - 15 - 10 - 18 = \underline{128}
 \end{array}$$

This is by far the most sophisticated korvai we have examined as it pulls together almost all elements of this thesis examined thus far. Firstly, section one can be viewed as being comprised of the following phrases:

Figure 44: Isolated cells showing individual phrases

Figure 44: Isolated cells showing individual phrases

...and then expressed as:

ABCD

ABCCDD

ABCCC (where CCC is the mora)

This way of viewing the pattern offers the simplest demonstration of the underlying structure.

One of the most elaborate elements of the design is that we have two phrases, C and D, which are being expanded. We can extrapolate that if the mora were not to interrupt the first section then the above pattern would continue to fan out as follows:

ABCD

ABCCDD

ABCCCDDD

ABCCCCDDDD

ABCCCCDDDDD *etc.*

... which is where we hear the phrase logically promulgating into infinity. However, what actually happens is that the systematically tripled C phrase becomes the X phrase of the ensuing mora, effectively shedding the D phrase altogether. As the mora is revealed in the final stage of the korvai, we see that there is a further level of crafting where the mora itself is a srotovaha mora as described in Chapter Two. This mora can be articulated as:

***12 - 10 - 15 - 10 - 18***

... and is a variant on:

***15 - 10 - 15 - 10 - 18***

... where the last X phrase has borrowed 3 partials from the first X phrase. If we examine the individual phrases it is even more clearly seen:

C becomes X

4 + 4 + 4

12



Y

2 10



X'

3 15



X''

4 18



Figure 45: Isolated cells showing individual phrases

It is even more fascinating that the X' and X'' phrases are also harmonic variations on the first X phrase.

In summation, we have section one which expands in an orderly fashion in two ways, then lends the expanded phrase to the mora which in turn continues to expand within the guidelines for expansion of a srotovaha mora. It is quite remarkable that the seed for the eventual concluding phrase is the small C phrase nested in the middle of the initial statement. Furthermore, it is wholly impressive that the whole korvai has an overarching sense of expansion yet still adheres to all the rigorous rules of korvai, mora and srotovaha and meets the useful target number of 128. For this masterful crafting of the korvai device, the credit must go to percussionist Palghat Ragu.

## Further Application

The first korvai that I created for this thesis was incorporated into my arrangement of the Dave Holland piece “The Winding Way” (CD1) and is rendered in the harmonic context of F dorian:

6 9 12

section one (*orderly expansion*)

12 16

20

X = 5 Y = 3 X = 5 Y = 3 X = 5

section two (*mora*)

Figure 46: Korvai from "The Winding Way", CD2 Track 6 (4:34)

One way of expressing the underlying number pattern is as follows:

6 9 12

12 16 20

$5 - 3 - 5 - 3 - 5 = \underline{96}$

... which at first glance looks inconsistent with orderly expansion: specifically, successive groups of twelve. The pattern is more readily apparent if we view it like this:

2 2 2

3 3 3

4 4 4

3 3 3 3

4 4 4 4

5 5 5 5

5 - 3 - 5 - 3 - 5

This is in fact based on a similar design that Wren used on his piece “Kanakku”, though my version is a diminutive of his. It is also worth noting that this korvai has a duration totalling 96 which is the same target number as the earlier examples from Wren’s work. It is testament to the malleability of these devices that such a variety of designs can be generated within seemingly strict guidelines and with an identical target number in mind.

The korvai added an unexpected interlude to “The Winding Way” which was imbued with the adroit systematic phrasing characteristic of the Carnatic rhythmic approach. The inclusion of the korvai was also functional as it was deployed by a soloist to signal the end of improvisation.

My original piece “Bass Etude #1” was based on a korvai which I discovered in Nelson’s dissertation. It is a korvai that he transcribed from a mrdanga solo performed by T.K. Murthy and was presented in the dissertation in phonetic solkattu (Nelson 1991, p. 146). As mentioned in the introduction, I have trained myself in basic solkattu through the books of Nelson and Sankaran (*Solkattu Manual* and *The Art Of Konnakol* respectively) and was able to translate this transcribed korvai into standard western notation. After settling on a harmonic context of the A eight note dominant scale, I constructed the korvai as follows:

Musical notation for section one (orderly reduction). The staff shows a sequence of notes with brackets above indicating groupings of 3, 3, 9, 8, 3, and 9 notes.

section one (*orderly reduction*)

Musical notation for section two (*mora*). The staff shows a sequence of notes with brackets above indicating groupings of 8, 9, and  $X = 22$  notes.

section two (*mora*)

Musical notation for section three. The staff shows a sequence of notes with brackets above indicating groupings of  $Y = 5$  and  $X = 22$  notes.

Musical notation for section four. The staff shows a sequence of notes with brackets above indicating groupings of  $Y = 5$  and  $X = 22$  notes.

Musical notation for section five. The staff shows a sequence of notes with brackets above indicating groupings of  $Y = 5$  and  $X = 22$  notes.


Figure 47: Korvai from "Bass Etude in A", CD3 Track 1 (0:01)

The corresponding number pattern is:

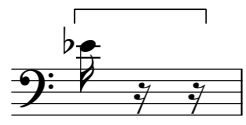
3	3	9	8
	3	9	8
		9	$22^{(8,8,6)} - 5 - 22^{(8,8,6)} - 5 - 22^{(8,8,6)}$

It should be noted that the 8 partial phrase in section one becomes the first of a group of three phrases which make up the 24 partial X phrase of the mora. I chose to interpret the number pattern with the phrases shown below:


A



B



C



D




Figure 48: Isolated cells showing individual phrases

In this context we can see that the phrase is visually more pleasing as:

A	B	C	D
	B	C	D
		C	<i>X - (Y) - X - (Y) - X</i>

Using Wren as a starting point, I was careful to attribute specific phrases to each section so as to differentiate each phrase. The X phrase of the mora is almost a mora in itself as it is comprised of three repetitions of D, although the last repetition is shortened by 2 partials (represented in the following diagram as D').

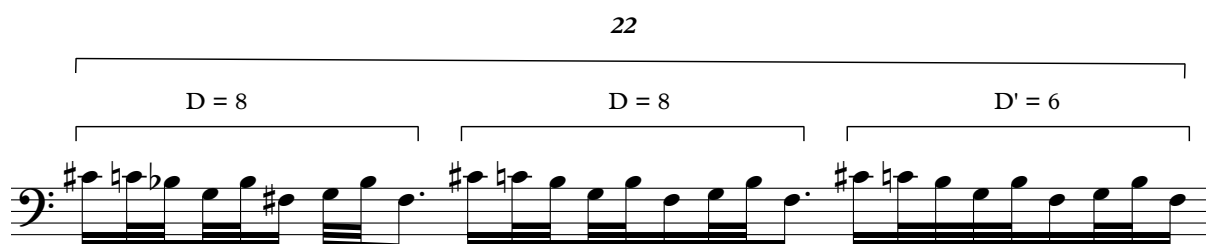


Figure 49: Isolated X phrase

Once again, similar to the 128 partial korvai that we examined earlier in the chapter, the material for the mora is embedded in the opening statement.

Within the process of generating the actual pitched phrases, I chose to transpose the X phrase of the mora with each successive statement. As the piece is based on the symmetrical eight note dominant scale, I was able to achieve an exact transposition of the phrase by raising it a minor third each time without stepping outside of the harmonic framework. Hence the X phrases still sound like they are repetitions and are descriptive of a classic mora shape but with an extra harmonic drive from the note choice.

In my piece “Ignominy!” (CD3) I once again set myself the task of constructing a korvai but with some more sophisticated aims than the one I created earlier for “The Winding Way”: to use a less uniform “phrased based” reduction technique (similar to the korvai just examined in “Bass Etude 1”) and to include a more elaborate mora. This korvai occupies 4 bars in a 3/4 meter giving it (once again) a duration of 96. The korvai in standard notation is provided below:

2      5      2      6      5      2

section one (*orderly reduction*)

6      2      6      X = 18

section two (*mora*)

Y = 3      X = 18

Y = 3      X = 18

Figure 50: Korvai from "Ignominy!", CD3 Track 2 (0:47)

2	5	2	6
	5	2	6
		2	6

$$18 - 3 - 18 - 3 - 18 = \underline{96}$$

In this case I constructed the mora first based on Mora 9b from the Index of Useful Moras with a corresponding target number of 60. It is delineated in the above notations but the individual X and Y phrases are notated below:

X

18

Y

3

2

Figure 51: Isolated cells showing individual phrases

Looking now at the X phrase in isolation, we can see that it is a self-contained reduction design, similar to those discussed in Chapter Two. We can even consider this  $5 - (0) - 6 - (0) - 7$  structure a gopucca mora in its own right, a variation on a mora with a structure of  $6 - (0) - 6 - (0) - 6$ .<sup>13</sup>

<sup>13</sup> Again as in Chapter Two, this could be described as a “compound mora” (Nelson 1991, p. 53).

The 60 partial mora leaves 3 bars of  $3/4$  to sculpt into a reduction design to complete the mora. However as previously stated I wished to construct a section where the reduction was not mathematically pure but rather based on shedding the phrases of a sequence. This was achieved by a trial and error process of rearranging numbers on a piece of paper such that they reached the target number of 36. As we have already seen in the number diagram, section one can be conceived of as:

2	5	2	6
	5	2	6
		2	6

The pattern is fairly clear, however if we take the total duration of each line it makes very little sense indeed, aside from the fact that their sum is 36:

15

13

8

The individual phrases that I crafted are notated below:

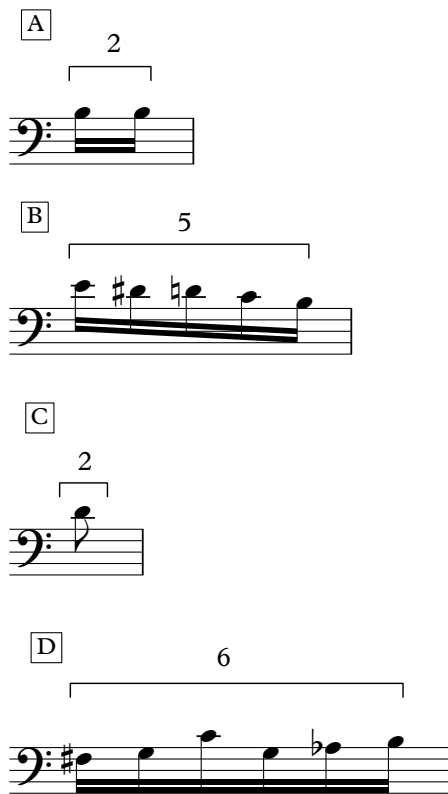


Figure 52: Isolated cells showing individual phrases

In this context the phrasing diagram reads:

A	B	C	D
	B	C	D
		C	D

Once again, in this form the structure is more obvious and we should now have no confusion over the presence of two different interpretations of a 2 partial phrase. Another level of sophistication which I introduced at this stage was to strictly maintain the shape of each phrase, but change the note choice in repetition. For example, the 5 partial B phrase is a descending scale which begins on a different note in its second iteration. This created a smoother overall contour to the entire first section in contrast to the more jagged shape of the

mora in section two. The effect is an intricate passage bubbling over with rhythmic interest and oblique contour, yet one that maintains a sense of homogeneity due to the use of a limited pool of smaller phrases.

This passage incorporates all three of the rhythmic devices discussed thus far, reinforcing the complementary nature of the techniques. Indeed, in the subsequent pages we will be presented with another original korvai enhanced by the focus of that chapter, the concept of nadai. A korvai presents a framework for phrases longer than the mora and hence lends itself to compositional, rather than improvisational, pursuits. The rigorous parameters promote uncommon phrases and encourage the performer to produce hitherto unimagined passages while simultaneously adhering to a workable duration which can be easily inserted into a contemporary jazz context.

## Chapter Four: Nadai

### Definition

In *The Art of Konnakol* (2010), Sankaran offers the reader the following thorough explanation of the Carnatic concept of nadai:

*Nadai* is a Tamil term (*gati* in Sanskrit) which denotes the rate of speed or movement. More specifically it refers to the number and the rate at which the inner pulse divisions move within the tala beats. This can be compared to the Western equivalent concept of duplet, triplet, quintuplet, sextuplet etc. (Sankaran 2010, p. 28)

Nelson succinctly says that the term refers to “subdivisions of beats” (Nelson 1991, p. xiv) which is probably the simplest way for a contemporary jazz performer to comprehend the concept. The five nadais that Sankaran presents as the most important are chatusra (4-to-a-pulse), tisra (3-to-a-pulse), khanda (5-to-a-pulse), misra (7-to-a-pulse) and sankirna (9-to-a-pulse) (Sankaran 2010, p. 28). The following notation illustrates the five nadais in standard notation.

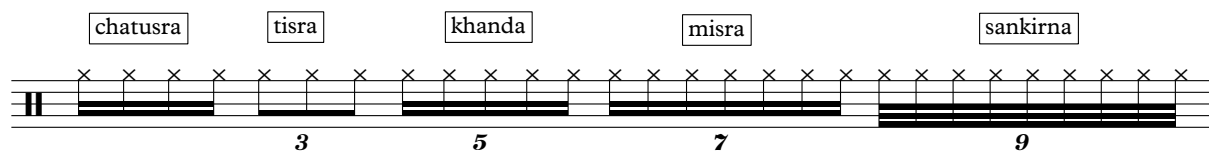


Figure 53: The five nadais of Carnatic music

On the surface this device has precedent within the Western music world (exemplified by the fact that it could be so readily translated into standard notation), though the characteristic way in which it is integrated into performance is specific to Carnatic music.

One major difference in approach is that Carnatic musicians comfortably inhabit the subdivisions of 5, 7 and 9 (which are least common in Western music) and imply the underlying grid with surety and “groove”. Examples of quintuplets can be found in jazz, but they are commonly deployed (as in the Western classical tradition) as a flourish and not a definite shift to a 5-to-a-pulse context.<sup>14</sup> In contrast, Carnatic musicians have developed rhythmic vocabulary within these *nadai* which completely embraces the base groupings less familiar to Western musicians.

A further aspect of *nadai* that this thesis will focus on is what Sankaran refers to as *nadai bedam*, the device of “pulse modulation” (Sankaran 1994, p. 26), which can be seen as switching between subdivisions within the same piece and tempo. Where in a jazz improvisation this may occur for several measures to insert rhythmic diversity, a Carnatic musician will regularly shift subdivision and improvise within it for minutes at a time, constructing a section within the solo distinct from the preceding material. In his description of the structure of a *tani avartanam* (extended percussion solo) Nelson says that the second section of a solo is “likely to include several important transitions, including at least one leading to an exploration of another *gati (nadai)*” (Nelson 1991, p. xvi). It is vital in understanding the improvisations of Carnatic percussionists to recognise that this is a very

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<sup>14</sup> An early example of quintuplets being used in jazz can be found in the appropriately titled Bill Evans piece “Five” from his 1957 album *New Jazz Conceptions*. The melody is constructed entirely from quarter note quintuplets and shows a focused attempt by Evans to integrate this concept into his vocabulary.

common occurrence and that while the phrases may appear to be speeding up the underlying pulse is not changing speed (tempo).

One common transition in Carnatic music is from 4-to-a-pulse to 3-to-a-pulse. This seems to be a shift which is comfortable to many performers of different backgrounds and as we shall see has long been in use in Western music. A clear example of this is found in Nelson's *Solkattu Manual*, where one of the given exercises is a composition attributed to Carnatic percussionist Palani Sri M. Subramania Pillai which the student is asked to perform in a context of 4-to-a-pulse, then 6-to-a-pulse and finally 8-to-a-pulse (effectively double time of the first 4-to-a-pulse iteration) (Nelson 2008, pp. 58-60). In the explanation of this exercise, Nelson has this to say under his own heading "Tisra Nadai and the Notion of "Triplets" in European Music":

When we change to three- or six-pulse divisions.... we do so over a constant *tala*.

This means that the rate of the pulses slows down from four to three, or speeds up from four to six, within each regular beat. The phrases, however, retain their quadruple shapes and accents; they therefore generate tension with the three- or six-pulse beats.

Tisra nadai, then is not quite the same as the *triplet* in European music, where the phrases take on the shape of the three-pulse beat, *one two three, one two three*, and so on. In order to speak or play comfortably in tisra nadai, we need to be able to feel the entire *cycle* as it is divided into thirds. (Nelson 2008, pp. 58-59)

Examples later in this chapter will show some simple elaborations on this idea, but for this introductory section I will focus on one specific and ingenious use of this device.

In Nelson's analysis of the tani avartanam attributed to percussionist Ramabhadran, he describes a *korvai* that is played three times in chatusra, then a slow tisra followed by a fast tisra.<sup>15</sup> As Nelson states in his analysis "[I]terally any korvai, and indeed any phrase or composition played three times can be processed in this manner" (Nelson 1991, p. 125). In the "Further Application" part of this chapter I will outline my analysis and application of the underlying mechanics of this device.

### **Use in Contemporary Jazz**

As stated in the introduction, this thesis asserts that the contemporary jazz world has been progressing slowly towards a position where it can absorb the hitherto unattainable rhythmic language of India, especially when it comes to subdividing into 5 and 7. Mark Turner's piece "Brother Sister" (which appears on his 2014 album *Lathe of Heaven*) employs a compositional technique which has strong parallels with the notions of switching nadai. In the piece a simple melody made up of half notes is stated several times by the saxophone while the bass plays (we could even say "walks", to use the jazz vernacular) in the subdivisions of 3, 5 and 7-to-a-pulse. The following notation shows the melody and the three different basslines played by bassist Joe Martin on each repeat:

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<sup>15</sup> The "fast tisra" section can also be conceptualised as 6-to-a-pulse.



The accompaniment provided by the drummer (not transcribed above) adheres mainly to a sparse quarter note beat to leave room for the bass to progress through the subdivisions. As in the Carnatic approach the pulse remains constant: only the density of the subdivision increases. This piece is evidence of the growing comfort and curiosity with the vocabulary of 5 and 7-to-a-pulse within the jazz world.

Toby Wren has also explored this device in his composition “Flood Lines” from the 2015 release *Rich and Famous*. In this composition Wren shifts the tempo using a variety of modulation techniques including a shift from 4-to-a-pulse (sixteenth notes) to 5-to-a-pulse. The following figure shows the preceding bar of 7/4 (with an underlying sixteenth note subdivision) shifting to bars of 5/8:<sup>16</sup>

The figure consists of two systems of musical notation. The first system is in 7/4 time, with a treble staff and a bass staff. The second system is in 5/8 time, with a treble staff and a bass staff. A legend above the second system shows a quarter note followed by five sixteenth notes, with the text "\*5 to a beat (khanda)".

Figure 55: A passage of *khanda nadai* from "Flood Lines", CD1 Track 4 (1:53)

<sup>16</sup> This figure is an example of the difficulties of notation. The clearest way to comprehend this effect without hearing it is to understand that the quarter notes being played by the bass in the first line are the same duration as the first notes in the 5/8 section. It almost appears that the piece should feel “slower”, so possibly another choice could be to notate these bars in 5/16. However, in my transcription I chose to represent this passage as 5/8 as it is easier to interpret for a jazz player.

As before, the underlying pulse does not change, only the density of notes, and the grouping of the 5-to-a-pulse section is shaped around a lilt of [2 - 3] (somewhat described by the melody and reinforced by the rhythm of the bass notes) which is a common articulation of this subdivision in Carnatic music.

The notion of changing from 4-to-a-pulse to 3-to-a-pulse as it relates to the Carnatic tradition was outlined earlier in this chapter. Jazz performers are likely to be comfortable with this technique at the outset, as the notion of “swinging” eighth notes is effectively changing a phrase from 4-to-a-pulse (eighth notes) to 6-to-a-pulse (eighth note triplets). Horace Silver’s “Nica’s Dream”, Dizzy Gillespie’s “Night In Tunisia” and Miles Davis’ arrangement of the Kaper/Washington piece “On Green Dolphin Street” are all examples from the standard jazz repertoire where performing different sections of the piece with straight and swung eighth notes is the default approach.<sup>17</sup>

An example of the three speed technique discussed earlier in this chapter (4-to-a-pulse, then slow 3-to-a-pulse, then fast 3-to-a-pulse) can be found in Sandy Evans’ piece “The Agile Wallaby” from her 2012 release *Cosmic Waves*. The piece features this exact treatment of a three-time repetition as is evident in the following figure:

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<sup>17</sup> A clear example of a shift from 4-to-a-pulse to 3-to-a-pulse within this thesis can be found in the coda of Tom Chang’s “Tongue and Groove” (CD1, Track 8 [6:37]). This section features a phrase played first as sixteenth notes, then slower as eighth note triplets. The notation can be found in the Appendix.

Figure 56: Three speed mora from "The Agile Wallaby", CD1 Track 7 (0:39)

The figure is constructed through the permutation of a 16 partial phrase, internally grouped [3 - 3 - 3 - 3 - 4], which is presented in three speeds. It is fascinating to observe that we can view this as yet another systematic way to transform a mora. The “original” untreated mora can be conceptualised as a triple repetition of a 16 partial X phrase (i.e. *16 - 0 - 16 - 0 - 16*) and, most stunningly, would have the same overall duration as the above figure.

It may seem at first glance that a more straightforward order for the three speeds would be 3-to-a-pulse then 4-to-a-pulse, then 6-to-a-pulse, as this would create a clear-cut expansion (srotovaha). However, when it comes to the real world application of this device the notated order presents fewer limitations. In the suggested Carnatic sequence (4-, then 3- then 6-to-a-pulse), the 3-to-a-pulse and the 6-to-a-pulse sections are consecutive and, as they are linked as factors of 3, it is much simpler to transition between them. If a phrase was constructed starting with the slower 3-to-a-pulse, there is a much higher chance of having to deploy the 4-to-a-pulse phrase on a second or third triplet, which completely violates the underlying grid.<sup>18</sup>

<sup>18</sup> It is of course not impossible to imagine starting a sixteenth note phrase on the second or third triplet (we can physically play anything, it is not illegal!). However, that line of inquiry veers off into a more abstract concept of rhythm beyond the neat mathematics being adhered to in this thesis.

By changing the order to start with the 4-to-a-pulse phrase, the number of phrases you can convert with this technique is greatly increased. The only real restriction inherent in using this order of speeds is that the second X phrase must begin either on or halfway between the pulse so that the introduction of the triplet grid does not violate the underlying mathematics of the pulse. However, this restraint is easily managed by adjusting the commencement point of the initial 4-to-a-pulse X phrase.

### **Further Application**

In Chapter Three I analysed a korvai which I wrote for my arrangement of Dave Holland's piece "The Winding Way". To create a coda for the arrangement I decided to reinterpret the korvai with an underlying eighth note triplet subdivision. In the following notation we can see the original korvai, followed by the same phrase in its converted form:<sup>19</sup>

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<sup>19</sup> For ease of viewing this diagram does not display all aspects of the korvai. A full analysis can be found in Chapter Three.

Original korvai in eighth notes:

Converted korvai in eighth note triplets:

Figure 57: A korvai expressed as 4-to-a-pulse then again as 3-to-a pulse from "The Winding Way", CD2 Track 6 (7:48)

As is evident from the diagram, the underlying number pattern has been maintained through the treatment. This rather simple first experiment illuminates a key tenet for the usage of this device: for simple usage, the total number of partials contained in the phrase should be a factor of both or all numbers of the underlying subdivisions which are being transitioned between.

In the above case, the first phrase in our example has a duration of 96 partials which is divisible by both 3 and 4. Because of this correlation the phrases may start at a different point in the bar but they will both begin on a pulse (or beat). This is what is meant by “simple usage” and, as we shall see, has important ramifications when progressing to stringing several of these transitions together.

I elaborated on this idea with the piece “Peripatetic Palanquin” which I co-wrote with pianist Ed Heddle specifically for this thesis. We used the above principle and wove it together with

the idea of using a korvai to transition to different subdivisions. The goal was to create a korvai that could be played in 4-to-a-pulse, then 5-to-a-pulse, then 6-to-a-pulse. To achieve this aim we needed a target number that would be divisible by 4, 5 and 6, of which the lowest number is 60. Because the above principle was adhered to, each repetition began on a pulse allowing us to string these korvais together without there being a mismatch of subdivisions.

I would assert that so far in this thesis the exercises and techniques I have developed would be accessible to a competent jazz performer without needing to learn solkattu or understand Carnatic music in detail. I am inclined to say that it would not have been possible to perform this particular piece without Heddle committing to weekly solkattu sessions with me in simultaneous preparation for this piece. Although it is possible to notate the following piece, the difficulty of interpreting the rhythms (especially the quintuplet section) as they appear on the staff is too great and the phonetic approach is nonetheless required.

I composed two 60 partial korvais which were to serve as the beginning and ending of the piece (the “head in” and “head out” to use jazz terminology). I presented them to Heddle and we honed them together, making small alterations to appeal to our aesthetic sense. I then wrote them up as follows in phonetic language:

## Korvai 1 (Head in)

section one (orderly expansion):

(*ta ka*)  
(*ta ka di mi*)

Ta ki ta din - din - na -  
Ta ki ta din - din - na -  
Ta ki ta din - din - na -

section two (mora):

***Ta - din - gi na tom***  
***Tan - gu***  
***Ta - din - gi na tom***  
***Tan - gu***  
***Ta - din - gi na tom***

internal structure:

		3	6
	2	3	6
2	2	3	6

(7 - 3 - 7 - 3 - 7)

## Korvai 2 (Head out)

section one (orderly expansion):

(*din - -*)  
(*din - - din - -*)

Din taka Din taka Din taka Din taka  
Din taka Din taka Din taka Din taka  
Din taka Din taka Din taka Din taka

section two (mora):

***Ta ki ta din - - din - -***  
***Ta ki ta din - - din - -***  
***Ta ki ta din - - din - -***

internal structure:

		2	2	2	2
	3	2	2	2	2
3	3	2	2	2	2

(9 - 0 - 9 - 0 - 9)

These diagrams (rendered in the same format as the korvais in Chapter Three) display the shape of the phrase and are useful for that reason. Borrowing a format from Nelson's *Solkattu Manual*, I also presented the phonetic language in terms of pulses as follows:

## Korvai 2

### 4 to a beat

Din <u>taka</u> Din <u>taka</u>	Din <u>taka</u> Din <u>taka</u>	<i>din</i> - - Din	<u>taka</u> Din <u>taka</u> Din	
<u>taka</u> Din <u>taka</u> <i>din</i>	- - Din <u>taka</u>	Din <u>taka</u> Din <u>taka</u>	Din <u>taka</u> <i>din</i> -	
- Ta ki ta	<i>din</i> - - <i>din</i>	- - Ta ki	ta <i>din</i> - -	
<i>din</i> - - Ta	ki ta <i>din</i> -	- <i>din</i> - -		

### 5 to a beat

Din <u>taka</u> Din <u>taka</u> Din	<u>taka</u> Din <u>taka</u> <i>din</i> -	- Din <u>taka</u> Din <u>taka</u>	Din <u>taka</u> Din <u>taka</u> <i>din</i>	
- - <i>din</i> - -	Din <u>taka</u> Din <u>taka</u> Din	<u>taka</u> Din <u>taka</u> Ta ki	ta <i>din</i> - - <i>din</i>	
- - Ta ki ta	<i>din</i> - - <i>din</i> -	- Ta ki ta <i>din</i>	- - <i>din</i> - -	

### 6 to a beat

Din <u>taka</u> Din <u>taka</u> Din <u>taka</u>	Din <u>taka</u> <i>din</i> - - Din	<u>taka</u> Din <u>taka</u> Din <u>taka</u> Din	<u>taka</u> <i>din</i> - - <i>din</i> -	
- Din <u>taka</u> Din <u>taka</u> Din	<u>taka</u> Din <u>taka</u> Ta ki ta	<i>din</i> - - <i>din</i> - -	ta ki ta <i>din</i> - -	
<i>din</i> - - ta ki ta	<i>din</i> - - <i>din</i> - -			

Heddle and I learnt this phonetic piece for a couple of weeks before approaching our instruments to apply actual pitches to the phrases. It was only after this part of the process was complete that I notated the piece on the regular Western staff.<sup>20</sup> This resulted in the final version of the piece which begins with a korvai performed in 4-to-a-pulse, transitioning through 5-to-a-pulse then 6-to-a-pulse which is where the piano solo begins. The bass solo emerges after a mora which is performed in 4-to-a-pulse then ushers in the new 5-to-a-pulse context. After the bass solo we perform the second korvai which builds through the increasing subdivisions to propel the piece to its climactic finish. The full score including transcribed bass solo is provided in the Appendix.

The bass solo in the aforementioned piece was performed in a 5-to-a-pulse subdivision (khanda nadai). This was achieved through another process which I developed through the work on CD2. When listening to recordings of Carnatic musicians improvising in the less familiar 5-to-a-pulse and 7-to-a-pulse subdivisions, I was struck by the way that the music was performed quite naturally through accessing the natural lilt of the nadai. That is to say, the musicians did not simply play endless cascades of quintuplets or septuplets, but rather built their patterns on ostinato-like figures.

This revelation caused me to reflect on the “swinging” of eighth notes commonplace in jazz. As so many of us are brought up playing in school ensembles where we learn this technique, we don’t notice that we have all learnt a fairly abstract trick: to convert any eighth note line to “swing”, the jazz musician internally moves all off beat eighth notes to be in line with the third of three imagined eighth note triplets. This is well documented of course, but the fact that swing music is notated as straight eighths, which we interpret as swung as we perform, is actually quite remarkable.

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<sup>20</sup> If this style of composition was to be exploited in the future I would assert that this manifold approach to expressing the material is a necessity.

This sent me down the path of establishing a system for converting eighth note lines into a 5-to-a-pulse (and later 7-to-a-pulse) context. My guiding principle was that the language of contemporary jazz is entrenched in the explorations of bebop and its meticulous tinkering with synchronised scales and surrounding note figures. The harmonic vocabulary most jazz musicians have developed over their careers is based on groups of four (or eight) so a useful intermediate step would be one that retains those principles yet somehow adjusts to a grid based on odd numbers.

I found the simplest way to correlate bebop eighth notes to an underlying 5-to-a-pulse subdivision was to relate everything to a minim pulse. The minim pulse would then be subdivided in to 5-to-a-pulse and a clave-like pattern was arrived at by emphasising all but the fourth of the 5 partials. This is the same [2-3] lilt discussed earlier in the context of “Flood Lines” and is evident in Sankaran’s *South Indian Drumming* where he gives the phonetic expression of one pulse of khanda nadai as (Sankaran 1994, p. 26):

*Ta ka Ta ki ta*

Because of the placement of the “*Ta*” sounds in this phrase, we can infer that the starting point for interpreting five-to-a-pulse phrasing is to conceive of it as having the aforementioned [2 - 3] lilt.<sup>21</sup>

I then decided that the four notes ordinarily present in a minim length eighth note line would be redistributed on to these four emphasised parts of the beat. Through this approach I

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<sup>21</sup> We can be fairly confident in this assumption as Nelson describes “*Ta ka*” as a two syllable phrase and “*Ta ki ta*” as a three syllable phrase (Nelson 2008, p. 15). These phrases are the fundamental building blocks of solkattu, so it is reasonable to assert that the accents are felt in this manner, in accordance with the placement of the “*Ta*” sound.

created the following chart which provides all possible eighth note phrases of a minimum duration in their original form and how they would appear after being converted through the process.

Figure 58: A chart showing the conversion of eighth note phrases to a 5-to-a-pulse context

To fully exploit this new system, and ground my explorations within the jazz tradition, I decided to apply it to a classic bebop piece, Charlie Parker's "Ornithology". The converted piece could be expressed in the following notation where a 5/8 bar correlates to a minimum pulse in regular 4/4.

## Ornithology

$\text{♩} = 360$

$\text{♩} = 288$  (ie. the minim pulse is now divided by 4 instead of 5)

Figure 59: "Ornithology" converted to 5-to-a-pulse, CD2 Track 5 (0:07)

This piece was performed by the recorded ensemble using the off-balance lilt as the basis for all improvising and accompaniment. Other classic pieces from the jazz repertoire were also given this treatment. Miles Davis' "So What" (as part of "Khanda Blue Suite", CD2, Track 3) was performed with the A sections in 5-to-a-pulse and the B section in a regular swing feel (which we could call 6-to-a-pulse). This arrangement also included Davis' famous solo performed in unison by the bass and tenor saxophone reinterpreted for this framework.

Thelonious Monk's "Evidence" (CD2, Track 2) provided the biggest challenge as it already exhibits considerable syncopation in its original form. This piece was treated stylistically as closer to an Afro-Cuban approach as opposed to a substitute for swung eighth note jazz.

In preparation for the recording of CD3 I expanded this idea further with a similar approach to converting eighth notes to an underlying 7-to-a-pulse grid. This was clearly deployed in my piece "There Are Birds" (CD3, Track 4) where the melody is stated first in swung eighths (6-to-a-pulse) then a second time within a 7-to-a-pulse context. The improvising then proceeds with 7-to-a-pulse phrasing. The full arrangement with analysis is provided in the Appendix.

The furthest exploration of this technique was evident in the solo bass introduction to the original composition "Old Knives" (CD3, Track 5) for which I composed a six bar eighth note melody which I performed in decreasing subdivisions of 8-to-a-pulse, 7-to-a-pulse, 6-to-a-pulse then 5-to-a-pulse.<sup>22</sup> In between each expression of the melody I improvised in the new subdivision which had been ushered in. Before recording, the piece was notated solely in regular 4-to-a-pulse eighth note phrasing as follows:



Figure 60: Introductory motif from "Old Knives"

<sup>22</sup> This could be seen as an example of gopucca (orderly reduction).

This was deliberately notated solely in eighth notes so that I would have to execute the reattribution of the lilt entirely in my mind. If the four iterations of the melody were written out as they sound, it would appear as follows:<sup>23</sup>

Figure 61: Bass introduction in four different nadais from "Old Knives", CD3 Track 5 (0:00)

This final result shows the full potential of my developed methodology for segueing between various subdivisions while retaining the established jazz language.

The Carnatic approach to subdivision opened up many new areas of expression for my ensemble throughout this study. Through the process described above (and over a two year

<sup>23</sup> The full introduction with transcribed improvised passages is provided in the Appendix.

period) my quartet expanded its existing capability to be able to shift between 3-to-a-pulse, 4-to-a-pulse, 5-to-a-pulse and 7-to-a-pulse. In some sense the group has doubled its potential for creating colour and drama with subdivision and in my opinion this result is the most satisfying of the thesis. It was a concern for me throughout that whatever I came up with in the course of my research and development might sit unconvincingly in the context of the vocabulary of other musicians or at worst be entirely incompatible. The recordings that concern themselves with nadai (largely concentrated on CD3) appear to me to display synergy within the group and the clearest melding of Carnatic rhythmic devices and jazz.

## Chapter Five: Koraippu

### Definition

The final rhythmic device I will discuss in this thesis is the exchange of improvised phrases known as a koraippu. As Sankaran puts it, a koraippu is traditionally “performed by two or more drummers” and “is characterized by the principle of reduction.” (Sankaran 2010, p. 65). He elaborates further:

A logical reduction of specific rhythmic patterns or motives over the tala cycles, and the improvisation within that structure, is performed in several stages. For example, in Adi Tala of 8 beats, a koraippu can start off with two cycles, and reduce to one cycle, then half a cycle, then a quarter cycle, and sometimes even an eighth of a cycle. The koraippu builds in the spirit of call-and-response and as it reaches the quarter or one-eighth cycle, the instruments are heard closer and closer over the tala cycle. (Sankaran 2010, p. 65)

Any student of contemporary music reading this should be struck by some obvious parallels with concepts inherent in jazz. Firstly, the phrase “call-and-response” is often cited as one of the fundamental tenets of jazz, and secondly the idea of two soloists taking it in turns to improvise occurs regularly in jazz performances through “trading” with the drums.<sup>24</sup>

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<sup>24</sup> This is very common practice for jazz performers and countless instances are in evidence throughout the history of recorded jazz. Concentrated examples can be found on the albums *Saxophone Colossus* (1956) by Sonny Rollins, *Milestones* (1958) by Miles Davis and *Coltrane Jazz* (1961) by John Coltrane.

## Use in Contemporary Jazz

An example of this device in a contemporary jazz setting can be observed in Sandy Evans' "The Sacred Cow's Tail" (CD1, Track 6). Midway through the piece a simple koraippu structured in the manner described above by Sankaran is deployed. This version of a koraippu begins with the bass and mrdangam swapping two bar phrases, then one bar phrases, then through a series of reducing durations until the soloists are playing alternate eighth notes. Each phase of the koraippu is repeated four times (the later phases are represented within the same bars for ease of reading).<sup>25</sup>

The figure illustrates the koraippu structure through seven phases, each repeated four times. The notation is presented in a series of staves, with the Bass line on the upper staff and the Drums line on the lower staff. Phase 1 is in 4/4 time, showing a two-bar swap. Phase 2 is in 4/4 time, showing a one-bar swap. Phase 3 is in 4/4 time, showing a half-bar swap. Phase 4 is in 4/4 time, showing a quarter-bar swap. Phase 5 is in 4/4 time, showing eighth notes. Phase 6 is in 6/8 time, showing eighth notes. Phase 7 is in 4/4 time, showing eighth notes.

Figure 62: Koraippu structure from "The Sacred Cow's Tail", CD 1 Track 6 (3:21)

<sup>25</sup> Complete transcription of the koraippu from my performance of this piece is provided in the Appendix.

### Further Application

To utilise this idea within a modern jazz context I used another version of a koraippu provided by Sankaran in his book *The Art Of Konnakol* (Sankaran 2010, p. 66). This koraippu employs an elegantly simple idea to create the reduction effect. If we take two bars of 4/4 as an initial cell and commence improvising on beat two, it follows that the improvising will occupy seven beats before resolving on the first beat of the next bar (we may label this the target beat as we have before). We can now exploit our vocabulary of seven based groupings which will fit neatly into this seven beat duration.



Figure 63: Groupings of seven commencing on beat two

From that point we can extrapolate in either direction to create a koraippu. For example, to go one level back and create expansion we can conceive of four bars of improvising commencing on beat three. This will leave fourteen beats and will be suitable for seven based phrasing also. To go in the opposite direction we can imagine one bar beginning on the second eighth note.<sup>26</sup> Through this pattern we can create a koraippu which gives the impression of reduction without necessitating the alteration of the given time signature. The following koraippu structure fits the form offered by Sankaran in “*The Art of Konnakol*”:

<sup>26</sup> These numbers are all related to ratios and can be represented differently depending on whether you choose to conceptualise the koraippu in eighth notes or sixteenth notes.

Phase 1 :



Phase 2 :



Phase 3 :



Phase 4 :

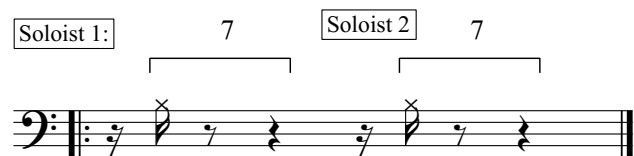
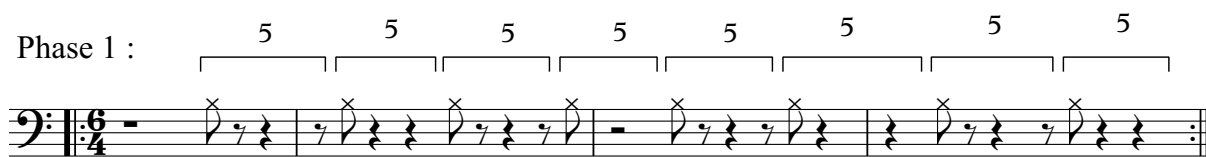



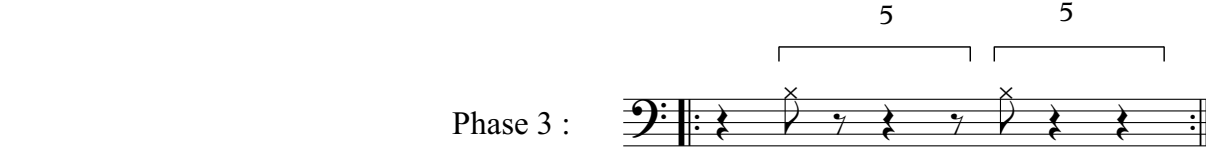
Figure 64: Koraippu structure

In the piece “Heptagram” (CD3, Track 8) this specific koraippu structure is used as a trading device between double bass and piano. These improvisations were based on the phonetic solkattu exercises which accompanied the explanation in the Sankaran text and were spontaneous through note choice, articulation and expression. The full transcription of both piano and bass improvisations can be found in the Appendix.

A more developed use of the koraippu device is presented in my piece “Alabaster” (CD3, Track 6). To expand the koraippu into a swing context I began by changing the base numbers: where the above koraippu was based on groups of seven being performed in the context of a 4/4 metre, I came up with a related structure based on on groups of five being performed in the context of a 6/4 metre:

Phase 1 : 

Phase 2 : 

Phase 3 : 

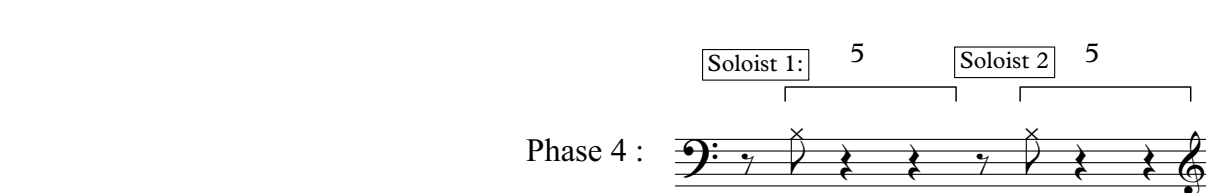


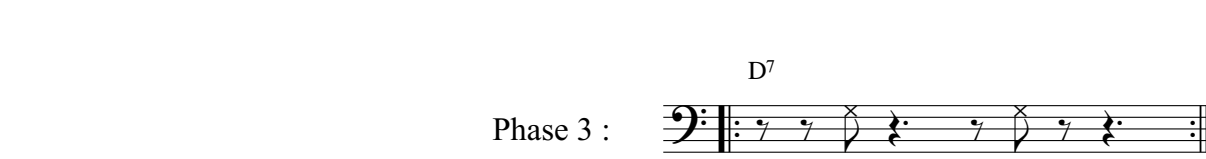
Phase 4 : 

Figure 65: Koraippu in 6/4

Then, to relate the exercise back to a jazz swing context, I re-contextualised the 12 eighth notes of the 6/4 metre as the 12 eighth notes of a 12/8 metre (i.e. the underlying pulse is felt grouped in three rather than two). This re-ordering of the time signature renders the koraippu as follows:

Phase 1 : 

Phase 2 : 

Phase 3 : 

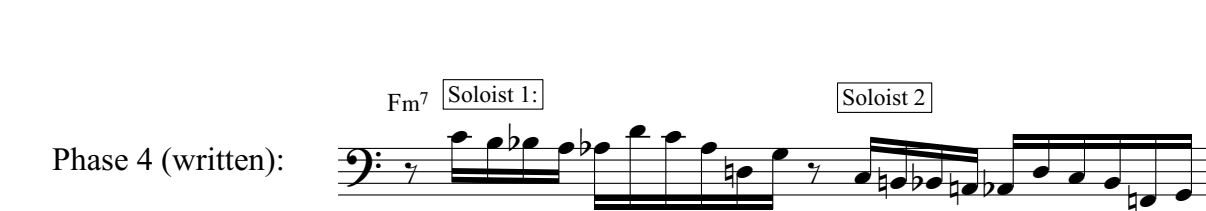
Phase 4 (written): 

Figure 66: Koraippu in 12/8 from "Alabaster", CD 3 Track 6 (0:57)

Preparation for this improvisation involved practicing small 5 partial cells that could be deployed within the strict koraippu structure. The initial exercises that I developed appeared as follows:

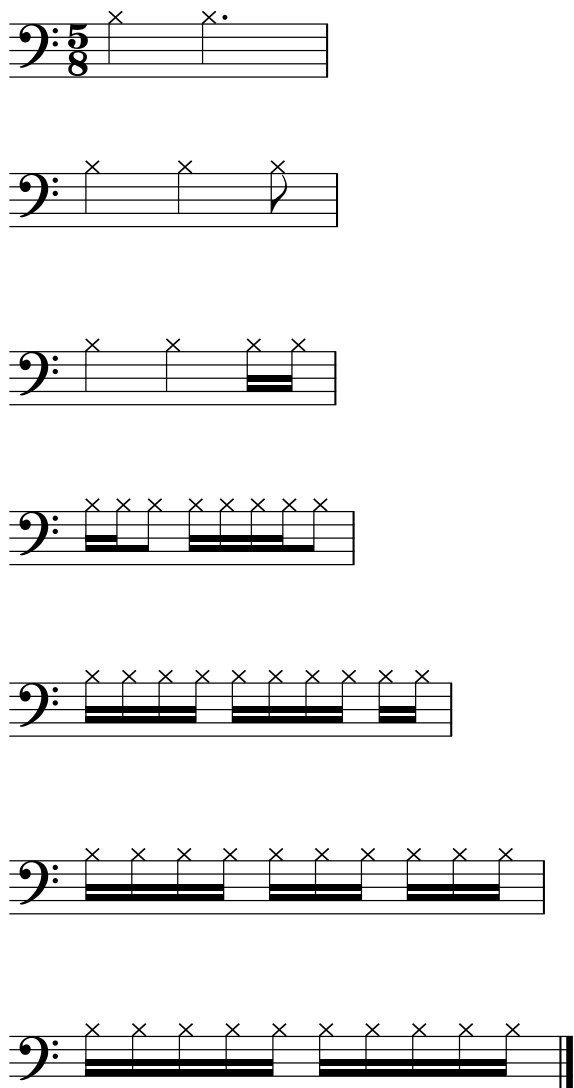


Figure 67: Individual five based cells for improvisation practice

After several weeks of practising these fragments, switching between them within the koraippu and tinkering with note choice, all in an improvised context, I was surprised at the amount of new and interesting phrases which materialised through the process. This is an

area ripe for further exploration, although the initial practice workload is considerable. The full transcription of both piano and bass improvisations can be found in the Appendix.

A third koraippu appears in my original piece “1062956 Blues”, this time with trading between bass and drums, and was inspired by a recording of Carnatic percussionists Karaikudi Mani and T.A. Kaliyamurthy on the piece “Stimulation” featured on their album *Amrutham: Fusion for freedom* (2003).

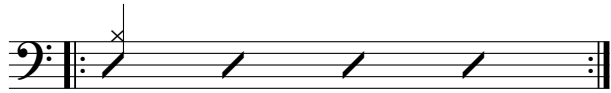
Phase 1 :



Phase 2 :



Phase 3 :



Phase 4 :

Complex musical notation for Phase 4 showing alternating Drum and Bass patterns with triplets. The notation consists of two staves. The top staff shows a sequence of Drum and Bass patterns, with 'Drums' and 'Bass' labels above dashed lines. The bottom staff shows a sequence of Bass and Drum patterns, with 'Bass' and 'Drums' labels above dashed lines. Both staves feature triplet markings (the number 3) above groups of notes.

Phase 5 :

Complex musical notation for Phase 5 showing alternating Drum and Bass patterns with triplets. The notation consists of a single staff. Above the staff, 'Drums' and 'Bass' labels are placed above dashed lines, alternating in a sequence. The staff itself shows a sequence of notes and rests, with triplet markings (the number 3) above groups of notes.

Figure 68: Koraippu structure from "1062956 Blues", CD4 Track 1 (21:00)

This koraippu begins with two phases of reducing 7 beat phrases (as in the beginning of “Heptagram”) and then proceeds to switch to decreasing 4 beat phrases in a 3-to-a-pulse context. The effect of the trading phrases becoming increasingly closer is presented here in yet another form, though this time the method of reduction changes as the koraippu unfolds.

## Conclusion

This thesis has provided a new approach for digesting the dizzying array of rhythmic devices inherent in Carnatic music, through the experience of a jazz-trained Western musician. The framework laid out in the exegesis stands as an original approach, while fully acknowledging previous investigations into Carnatic influenced jazz.

The thesis has drawn upon five distinct rhythmic devices, which have been hitherto largely neglected by jazz practitioners. The definitions of these rhythmic devices were gleaned from authoritative sources, then presented in contexts and notations familiar to a jazz musician. Research through transcription was in evidence in the “Use In Contemporary Jazz” sections of each chapter, and in the repertoire of the first CD. Great care was taken to observe the work previously undertaken by musicians such as Toby Wren and Sandy Evans, so as to ensure that the research builds on their work, rather than simply repeating it. CD1 featured new versions of pre-existing Carnatic influenced jazz pieces, which themselves provided the inspiration for my double bass improvisations. The third part of each chapter, “Further Application”, detailed the original processes undertaken by the author to integrate the rhythmic devices into the contemporary jazz vocabulary.

Chapter One explored the short phrase structure known as a mora, and offered a method for implanting these phrases into bar lengths common in jazz. Chapter Two investigated gopucca yati and srotovaha yati, and drew attention to the mathematical patterns underpinning these devices and how the “borrowing” technique can be applied to moras to open up an even greater number of variations for the performer to exploit. Chapter Three delved into the large

structure known as a korvai and included several transcribed examples of korvais developed by the author, underpinned with analyses of their use in a jazz context. Chapter Four was concerned with nadai, and detailed instances of phrases being transposed into different subdivisions. It also described an original method for converting jazz eighth note phrases to 5-to-a-pulse and 7-to-a-pulse subdivisions. Chapter Five gave guidelines for performing a koraippu, and included examples of the koraippus devised for this study, most notably a structure that was created based on triplets such that it would correspond with the common jazz swing feel.

The first three chapters are based on an iterative process that uncovers and synthesizes new phrases which don't occur through organic improvisation, and accordingly are angular and less predictable. The phrases derived from these processes nevertheless contain a satisfying logic through their repetition of core material and aurally discernible expansion and diminution. These ideas applied to a jazz context expand the scope of possible phrases immeasurably without stepping outside the bounds of the swung or straight eighth note. As such, the examples devised and recorded for this study are crucial in comprehending how to construct useful material from the selected pattern. These examples act as a bridge between the fully codified Carnatic rhythmic tradition and the harmony and vocabulary of jazz.

The fourth chapter points to the exciting potential that devices such as these hold for the future of jazz improvisation. To arrive at a framework for transitioning between uncommon subdivisions while maintaining the existing jazz vocabulary suggests to me that jazz ensembles following this approach will gain the ability to segue between 5-to-a-pulse and 7-to-a-pulse within a jazz performance: melodic content is preserved while the underlying grid

shifts beneath it. The fifth chapter offers an invigorating new way to trade improvised phrases, one that strengthens the rhythmic awareness and vitality of each performer.

The recordings, presented in the same order in which they were recorded, highlight the cumulative effect of the application of these techniques over the course of the study, and the growing ease of the performers in the less familiar rhythmic contexts. My double bass improvisations bear the increasing influence of the study over time, both in the direct, planned ways described in the text, and in nuanced lateral ways which weren't explicitly related to the five rhythmic devices investigated in the thesis. That is to say, the non-transcribed solos are marked by a level of rhythmic buoyancy and inventiveness which is unquestionably the result of the study, with untethered polyrhythms and cross-subdivision phrasing surfacing in moments of true improvisation through the less structured improvisations. This is ultimately the goal of any concerted effort to expand improvised phrasing, and I fully anticipate this unconscious blossoming of the seeds sown will continue over the ensuing years.

In the initial stages of this project I was apprehensive about the apparent differences between Carnatic music and jazz, but was quickly reassured by many commonalities. Both disciplines perform pieces from a selected repertoire, which are shaped spontaneously in the crucible of live performance according to conventions that have been passed down through generations. The Carnatic approaches may seem rigorously stiff at first glance, but so can the musical language of Charlie Parker and John Coltrane. Both traditions also revere specific performers by attributing innovations or particularly elegant phrases to them, and respectfully preserving their place in a historical canon of musicians.

The methodology devised through the study sought to create brand new approaches which, though challenging at first, would be of practical use to a trained jazz performer. The methodology ultimately presented in this thesis gives the reader a practical framework for:

- 1) Developing original phrases based on the mora structure
- 2) Developing original phrases constructed with a contour involving gopucca and srotovaha
- 3) Constructing larger phrases from korvais which can function as transitions between improvised passages as well as general compositional structures
- 4) Developing the ability to perform phrases in 5-to-a-beat and 7-to-a-beat contexts, including phrases which have consistency with contemporary jazz
- 5) Transitioning between different subdivisions
- 6) Performing duo improvisations based on trading phrases of decreasing length

These outcomes are evident in my double bass performance as presented on the CDs, and stand as proof of the success of the devised methodology. The recordings also display the malleability of the methodology through the ensemble performances, and indicate the great potential of the methodology to provide new inspiration for the jazz performer who has an interest in the fascinating and deeply complex world of Carnatic rhythm.

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## **Appendix: Arrangements and Transcriptions**

This Appendix contains notated arrangements of the material found on the four CDs as well as thirteen selected transcriptions of my original bass improvisations. Analysis of Carnatic rhythmic devices is provided above the staves where appropriate (an explanation of the labelling system for the analysis can be found on the next page).

Though all of the recorded bass improvisations can be appreciated as bearing the mark of my study of Carnatic rhythmic devices, the thirteen transcribed examples were selected as they contain specific techniques which are best appreciated with the aid of diagrams and link directly to the chapters in the exegesis.

# **List of Arrangements and Transcriptions**

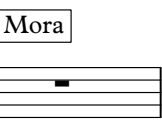


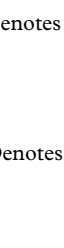
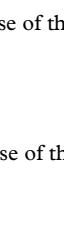
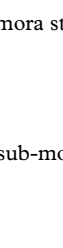
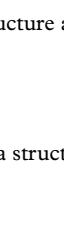
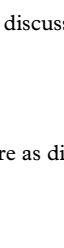
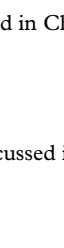

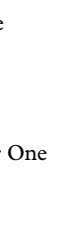



- 1 Pentacle (w/transcribed bass improvisation)
- 2 Tisra Jati Tripata (w/transcribed bass improvisation)
- 3 Blues For Palghat Raghu
- 4 Flood Lines
- 5 Viv's Bum Dance
- 6 The Sacred Cow's Tail (w/transcribed bass improvisation)
- 7 The Agile Wallaby
- 8 Tongue And Groove
- 9 Mora Blues (w/transcribed bass improvisation)
- 10 Evidence (w/transcribed bass improvisation)
- 11 Khanda Blue Suite (w/transcribed bass improvisation)
- 12 Central Park West
- 13 Ornithology (w/transcribed bass improvisation)
- 14 The Winding Way
- 15 Bass Etude in A
- 16 Ignominy! (w/transcribed bass improvisation)
- 17 Peripatetic Palanquin (w/transcribed bass improvisation)
- 18 There Are Birds
- 19 Old Knives (w/transcribed bass improvisation)
- 20 Alabaster (w/transcribed bass and piano improvisations)
- 21 Bat Tricks
- 22 Heptagram (w/transcribed bass and piano improvisations)
- 23 Good Luck Everybody (w/transcribed bass improvisation)

24 Bass Etude in E minor

25 1062956 Blues

## Key for labels on notation:

The labels listed below appear above the staff on the notation contained in this Appendix to highlight the use of a specific Carnatic rhythmic device.

	Denotes use of the mora structure as discussed in Chapter One
	Denotes use of the sub-mora structure as discussed in Chapter One
	Denotes instance of orderly reduction as discussed in Chapter Two
	Denotes instance of orderly expansion as discussed in Chapter Two
	Denotes instance of orderly reduction applied to the mora structure as discussed in Chapter Two
	Denotes instance of orderly expansion applied to the mora structure as discussed in Chapter Two
	Denotes use of the korvai structure as discussed in Chapter Three
	Denotes instance of 3-to-a-pulse phrasing as discussed in Chapter Four
	Denotes instance of 4-to-a-pulse phrasing as discussed in Chapter Four <i>(since most jazz is based on 4-to-a-pulse phrasing, this box only appears to highlight a transition between the less common subdivisions)</i>
	Denotes instance of 5-to-a-pulse phrasing as discussed in Chapter Four
	Denotes instance of 7-to-a-pulse phrasing as discussed in Chapter Four
	Denotes instance of three speed nadai conversion applied to the mora structure as discussed in Chapter Four
	Denotes instance of trading improvised phrases within a framework of orderly reduction as discussed in Chapter Five
	Denotes instance of the beat grouping "Misra chapu" as discussed in the Introduction.



65 Gmaj7(#11)  
Gtr:

73 Sop & Gtr: D7(sus4) To Coda

81 1st X only  
Guitar & Keys R.H.: Drums  
Bs & Keys L.H.:

Guitar improvisation:  
89 D7(sus4)

Saxophone improvisation:  
97 F7(sus4)

Guitar Improvisation:  
105 D7(sus4)

Saxophone Improvisation:  
113 G13

Guitar improvisation:  
121 D7(sus4)

Saxophone improvisation:  
129 Cmaj7

Guitar improvisation:

137 D7(sus4)



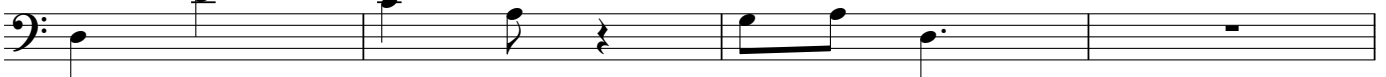
Saxophone improvisation:

145 Gmaj7



Transcribed bass improvisation:

153 D7(sus4)



157



161



\*the next 6 bars are best interpreted as being related to the minim pulse, hence the change to 5/4. The 5/8 ostinato continues beneath superimposed change.

Tisra nadai

Mora

X = 5

X = 5

X = 5

165



169



Khanda nadai

171



175



Gopucca mora

X = 15

Y = 2

X' = 12

Y = 2

X'' = 9

179

5 5 5 4 4 4 3 3

183

187

191

195

199

203

207

211

215

219

Musical staff in bass clef containing measures 219 through 222. The notation consists of eighth and quarter notes.

223

Musical staff in bass clef containing measures 223 through 226. The notation consists of eighth and quarter notes.

Bass cue to end solo:

227

Musical staff in bass clef containing measures 227 through 234. Measures 227-230 and 231-234 feature sixteenth-note runs. Measures 228, 232, and 234 are marked with a slash and a colon (/:). Above measures 231 and 234 is the number 4.

235

Musical staff in bass clef containing measures 235 through 242. Measures 235-238 and 239-242 feature sixteenth-note runs. Measures 236, 240, and 242 are marked with a slash and a colon (/:). Above measures 239 and 242 is the number 4.

243

Musical staff in bass clef containing measures 243 through 250. Measures 243-246 and 247-250 feature sixteenth-note runs. Measures 244, 248, and 250 are marked with a slash and a colon (/:). Above measures 247 and 250 is the number 4.

251

Musical staff in bass clef containing measures 251 through 258. Measures 251-254 and 255-258 feature sixteenth-note runs. Measures 252, 256, and 258 are marked with a slash and a colon (/:). Above measure 255 is the number 4, and above measure 258 is the number 8.

Interlude:

Whole ensemble in unison:

Mora

X = 25

Y = 5

259

Musical staff in treble clef containing measures 259 through 264. The notation consists of eighth and quarter notes. Brackets above the staff indicate the X = 25 and Y = 5 groupings.

X = 25

Y = 5

265

Musical staff in treble clef containing measures 265 through 270. The notation consists of eighth and quarter notes. Brackets above the staff indicate the X = 25 and Y = 5 groupings.

X = 25

271

Musical staff in treble clef containing measures 271 through 276. The notation consists of eighth and quarter notes. A bracket above the staff indicates the X = 25 grouping.

Keyboard improvisation:

276 D7(sus4)



285 F7(sus4)



293 D7(sus4)



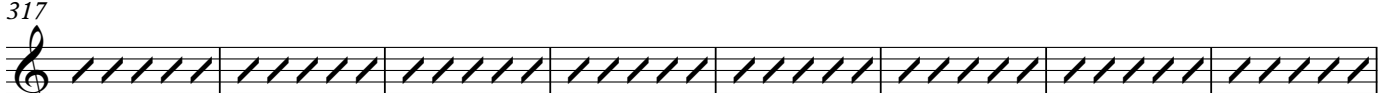
301 G13



309 D7(sus4)



317 Cmaj7(#11)



325 D7(sus4)



333 Gmaj7(#11)



Keyboard improvisation continues:

Open Drum Solo:

341 D7(sus4)

Open til cue

D.C. al Coda on cue



# Tisra Jati Triputa

CD1 Track 2

composed by Toby Wren  
transcribed and arranged by Lyndon Gray

Introduction: Gopucca

Whole ensemble in unison:

7 7 7 7 7 6 6 6

6 5 5 5 5 4 4 4 3

3 3 3 3 2 2 2 2 2 1 1 1 1

Transcribed bass improvisation (1st solo):

11

15

19

23

27

Mora X = 7 X = 7 X = 7

31

Mora  $X = 7$   $X = 7$   $X = 7$

35

Srotovaha mora  $X = 5$   $X' = 7$   $X'' = 9$

38

Guitar improvisation (1st solo):

41 Bass Ostinato: Open til cue

Transcribed bass improvisation (2nd solo):

43

47

Khanda nadai

51

Khanda nadai

55

59

63

Mora 8a

$X = 18$   $Y = 1$   $X = 18$

67

69 Y = 1 X = 18

Guitar improvisation (2nd solo):

71 Bass Ostinato: Open til cue

Ending:

Srotovaha mora

X = 15

Y = 1

X' = 18

73 Guitar tacet, drums phrase with bass

Y = 1

X'' = 21

77

81 Gtr & Bs:

85

89

92

95 1.- 3. 2

98 1.- 3. 2

101

105

109

Gtr:

3 times

Bs & Drs:

113

Gopucca

Drs:

3 times

Gopucca

3 times

114

Gtr & Bs:

Gopucca

115

Gopucca

117

Gopucca

119

Gtr:

Bs:

120

# Blues For Palghat Raghu

CD1 Track 3

composed by Toby Wren

transcribed and arranged by Lyndon Gray

Violin, with bass accompaniment:

1  
E7  
A7  
4  
B7  
7  
10

*korvai structure:*

Korvai

12 (2) 8 (2)  
2 12 (2) 8 (2)  
2 2 12 (2) 8 - 2 - 8 - 2 - 8

Vln & bs: 12 2 8 2 12

13

section one (*orderly expansion*)

15

2 8 2 2 + 2 12

2 X = 8 Y = 2 X = 8 Y = 2 X = 8

17

section two (*mora*)



korvai structure:

12 (3)  
4 2 12 (3)  
4,4 2,2 12 (3)  
**12<sub>(4,4,4)</sub> - 10 - 15 - 10 - 18**

Korvai

section one (*orderly expansion*)

section two (*mora*)

Bass improvisation (1st solo):



Bass improvisation (2nd solo):

57 E<sup>7</sup> A<sup>7</sup> C/B Open til cue

*korvai structure:*

Korvai

6 6 6 7  
 6 6 6 7 7  
 6 6 6 7 - (0) - 7 - (0) - 7

63

section one (*orderly expansion*)

65

67

section two (*mora*)

Violin improvisation (2nd solo):

69 E<sup>7</sup> A<sup>7</sup> C/B Open til cue

*korvai structure:*

Korvai

5 5 5 5 5  
4 4 4 4 4  
3 3 3 3 3  
2 2 2 2 2  
1 1 1 1 1  
7 - (0) - 7 - (0) - 7

75

5-5-5-5-5

4-4-4-4-4

section one (*orderly reduction*)

77

3-3-3-3-3

2-2-2-2-2

1-1-1-1-1

X = 7

80

X = 7

X = 7

section two (*mora*)

# Flood Lines

CD1 Track 4

composed by Toby Wren  
transcribed and arranged by Lyndon Gray

C7#9 Harmony throughout  
based on the following mode  
(C 8 note dominant w/o flat 9)



## Introduction:

Srotovaha mora

X = 13

X' = 16

X' = 19



5 Drums and guitar enter, light accompaniment:



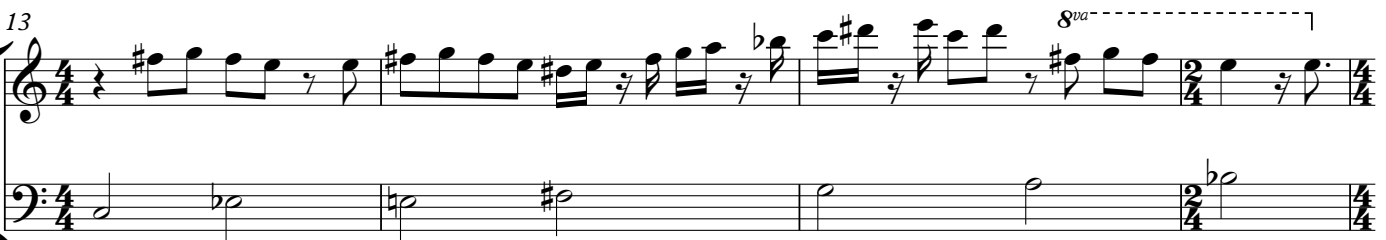
## Melody:

Alto Saxophone & Gtr:



Tisra nadai

3 times



17 *8va*

1.2.

21 (8)

24 (8)

**Khanda nadai**

26

31 *tr*

1X Sax improv  
2X Guitar improv  
3X Sax improv  
4X Guitar improv

4 times

36

3 times

40

3 times

44

Musical notation for measures 44-48. Treble clef, 5/8 time signature. Bass clef accompaniment.

Solo section:

49

*tr* 8 times

1st time only

Musical notation for measures 49-53. Treble clef, 5/8 time signature. Bass clef accompaniment. Trill in measure 49.

54

*other instruments play figure behind solo* 8 times

Musical notation for measures 54-57. Treble clef, 6/8 time signature. Bass clef accompaniment.

After last solo:

3 times

D.C. al Fine

58

Musical notation for measures 58-61. Treble clef, 6/8 time signature. Bass clef accompaniment.

# Excerpts from "Viv's Bum Dance"

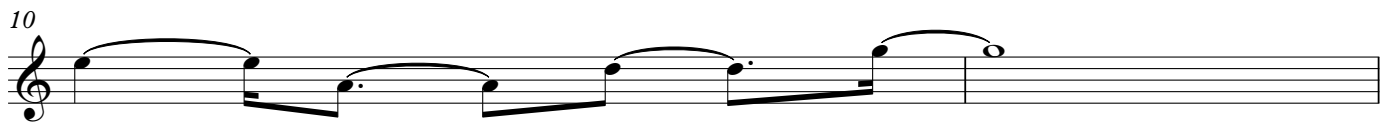
CD1 Track 5

composed by John Rodgers  
transcribed and arranged by Lyndon Gray

Bass & Keyboard:



Free group Improvisation:



Free group Improvisation:



On cue



Srotovaha mora

X = 9

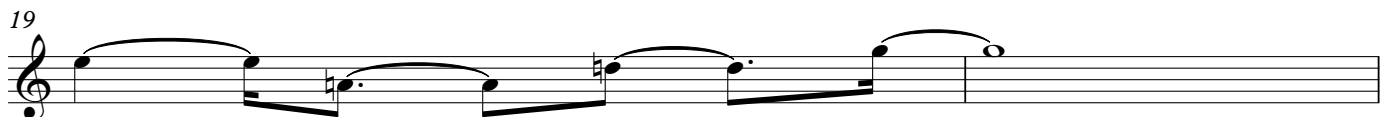
Y = 3

X' = 12

Y = 3



X'' = 15



Free group Improvisation:

Open til cue

21

On cue

22 Keys:

25

28

30

32

34

Srotovaha mora

$X = 15$

$X' = 21$

Musical score for measures 36-41. The score is written in treble and bass clefs. Measure 36 starts with a treble clef and a 7/8 time signature. The melody in the treble clef consists of eighth and sixteenth notes. The bass line consists of dotted quarter notes. Above the treble staff, there are two groups of notes with brackets and the number 5 above them, and two groups with brackets and the number 7 above them. Above the bass staff, there are three groups of notes with brackets and the number 5 above them, and three groups with brackets and the number 7 above them.

$X'' = 27$

Musical score for measures 38-41. The score is written in treble and bass clefs. Measure 38 starts with a treble clef and a 7/8 time signature. The melody in the treble clef consists of eighth and sixteenth notes. The bass line consists of dotted quarter notes. Above the treble staff, there are four groups of notes with brackets and the number 7 above the first, and the number 9 above the other three. Above the bass staff, there are two groups of notes with brackets and the number 9 above them.

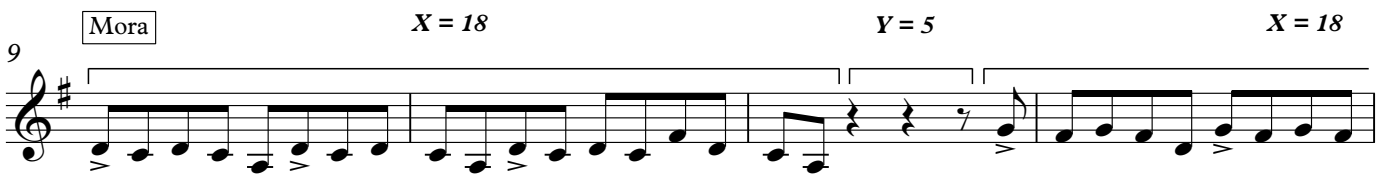
# The Sacred Cow's Tail

CD1 Track 6

Introduction:

composed by Sandy Evans  
transcribed and arranged by Lyndon Gray

Whole ensemble unison:



25 Tenor Saxophone:

Guitar:

Bass:

Melody:

29 Sax & Keys:  
D<sup>7</sup> (Keys up 1 octave)

Gtr:

33 G<sup>7</sup> D<sup>7</sup>

Gtr:

37 Gtr, TS & Keys:  
Bs & Keys L.H.:

40 Drums:

Whole ensemble unison:

43 Mora X = 5 X = 5 X = 5 Fine

Guitar Improvisation:

46  $D^7$  Open til cue

Staff 46-51: Treble clef, key signature of one sharp (F#). The staff contains a series of rhythmic slashes representing improvisation. A double bar line with repeat dots is at the end.

Transcribed bass and drum improvisation:

Koraippu

Phase 1:

48

Staff 48-51: Bass clef, key signature of one sharp (F#). Labeled 'Bass:' and 'Drums:'. The bass line has eighth-note patterns, and the drums have rhythmic slashes. A double bar line with repeat dots is at the end.

Srotovaha mora

52

Staff 52-55: Bass clef, key signature of one sharp (F#). Labeled 'Bs:' and 'Dr:'. Above the staff are brackets with labels: X = 7, Y = 4, X' = 8, Y = 4, X'' = 9. The bass line has eighth-note patterns, and the drums have rhythmic slashes. A double bar line with repeat dots is at the end.

56

Staff 56-59: Bass clef, key signature of one sharp (F#). Labeled 'Bs:' and 'Dr:'. The bass line has eighth-note patterns, and the drums have rhythmic slashes. A double bar line with repeat dots is at the end.

60

Staff 60-63: Bass clef, key signature of one sharp (F#). Labeled 'Bs:' and 'Dr:'. The bass line has eighth-note patterns, and the drums have rhythmic slashes. A double bar line with repeat dots is at the end.

Phase 2:

64

Staff 64-67: Bass clef, key signature of one sharp (F#). Labeled 'Bs:' and 'Dr:'. The bass line has eighth-note patterns, and the drums have rhythmic slashes. A double bar line with repeat dots is at the end.

68

Staff 68-71: Bass clef, key signature of one sharp (F#). Labeled 'Bs:' and 'Dr:'. The bass line has eighth-note patterns, and the drums have rhythmic slashes. A double bar line with repeat dots is at the end.

Phase 3:

72

Staff 72-75: Bass clef, key signature of one sharp (F#). Labeled 'Bs:' and 'Dr:'. The bass line has eighth-note patterns, and the drums have rhythmic slashes. A double bar line with repeat dots is at the end.

Phase 4:

76

Staff 76-79: Bass clef, key signature of one sharp (F#). Labeled 'Bs:' and 'Dr:'. The bass line has eighth-note patterns, and the drums have rhythmic slashes. A double bar line with repeat dots is at the end.

Phase 5:

80

Staff 80-83: Bass clef, key signature of one sharp (F#). Labeled 'Bs:' and 'Dr:'. The bass line has eighth-note patterns, and the drums have rhythmic slashes. A double bar line with repeat dots is at the end.

Phase 6:

82

Staff 82-85: Bass clef, key signature of one sharp (F#). Labeled 'Bs:' and 'Dr:'. The bass line has eighth-note patterns, and the drums have rhythmic slashes. A double bar line with repeat dots is at the end.

Phase 7:

82

Staff 82-85: Bass clef, key signature of one sharp (F#). Labeled 'Bs:' and 'Dr:'. The bass line has eighth-note patterns, and the drums have rhythmic slashes. A double bar line with repeat dots is at the end.

Saxophone Improvisation:

Open til cue

85 D<sup>7</sup>

*korvai structure:*

Korvai

4 3 3 3 3  
 3 3 3 3 3  
 2 3 3 3 3  
 8 - 2 - 8 - 2 - 8

87

section one (*orderly reduction*)

**D.S. al Fine**

89

3 times

section two (*mora*)

# The Agile Wallaby

CD1 Track 7

composed by Sandy Evans  
transcribed and arranged by Lyndon Gray

8 bar improvised drum introduction:

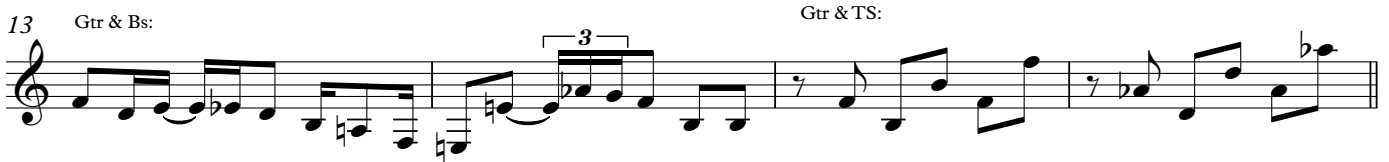


8 bar improvised drum introduction notation in 3/4 time, consisting of a series of rhythmic slashes representing drum strokes.

Melody:



Melody notation for measures 9-12. Measure 9 is marked with a treble clef and a key signature of one flat. The notation includes notes for Guitar & Bass and Gtr & Tenor Saxophone.

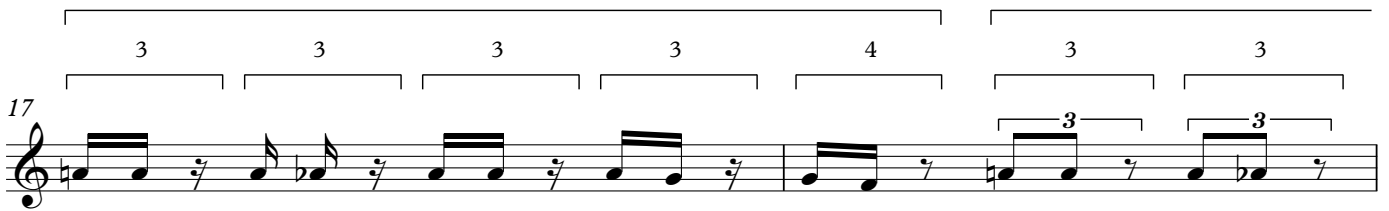


Melody notation for measures 13-16. Measure 13 is marked with a treble clef and a key signature of one flat. The notation includes notes for Guitar & Bass and Gtr & TS, with a triplet of eighth notes in measure 14.

Three speed mora

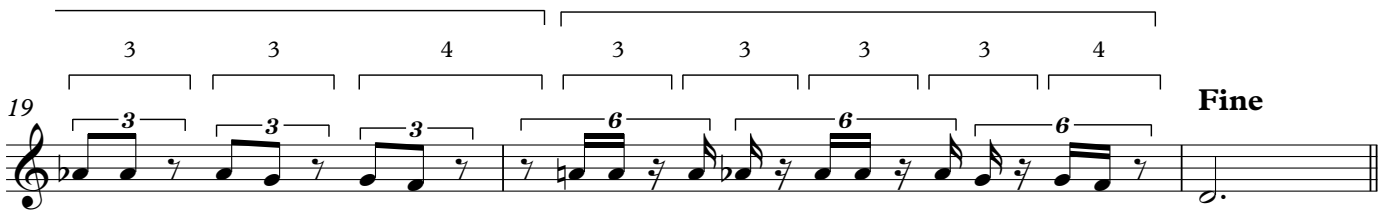
Caturasra nadai X = 16

Tisra nadai X = 16



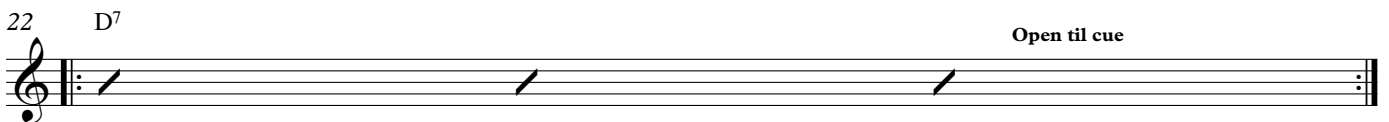
Three speed mora notation for measures 17-18. Measure 17 is marked with a treble clef and a key signature of one flat. The notation includes notes for Guitar & Bass and Gtr & TS, with a triplet of eighth notes in measure 17 and a triplet of eighth notes in measure 18.

Double speed tisra nadai X = 16



Double speed tisra nadai notation for measures 19-21. Measure 19 is marked with a treble clef and a key signature of one flat. The notation includes notes for Guitar & Bass and Gtr & TS, with a triplet of eighth notes in measure 19 and a triplet of eighth notes in measure 20. The word "Fine" is written at the end of the section.

Open improvisation section:



Open improvisation section notation for measures 22-23. Measure 22 is marked with a treble clef and a key signature of one flat. The notation includes notes for Guitar & Bass and Gtr & TS, with a D7 chord indicated above the staff. The word "Open til cue" is written above the staff.



On cue notation for measures 23-24. Measure 23 is marked with a treble clef and a key signature of one flat. The notation includes notes for Guitar & Bass and Gtr & TS, with a D7 chord indicated above the staff. The word "On cue" is written above the staff. The word "D.S. al Fine" is written at the end of the section.

# Tongue & Groove

CD1 Track 8

Melody:

composed by Tom Chang

transcribed and arranged by Lyndon Gray

Gopucca

Alto Saxophone: 4 4 4 4 4 3 3 3 3 3 2 2 2

Keyboard:

Bass phrases around this figure:

3 2 2 1 1 1 1 1

4

First interlude:

6 B $\flat$ maj7(#5) E $\flat$ omaj7 E $\flat$ m(maj7) E $\flat$ omaj7 Open til cue

Bass and drums improvise around this ostinato  
Sparse chords from keys

2

Saxophone improvisation:

10  $B\flat$ maj7(#5)  $E\flat$ omaj7

Overall harmony is Ebm/Dm  
rhythm section builds on this pattern

12  $E\flat$ m(maj7)  $E\flat$ omaj7

Open til cue

Second interlude:

14

Keyboard improvisation:

16  $B\flat$ maj7  $A\flat$ 7

20  $F\sharp$ m7  $A$ maj7

Open til cue

Melody:

Gopucca

24

4 4 4 4 4 3 3 3 3 3 2 2 2

Bass pedals D

26

2 2 1 1 1 1 1

Ending:

Caturasra nadai

27

Tisra nadai

\*This is a repeat of the preceding phrase converted to tisra nadai.

29

3 3 3 3 3 3 3 3 3 3

Caturasra nadai

31

3 3 3 3 3

# Mora Blues

CD2 Track 1  
CD4 Track 5 (Live Version)

composed by Lyndon Gray

## Introduction:

Drums play all 6 times:

Drum notation for the first system, showing a sequence of six measures with various rhythmic patterns indicated by 'x' marks and a circled 'x'.

Srotovaha

Fingering diagram for the first system, showing numbers 3, 4, 5, 6, 7, 8, and 9 with brackets indicating groupings.

Bass tacet 2 times:

Bass line notation for the first system, featuring a melodic line with triplets and rests.

Alto Saxophone tacet 4 times:

Alto Saxophone line notation for the first system, featuring a melodic line with triplets and rests.

Guitar tacet 4 times:

Guitar line notation for the first system, featuring a sustained chord and rests.

4

6 times

Drum notation for the second system, showing a sequence of six measures with various rhythmic patterns.

Gopucca

Fingering diagram for the second system, showing numbers 8, 7, 6, 5, 4, and 3 with brackets indicating groupings.

Bass line notation for the second system, featuring a melodic line with rests.

Alto Saxophone line notation for the second system, featuring a melodic line with rests.

Guitar line notation for the second system, featuring a sustained chord and rests.

Melody:

Mora 5b

X = 8

Y = 4

X = 8

Y = 4

X = 8

7 AS:

Bs walks on F Blues

Gtr:

Mora 5a

X = 10

Y = 1

X = 10

Y = 1

X = 10

11

Srotovaha

3

4

5

6

7

8

9

15 Bs:

Guitar improvisation:

Saxophone improvisation:

19 \*Improvisations on F Blues

12

12

Transcribed bass improvisation:

First chorus:

43

Measures 43-46 of the first chorus. Measure 43 starts with a bass clef and a key signature of one flat. The melody consists of eighth and quarter notes with various accidentals (flats and naturals). Measure 44 continues the pattern. Measure 45 has a quarter rest followed by eighth notes. Measure 46 ends with a double bar line.

47

Measures 47-50 of the first chorus. Measure 47 continues the melodic line. Measure 48 has a sharp accidental. Measure 49 has a flat accidental. Measure 50 ends with a double bar line.

51

Measures 51-54 of the first chorus. Measure 51 has a quarter rest. Measure 52 has a sharp accidental. Measure 53 has a quarter rest. Measure 54 ends with a double bar line.

Second chorus:

55

Measures 55-58 of the second chorus. Measures 55-58 feature a triplet pattern of eighth notes. Measure 55 has a flat. Measure 56 has a sharp. Measure 57 has a flat. Measure 58 ends with a double bar line.

59

Measures 59-62 of the second chorus. Measures 59-62 continue the triplet pattern. Measure 59 has a flat. Measure 60 has a sharp. Measure 61 has a flat. Measure 62 ends with a double bar line.

63

Measures 63-66 of the second chorus. Measures 63-66 continue the triplet pattern. Measure 63 has a flat. Measure 64 has a sharp. Measure 65 has a flat. Measure 66 ends with a double bar line.

Third chorus:

67

Measures 67-70 of the third chorus. Measures 67-70 feature a triplet pattern of eighth notes. Measure 67 has a sharp. Measure 68 has a flat. Measure 69 has a flat. Measure 70 ends with a double bar line.

Mora 4b

X = 10      Y = 1      X = 10      Y = 1      X = 10

71

Measures 71-74 of the third chorus. Measures 71-74 continue the triplet pattern. Measure 71 has a flat. Measure 72 has a sharp. Measure 73 has a flat. Measure 74 ends with a double bar line.

75

Measures 75-78 of the third chorus. Measures 75-78 continue the triplet pattern. Measure 75 has a sharp. Measure 76 has a flat. Measure 77 has a flat. Measure 78 ends with a double bar line.

Fourth chorus:

79

Musical notation for measures 79-83. Measure 79 starts with a treble clef, a key signature of one sharp (F#), and a 7/8 time signature. It features a series of eighth notes with slurs and accents, including a triplet of eighth notes. Measure 80 continues with eighth notes and a triplet. Measure 81 has eighth notes and a triplet. Measure 82 has eighth notes and a triplet. Measure 83 ends with a quarter rest and a triplet of eighth notes.

84

Musical notation for measures 84-86. Measure 84 starts with a quarter rest, followed by eighth notes and triplets. Measure 85 continues with eighth notes and triplets. Measure 86 ends with a quarter rest, eighth notes, and triplets.

87

Musical notation for measures 87-90. Measures 87-90 consist of eighth notes with slurs and accents, with triplets indicated below the notes.

89

Musical notation for measures 89-91. Measures 89-91 consist of eighth notes with slurs and accents, with triplets indicated below the notes.

Fifth chorus:

91

Musical notation for measures 91-94. Measure 91 starts with a quarter rest, followed by eighth notes with slurs and accents. Measure 92 continues with eighth notes and slurs. Measure 93 has eighth notes with slurs and accents. Measure 94 ends with a quarter rest, eighth notes, and a quarter note.

95

Musical notation for measures 95-98. Measures 95-98 consist of eighth notes with slurs and accents, including a triplet of eighth notes in measure 95.

99

Musical notation for measures 99-102. Measure 99 starts with eighth notes and triplets. Measure 100 continues with eighth notes and slurs. Measure 101 has eighth notes and slurs. Measure 102 ends with eighth notes and a quarter note.

Sixth chorus:

Mora 5b

X = 12

Y = 6

103

X = 12

Y = 6

107

X = 12

111

Drum improvisation:

115 Ensemble hit:

11

Melody:

127

Bs walks on F Blues

131

Ending:

135

Ensemble returns to introductory ostinato, improvises until cue of "Fine":

Musical score for measures 135-138. The score consists of four staves. The top staff is a drum line with a 2/4 time signature, followed by a double bar line and a 6/4 time signature, then a 5/4 time signature, a 3/4 time signature, and finally a 5/4 time signature. The second staff is a bass line with a 2/4 time signature, followed by a double bar line and a 6/4 time signature, then a 5/4 time signature, a 3/4 time signature, and finally a 5/4 time signature. The third staff is a treble line with a 2/4 time signature, followed by a double bar line and a 6/4 time signature, then a 5/4 time signature, a 3/4 time signature, and finally a 5/4 time signature. The fourth staff is a treble line with a 2/4 time signature, followed by a double bar line and a 6/4 time signature, then a 5/4 time signature, a 3/4 time signature, and finally a 5/4 time signature. The score includes various musical notations such as rests, notes, and triplets.

139

Musical score for measures 139-140. The score consists of four staves. The top staff is a drum line with a 5/4 time signature, followed by a double bar line and a 6/4 time signature, and then a double bar line. The second staff is a bass line with a 5/4 time signature, followed by a double bar line and a 6/4 time signature, and then a double bar line. The third staff is a treble line with a 5/4 time signature, followed by a double bar line and a 6/4 time signature, and then a double bar line. The fourth staff is a treble line with a 5/4 time signature, followed by a double bar line and a 6/4 time signature, and then a double bar line. The score includes various musical notations such as rests, notes, and triplets. The word "Fine" is written above the second staff in measure 140, with "on cue" written below it.

# Evidence

CD2 Track 2

CD4 Track 4 (Live Version)

**Khanda nadai**

\*entire piece uses khanda nadai conversion of eighth notes covered in Chapter Four

composed by Thelonious Monk

arranged by Lyndon Gray

## Introduction:

Guitar & Drums:

\*repeats are created by delay pedal

Bbm7

Eb7(#11)

*f* *p* *f* *p*

5

Abmaj9

Db7

*f* *p* *f* *p*

9

Gm7

C7(b9)

*f* *p* *f* *p*

13

F13

Bb7(#11)

Whole ensemble:

*f* *p* *f*

## Melody (A Section):

17

Ebmaj7

Gm7

C7(#11)

21

Fm7

Bb7(#11)

25

A7

Abm7

Db7

29

Fm7

F7(#11)

Gtr & Bs:

Melody (B Section):

33  $Bb m7$   $E b 7(\#11)$

37  $A b m a j 9$   $D b 7$

41  $G m 7$   $C 7(b 9)$

45  $F 13$   $B b 7(\#11)$

Melody (A Section):

49  $E b m a j 7$   $G m 7$   $C 7(\#11)$

53  $F m 7$   $B b 7(\#11)$

57  $A 7$   $A b m 7$   $D b 7$

61  $F m 7$   $F 7(\#11)$   $G t r \ \& \ B s:$  **Fine on head out**

Transcribed bass improvisation from Evidence (Live version), CD4 Track2:

65 Ebmaj7 Gm7 C7(#11)

70 Fm7 Bb7(#11)

74 A7 Abm7 Db7

78 Fm7 F7(#11)

82 Ebmaj7 Gm7 C7(#11)

86 Fm7 Bb7(#11)

90 A7 Abm7 Db7

94 Fm7 F7(#11)

98 Bbm7 Eb7(#11)

102 Abmaj9 Db7

106 Gm7 C7(b9)

110 F13 Bb7(#11)

The image shows a transcribed bass line for the song 'Evidence' (Live version), CD4 Track 2. The notation is in bass clef with a key signature of two flats (Bb and Eb). The piece is in 4/4 time. The bass line consists of 11 measures, grouped into 11-measure phrases. The notes are as follows: Measure 65: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 66: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 67: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 68: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 69: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 70: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 71: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 72: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 73: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 74: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 75: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 76: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 77: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 78: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 79: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 80: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 81: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 82: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 83: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 84: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 85: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 86: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 87: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 88: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 89: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 90: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 91: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 92: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 93: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 94: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 95: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 96: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 97: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 98: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 99: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 100: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 101: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 102: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 103: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 104: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 105: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 106: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 107: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 108: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 109: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb. Measure 110: Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb, G, Bb, Eb.

114 Ebmaj7 Gm7 C7(#11)

Musical notation for measures 114-117. Measure 114 starts with Ebmaj7. Measures 115-117 are under Gm7. Measure 118 is under C7(#11).

118 Fm7 Bb7(#11)

Musical notation for measures 118-121. Measure 118 is under Fm7. Measures 119-121 are under Bb7(#11).

122 A7 Abm7 Db7

Musical notation for measures 122-125. Measure 122 is under A7. Measures 123-124 are under Abm7. Measure 125 is under Db7.

126 Fm7 F7(#11)  
\*Transition to 4-to-a-pulse, into guitar improvisation

Musical notation for measures 126-129. Measure 126 is under Fm7. Measures 127-129 are under F7(#11).  
\*Transition to 4-to-a-pulse, into guitar improvisation



Saxophone improvisation:

59 Dm<sup>7</sup>

67

75

Dm<sup>7</sup>

83

91

Ebm<sup>7</sup> Tisra nadai

99

Dm<sup>7</sup> Khanda nadai

107

1.

Miles Davis' solo converted to khanda nadai:

2.  
Bs & AS:

115

124

132

140

Tisra nadai

Ebm<sup>7</sup> Gtr & AS:

148

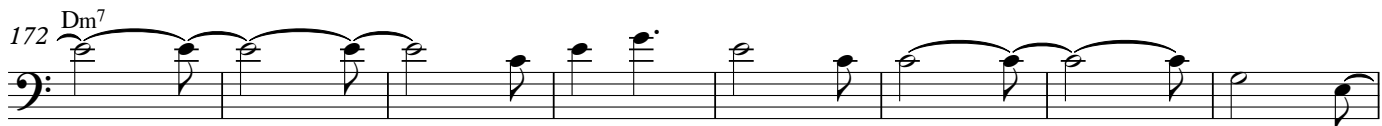
152

Khanda nadai

164

172

172 Dm7



180



188 Dm7



196 Gtr & AS:



Tisra nadai

204 Ebm7



208



Khanda nadai

212 Bs & AS: Dm7



220



Bass improvisation:

228 Dm7



236



244 Dm7



252



260 Ebm7 Tisra nadai

268 Dm7 Khanda nadai

276

(A Section):  
Guitar and Alto Saxophone:

284

294

302

310

Tisra nadai

\*3-to-a-pulse interpreted as swung eighth-notes

317 (B Section):

321

(A Section):

Khanda nadai

326

331

Transition:

Srotovaha

336

## Part Two: Freddie Freeloader

- 1X: Ensemble plays figures together
- 2X: Drums play swing time feel
- 3X: Bass walks
- 4X: Guitar comps on the beat, drums imply superimposed 5/4 groove

Mora

X = 28

Y = 3

342

X = 28

Y = 3

344

X = 28

346

348

351

Transition:

4.

354

Part Three: All Blues

\*Improvisations on form

355 G<sup>7</sup>

355

359 C<sup>7</sup> G<sup>7</sup>

359

363 D<sup>13</sup>(b9) E<sup>b</sup>13(b9) D<sup>13</sup>(b9)

363

365 G<sup>7</sup>

365

Transcribed bass improvisation:

367 G<sup>7</sup>



G<sup>7</sup>

Srotovaha Mora 1a

X = 3 Y = 1 X' = 6 Y = 1 X'' = 9

371 C<sup>7</sup>



375 D<sup>13</sup>(b9)

E<sup>b</sup>13(b9)

D<sup>13</sup>(b9)

G<sup>7</sup>



Mora 4b

G<sup>7</sup> X = 8 Y = 3 X = 8 Y = 3 X = 8

379



G<sup>7</sup>

Mora 1a

X = 8 Y = 1 X = 8 Y = 1 X = 8

383 C<sup>7</sup>



387

D<sup>13</sup>(b9)

E<sup>b</sup>13(b9)

D<sup>13</sup>(b9)

G<sup>7</sup>



G<sup>7</sup>

392



C<sup>7</sup>

G<sup>7</sup>

396



400

D<sup>13</sup>(b9)

E<sup>b</sup>13(b9)

D<sup>13</sup>(b9)

G<sup>7</sup>



# Central Park West

CD2 Track 4

Misra chapu tala

composed by John Coltrane

arranged by Lyndon Gray

Fm<sup>7</sup> Bb<sup>7</sup> Eb<sup>maj7</sup> Ab<sup>m7</sup> Db<sup>7</sup> Gb<sup>maj7</sup> Dm<sup>7</sup> G<sup>7</sup> C<sup>maj7</sup> Bm<sup>7</sup> E<sup>7</sup> A<sup>maj7</sup> Fm<sup>7</sup> Bb<sup>7</sup>

etc

6 Eb<sup>maj7</sup> Ab<sup>m7</sup> Db<sup>7</sup> Gb<sup>maj7</sup> Fm<sup>7</sup> Bb<sup>7</sup>

8 Eb<sup>maj7</sup> Fm/Eb Eb<sup>maj7</sup> Fm/Eb Fm<sup>7</sup> Bb<sup>7</sup>

12 Eb<sup>maj7</sup> Ab<sup>m7</sup> Db<sup>7</sup> Gb<sup>maj7</sup> Dm<sup>7</sup> G<sup>7</sup> C<sup>maj7</sup> Bm<sup>7</sup> E<sup>7</sup> A<sup>maj7</sup> Fm<sup>7</sup> Bb<sup>7</sup>

16 Eb<sup>maj7</sup> Ab<sup>m7</sup> Db<sup>7</sup> Gb<sup>maj7</sup> Fm<sup>7</sup> Bb<sup>7</sup>

18 Eb<sup>maj7</sup> Fm/Eb Eb<sup>maj7</sup> Fm/Eb

# Ornithology

CD2 Track 5

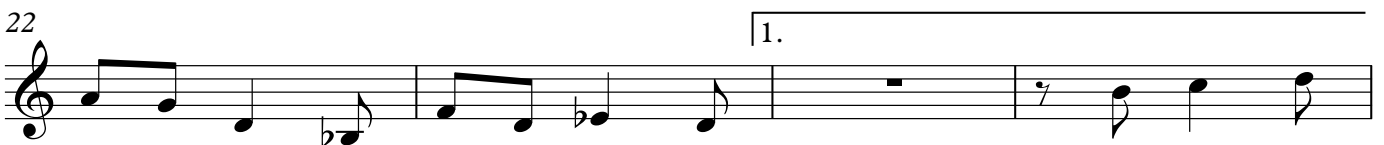
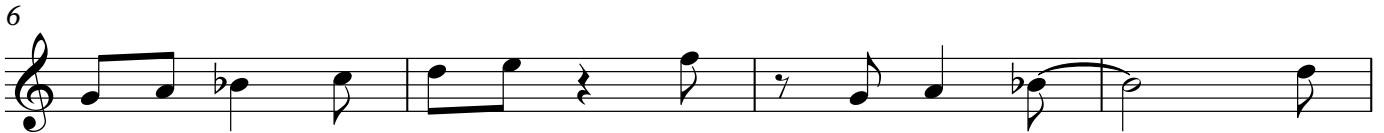
CD2 Track 7 (Live Version)

Khanda nadai

composed by Charlie Parker

arranged by Lyndon Gray

\*entire piece uses khanda nadai conversion of eighth notes covered in Chapter Four



Transcribed bass improvisation from Ornithology (Live version), CD2 Track 7:

Gmaj7

44



Gm7

C7

48



Fmaj7

52



Fm7

Bb7

56



Eb7

Am7(b5)

D7(b9)

60

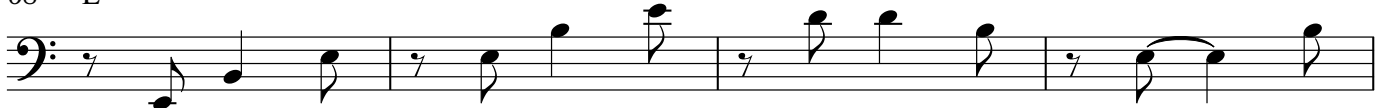


Gm

64



68 E7(sus4)



72 D7(sus4)



Gmaj7

76



# The Winding Way

CD2 Track 6

composed by Dave Holland  
arranged by Lyndon Gray

Melody:  
Gm

Solo section:  
Gm

korvai structure: 2 2 2  
 3 3 3  
 4 4 4  
 3 3 3 3  
 4 4 4 4  
 5 5 5 5  
 9 - (0) - 9 - (0) - 9

Korvai

2. 6 9 12

section one (*orderly expansion*)

12 16

20

X=5 Y=3 X=5 Y=3 X=5

section two (*mora*)



Korvai

\*Same structure as above

Korvai

\*Same structure as above converted to 3-to-a-pulse

Tisra nadai

6 9 12 12

16 20 X=5

Y=3 X=5 Y=3 X=5

# Bass Etude in A

CD3 Track 1

composed by Lyndon Gray

*korvai structure:* 3 3 9 8  
3 9 8  
9 22<sup>(8,8,6)</sup> - 5 - 22<sup>(8,8,6)</sup> - 5 - 22<sup>(8,8,6)</sup>

Korvai

3 3 9 8 3 9

Section one (orderly reduction) is a single staff of music in bass clef, key of A major (two sharps), and 4/4 time. It consists of six measures. The first measure has a triplet of eighth notes (A2, C#3, E3) followed by a quarter rest. The second measure has a triplet of eighth notes (G#2, B2, D3) followed by a quarter rest. The third measure has a triplet of eighth notes (F#2, A2, C#3) followed by a quarter rest. The fourth measure has a triplet of eighth notes (E2, G#2, B2) followed by a quarter rest. The fifth measure has a triplet of eighth notes (D2, F#2, A2) followed by a quarter rest. The sixth measure has a triplet of eighth notes (C#2, E2, G#2) followed by a quarter rest.

section one (*orderly reduction*)

8 9 X = 22

Section two (mora) is a single staff of music in bass clef, key of A major, and 4/4 time. It consists of three measures. The first measure has a triplet of eighth notes (A2, C#3, E3) followed by a quarter rest. The second measure has a triplet of eighth notes (G#2, B2, D3) followed by a quarter rest. The third measure has a triplet of eighth notes (F#2, A2, C#3) followed by a quarter rest.

section two (*mora*)

Y = 5 X = 22

Section three is a single staff of music in bass clef, key of A major, and 4/4 time. It consists of three measures. The first measure has a triplet of eighth notes (A2, C#3, E3) followed by a quarter rest. The second measure has a triplet of eighth notes (G#2, B2, D3) followed by a quarter rest. The third measure has a triplet of eighth notes (F#2, A2, C#3) followed by a quarter rest.

Y = 5 X = 22

Section four is a single staff of music in bass clef, key of A major, and 4/4 time. It consists of three measures. The first measure has a triplet of eighth notes (A2, C#3, E3) followed by a quarter rest. The second measure has a triplet of eighth notes (G#2, B2, D3) followed by a quarter rest. The third measure has a triplet of eighth notes (F#2, A2, C#3) followed by a quarter rest.

Section five is a single staff of music in bass clef, key of A major, and 4/4 time. It consists of three measures. The first measure has a triplet of eighth notes (A2, C#3, E3) followed by a quarter rest. The second measure has a triplet of eighth notes (G#2, B2, D3) followed by a quarter rest. The third measure has a triplet of eighth notes (F#2, A2, C#3) followed by a quarter rest.

Open bass improvisation:

A<sup>13</sup>(<sup>#9</sup><sub>b9</sub>)

Open bass improvisation is a single staff of music in bass clef, key of A major, and 4/4 time. It consists of three measures, each containing a slash (/) indicating improvisation.

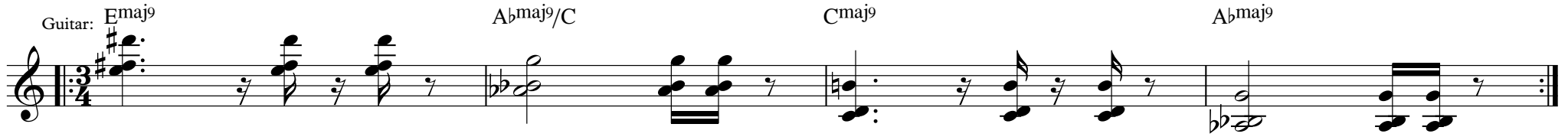
# Ignominy!

CD3 Track 2

composed by Lyndon Gray

Introduction:

Guitar:  $E^{maj9}$   $A^{\flat}maj^9/C$   $C^{maj9}$   $A^{\flat}maj^9$



Melody:

**Srotovaha** 3 6 9 12 15 **Fine**

5 Tenor Saxophone and Bass:




9 Gtr:




**Srotovaha** 3 6 9 12 15

13 TS & Bs:



17 Gtr:



*korvai structure:*

2 5 2 6  
5 2 6  
2 6

Korvai

TS & Bs:

**18 - 3 - 18 - 3 - 18**

2 5 2 6 5 2 6 2 6

21

section one (*orderly reduction*)

**X = 18**

**Y = 3**

**X = 18**

24

section two (*mora*)

**Y = 3**

**X = 18**

27

29 Bs & Dr:

34

Three speed mora      Caturasra nadai      Tisra nadai      Double speed tistra nadai

Gtr & TS:       $X = 16$        $X = 16$        $X = 16$

Transcribed bass improvisation:

38 Bmaj9      Ebmaj9/G      Gmaj9      Ebmaj9

42 Bmaj9

Sub-mora

$X = 10$        $Y = 4$        $X = 10$

5      5      2      2      5       $X' = 5$        $Y' = 2$        $X' = 5$        $Y' = 2$        $X' = 5$

half duration sub-mora

46 Bmaj9 Ebmaj9/G Gmaj9 Ebmaj9

50 Bmaj9 Ebmaj9/G Gmaj9 Ebmaj9

54 Bmaj9 Ebmaj9/G Gmaj9 Ebmaj9

Khanda nadai

Khanda nadai

58 Bmaj9 Ebmaj9/G Gmaj9 Ebmaj9

62 Bmaj9 Ebmaj9/G Gmaj9 Ebmaj9

6

Detailed description: This system contains measures 62 through 65. Measure 62 starts with a B major 9th chord (Bmaj9) and features a rhythmic pattern of eighth notes with slurs. Measure 63 has an Eb major 9th chord with G in the bass (Ebmaj9/G) and continues the eighth-note pattern. Measure 64 has a G major 9th chord (Gmaj9) and includes a sixteenth-note triplet. Measure 65 has an Eb major 9th chord (Ebmaj9) and ends with a sixteenth-note triplet. A '6' is written below the staff at the end of measure 65.

66 Bmaj9 Ebmaj9/G Gmaj9 Ebmaj9

Detailed description: This system contains measures 66 through 69. Measure 66 has a Bmaj9 chord and a complex eighth-note pattern. Measure 67 has an Ebmaj9/G chord and continues the eighth-note pattern. Measure 68 has a Gmaj9 chord and features a series of slurs over eighth notes. Measure 69 has an Ebmaj9 chord and ends with a slurred eighth-note pattern.

70 Bmaj9 Ebmaj9/G 8va-1 Gmaj9 Ebmaj9

Detailed description: This system contains measures 70 through 73. Measure 70 has a Bmaj9 chord and eighth-note patterns. Measure 71 has an Ebmaj9/G chord and includes an 8va-1 marking above the staff. Measure 72 has a Gmaj9 chord and continues the eighth-note pattern. Measure 73 has an Ebmaj9 chord and features a series of slurs over eighth notes.

74 Bmaj9 Ebmaj9/G Gmaj9 Ebmaj9

Detailed description: This system contains measures 74 through 77. Measure 74 has a Bmaj9 chord and eighth-note patterns. Measure 75 has an Ebmaj9/G chord and continues the eighth-note pattern. Measure 76 has a Gmaj9 chord and features a series of slurs over eighth notes. Measure 77 has an Ebmaj9 chord and ends with a slurred eighth-note pattern.



Saxophone improvisation:

Open til cue

82 Bmaj7 Am7 Bm7 Bb7 Cm7 C#m7 Bmaj7 Am7 Bm7 Bb7 Bmaj7 Am7 Bm7 Bb7 Cm7 C#m7

A single staff of music in treble clef, measures 82-85. The melody consists of eighth and quarter notes with various accidentals. Chord symbols are written above the staff: Bmaj7, Am7, Bm7, Bb7, Cm7, C#m7, Bmaj7, Am7, Bm7, Bb7, Bmaj7, Am7, Bm7, Bb7, Cm7, C#m7.

Saxophone improvisation continues:

Open til cue

86 Em9 Abm9 Cm9 Abm9

A single staff of music in treble clef, measures 86-89. The melody consists of quarter notes and eighth notes. Chord symbols are written above the staff: Em9, Abm9, Cm9, Abm9.

Interlude:

Bs & Dr:

90

A single staff of music in bass clef, measures 90-94. The melody consists of eighth and quarter notes. There are first and second endings marked with '1.' and '2.' above the staff.

three speed mora

Caturasra nadai

Tisra nadai

Double speed tisra nadai

Gtr & TS:

X = 16

X = 16

X = 16

95

A single staff of music in treble clef, measures 95-99. The melody consists of eighth and quarter notes with triplets and sextuplets. Brackets above the staff indicate groupings of 3 and 6 notes.

Guitar improvisation:

99 Bs: Tisra nadai  $\text{E}^{\flat}\text{maj}9$   $\text{A}^{\flat}\text{maj}9/\text{C}$   $\text{C}^{\flat}\text{maj}9$   $\text{A}^{\flat}\text{maj}9$  **Open til cue**

Dr: **2**

103 **On cue**

# Guitar and saxophone improvisation:

double time feel (6-to-a-pulse)

107 Em<sup>9</sup> Abm<sup>9</sup> Cm<sup>9</sup> Abmaj<sup>9</sup> **Open til cue** **On cue**

# Drum improvisation:

**D.C. al Fine**

113 TS tacet: **Open til cue** **On cue**

Guitar comps behind drums:  
Em<sup>9</sup> Abm<sup>9</sup> Cm<sup>9</sup> Abmaj<sup>9</sup>

Bs tacet:

# Peripatetic Palanquin

CD3 Track 3

composed by Lyndon Gray and Ed Heddle

*korvai structure:*

3 6  
2 3 6  
2 2 3 6  
7 - 3 - 7 - 3 - 7

Korvai

Gopucca

\*Korvai is played in increasingly faster subdivisions

Mora

\*Korvai is played three times

Caturasra nadai

section one (*orderly reduction*)

Detailed description: This musical staff shows the first section of the piece, labeled 'Caturasra nadai'. It consists of a single line of music in bass clef. Above the staff, there are brackets indicating rhythmic groupings: 3, 6, 2, 3, 6, 2, 2, 3, 6, and X=7. The notes are primarily eighth and sixteenth notes, with some beamed sixteenth notes. The key signature has two flats (Bb and Eb).

4

Y=3 X=7 Y=3 X=7

Korvai

Khanda nadai

section two (*mora*)

Detailed description: This musical staff shows the second section, labeled 'section two (mora)'. It starts at measure 4. Above the staff, there are brackets indicating rhythmic groupings: Y=3, X=7, Y=3, and X=7. The notes are primarily eighth and sixteenth notes, with some beamed sixteenth notes. The key signature has two flats. There are also brackets labeled '5' under some of the notes.

6

Detailed description: This musical staff shows the third section, starting at measure 6. It features a complex rhythmic pattern with many beamed sixteenth notes. There are brackets labeled '5' under several groups of notes.

8

Korvai

Tisra nadai

Detailed description: This musical staff shows the fourth section, labeled 'Tisra nadai', starting at measure 8. It features a complex rhythmic pattern with many beamed sixteenth notes. There are brackets labeled '6' under several groups of notes.

10

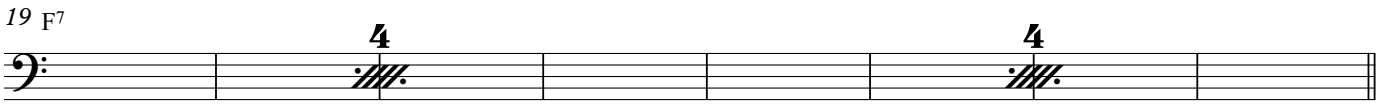
Detailed description: This musical staff shows the fifth section, starting at measure 10. It features a complex rhythmic pattern with many beamed sixteenth notes. There are brackets labeled '6' under several groups of notes.

Piano improvisation (tisra nadai):

11 F<sup>7</sup>



19 F<sup>7</sup>

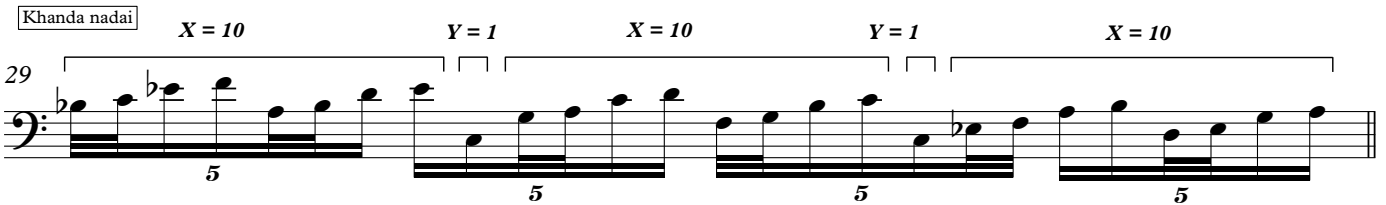


Interlude: Mora  
Caturasra nadai X = 10 Y = 1 X = 10 Y = 1 X = 10

27 Tisra nadai



29 Khanda nadai X = 10 Y = 1 X = 10 Y = 1 X = 10



Transcribed bass improvisation (Khanda Nadai):

30



33



35



37



39



korvai structure:

		2	2	2	2
		3	2	2	2
Korvai	3	3	2	2	2
Gopucca	9 - (0) - 9 - (0) - 9				
Mora					
Caturasra nadai					

42 Tisra nadai

44

section one (*orderly expansion*)

46

section two (*mora*)

48

50

Korvai

51 Tisra nadai

52

# There Are Birds

CD3 Track 4

CD4 Track 2 (Live Version)

composed by Lyndon Gray

## Tisra nadai

\*ie. swung eighth notes

Musical notation for measures 1-4. Chords: Cmaj7, Cm, F7.

Musical notation for measures 5-8. Chords: Gmaj7, Bbm7, Eb7.

Musical notation for measures 9-12. Chords: Am7, D7, Bm7, E7.

Musical notation for measures 13-16. Chords: A9, Bb°, Bm, E7, Em, A7, Am, D7, Dm, G7. Includes piano accompaniment (Pno L.H.) and bass line (Bass).

## 2. Srotovaha Mora 5b

Musical notation for measures 17-20. Chords: A9, D13(b9), Gmaj7(#5), G7alt. Includes piano accompaniment (Pno L.H.) and bass line (Bass).

Misra nadai

\*ie. same melody converted to 7-to-a-pulse

21 Cmaj7 Cm F7

25 Gmaj7 Bbm7 Eb7

29 Am9 D13 Bm7 E7

33 1. A9 Bb° Bm E7 Em A7 Am D7 Dm G7

37 2. Am9 D13 Gmaj9 solo break

# Old Knives

CD3 Track 5

Introduction:

Written part:

composed by Lyndon Gray

Caturasra nadai

Bass:

Transcribed bass improvisation:

Written part:

Transcribed bass improvisation:

Written part:

Transcribed bass improvisation:

Written part:

Transcribed bass improvisation:



(B section):

75 *drum fill*.....

Am B $\flat$ 7(sus4) E $\flat$ m

Musical notation for measures 75-79. Measure 75 contains a drum fill. Measures 76-79 are in 5/4 time. The melody in the treble clef consists of quarter notes: G $\flat$ , F $\flat$ , E $\flat$ , D $\flat$ , C $\flat$ , B $\flat$ , A $\flat$ , G $\flat$ . The bass line in the bass clef consists of quarter notes: G $\flat$ , F $\flat$ , E $\flat$ , D $\flat$ , C $\flat$ , B $\flat$ , A $\flat$ , G $\flat$ . Chords are indicated above the staff: Am, B $\flat$ 7(sus4), E $\flat$ m.

80 C/G B $\flat$ m11 Am(#11)

1.

2.

A $\flat$ 7(sus4)

A/B

Musical notation for measures 80-83. Measure 80 contains a drum fill. Measures 81-83 are in 5/4 time. The melody in the treble clef consists of quarter notes: G $\flat$ , F $\flat$ , E $\flat$ , D $\flat$ , C $\flat$ , B $\flat$ , A $\flat$ , G $\flat$ . The bass line in the bass clef consists of quarter notes: G $\flat$ , F $\flat$ , E $\flat$ , D $\flat$ , C $\flat$ , B $\flat$ , A $\flat$ , G $\flat$ . Chords are indicated above the staff: C/G, B $\flat$ m11, Am(#11), A $\flat$ 7(sus4), A/B. Dynamics include *p*.

84 E/G#

G $^+$

F#

F

E7

Musical notation for measures 84-85. The melody in the treble clef consists of quarter notes: E $\sharp$ , D $\sharp$ , C $\sharp$ , B $\sharp$ , A $\sharp$ , G $\sharp$ , F $\sharp$ , E $\sharp$ . The bass line in the bass clef consists of quarter notes: E $\sharp$ , D $\sharp$ , C $\sharp$ , B $\sharp$ , A $\sharp$ , G $\sharp$ , F $\sharp$ , E $\sharp$ . Chords are indicated above the staff: E/G $\sharp$ , G $^+$ , F $\sharp$ , F, E7.

86 Am(#11)

Musical notation for measures 86-89. Measure 86 contains a drum fill. Measures 87-89 are in 5/4 time. The melody in the treble clef consists of quarter notes: G $\flat$ , F $\flat$ , E $\flat$ , D $\flat$ , C $\flat$ , B $\flat$ , A $\flat$ , G $\flat$ . The bass line in the bass clef consists of quarter notes: G $\flat$ , F $\flat$ , E $\flat$ , D $\flat$ , C $\flat$ , B $\flat$ , A $\flat$ , G $\flat$ . Chord is indicated above the staff: Am(#11). Dynamics include *ff*.

# Alabaster

CD3 Track 6

composed by Lyndon Gray & Ed Heddle

Melody:

Musical notation for measures 1-3. Treble clef, 12/8 time signature. Chord A7 is indicated above the first measure. Bass clef contains piano accompaniment. Labels "Bass & Pno left hand:" and "Bass walks:" are present.

Musical notation for measures 4-7. Treble clef, 12/8 time signature. Chords A7 and F7 are indicated above the first and seventh measures respectively. Bass clef contains piano accompaniment. Label "Bs & Pno L.H.:" is present.

Musical notation for measures 8-11. Treble clef, 12/8 time signature. Chord C7 is indicated above the first measure. Bass clef contains piano accompaniment.

Musical notation for measures 12-15. Treble clef, 12/8 time signature. Chord C7 is indicated above the first measure. Bass clef contains piano accompaniment. Label "Bs & Pno L.H.:" is present.

10 Fm<sup>7</sup> Bb<sup>7</sup>

bass:

12 A<sup>7</sup> To Coda Gb<sup>7</sup> F<sup>7</sup>

Transcribed bass and piano improvisation:

Koraippu: Phase 1:

14 F/C C Bass:

18 F/C C Piano:

22 F/C C Bass:

26 F/C C *Piano:*

Musical staff for measures 26-29, Treble Clef, Piano dynamics. The staff contains a sequence of chords and melodic lines. Measures 26 and 27 feature a guitar-style chord progression with 'x' marks above the notes, indicating muted strings. The melody begins with a half note G4, followed by quarter notes A4, B4, and C5. The piece concludes with a double bar line.

30 F/C C *Bass:*

Musical staff for measures 30-33, Bass Clef, Bass dynamics. The staff contains a sequence of chords and melodic lines. Measures 30 and 31 feature a guitar-style chord progression with 'x' marks above the notes, indicating muted strings. The melody begins with a half note G3, followed by quarter notes A3, B3, and C4. The piece concludes with a double bar line.

34 F/C C *Piano:*

Musical staff for measures 34-37, Treble Clef, Piano dynamics. The staff contains a sequence of chords and melodic lines. Measures 34 and 35 feature a guitar-style chord progression with 'x' marks above the notes, indicating muted strings. The melody begins with a half note G4, followed by quarter notes A4, B4, and C5. The piece concludes with a double bar line.

38 F/C C *Bass:*

Musical staff for measures 38-41, Bass Clef, Bass dynamics. The staff contains a sequence of chords and melodic lines. Measures 38 and 39 feature a guitar-style chord progression with 'x' marks above the notes, indicating muted strings. The melody begins with a half note G3, followed by quarter notes A3, B3, and C4. The piece concludes with a double bar line.

42 F/C C *Piano:*

Musical staff for measures 42-43, Bass Clef, Piano dynamics. The staff contains a sequence of chords and melodic lines. Measures 42 and 43 feature a guitar-style chord progression with 'x' marks above the notes, indicating muted strings. The melody begins with a half note G3, followed by quarter notes A3, B3, and C4. The piece concludes with a double bar line.

44

Musical staff for measures 44-45, Treble Clef. The staff contains a sequence of chords and melodic lines. Measures 44 and 45 feature a guitar-style chord progression with 'x' marks above the notes, indicating muted strings. The melody begins with a half note G4, followed by quarter notes A4, B4, and C5. The piece concludes with a double bar line.

Phase 2:

46 F<sup>7</sup> *Bass:* *Piano:*

50 F<sup>7</sup> *Bass:* *Piano:*

54 F<sup>7</sup> *Bass:* *Piano:*

58 F<sup>7</sup> *Bass:* *Piano:*

Phase 3:

62 D<sup>7</sup> *Bass:* *Piano:* *Bass:* *Piano:*

66 *Bass:* *Piano:*

68 *Bass:* *Piano:*

Phase 4 (written):

70 Fm<sup>7</sup> Pno: Bb<sup>7</sup>

Bs:

D.S. al Coda

72 A<sup>7</sup> Gb<sup>7</sup> F<sup>7</sup>

Bs & Pno L.H.:



Bs & Pno L.H.:

B

Melody and solo form:

# Bat Tricks

CD3 Track 7

composed by Lyndon Gray

Srotovaha

\*Expansion principle applied to intervals.

ie. intervals increase by semitones, ascending in saxophone part, descending in guitar part.

Octaves are switched where necessary.

Cmaj7

Tenor Saxophone: Dmaj7 Fm/Eb Dmaj7

Guitar: min 2 maj 2 min 3 maj 3 perfect 4 tritone perfect 5 min 6 (octave shift) maj 6 min 7 maj 7

Bass:

5 Bm7 Cmaj7 Bm7 G13 F#m7

*p* *f*

min 2 maj 2 min 3 maj 3 perfect 4 tritone (octave shift) perfect 5 min 2 maj 2 min 3 maj 3 perfect 4

9 F#m7 Gmaj13 C#m7(b5) F#7(b9) Bm

3 3 3 3

13 Em7 Fm13 Emaj7 Ebm7 Emaj7

*mp* *mp*

16 *Emaj7* *C#7(b9)* *Emaj7*

19 *Emaj7* *C#7(b9)* drum fill

Srotovaha

21 *Dmaj7* *Fm/Eb* *Dmaj7* *Cmaj7*

*mf*

min 2 min 2 maj 2 maj 2 min 3 min 3 maj 3 maj 3 perfect 4 perfect 4 (octave shift) tritone tritone perfect 5 min 6 (octave shift) min 6 (octave shift) maj 6 maj 6 min 7 (octave shift) min 7 (octave shift) maj 7 maj 7

*mf*

*mf*

25 *Bm7* *Cmaj7* *Bm7* *G13* *F#m7*

*p*

*p*

29  $F\#m^7$   $Gmaj^{13}$   $C\#m^7(b5)$   $F\#7(b9)$   $Bm$

33  $Em^7$   $Fm^{13}$   $Emaj^7$   $Ebm^7$   $Emaj^7$  **To Coda on head out**

$\Phi$

**Srotovaha**

$\text{min } 2$   $\text{maj } 2$   $\text{min } 3$   $\text{maj } 3$   $\text{perfect } 4$   $\text{tritone}$   $\text{perfect } 5$   $\text{min } 6$   $\text{maj } 6$   $\text{min } 7$  **4 times**

37



Phase 2:

18 *Bass:*  $\text{Db}$



20 *Piano:*  $\text{Db}$



22 *Bass:*  $\text{Db}$



24 *Piano:*  $\text{Db}$



Phase 3:

26 *Bass:*  $\text{Db}$  *Piano:*  $\text{Db}$



28 *Bass:*  $\text{Db}$  *Piano:*  $\text{Db}$



Phase 4:

30 *Bass:* *Piano:*



31 *Bass:* *Piano:*





# Good Luck Everybody

CD3 Track 10  
CD4 Track 6 (Live Version)

composed by Lyndon Gray

Misra chapu tala

Melody and solo form:

Dm<sup>13</sup> / / C<sup>13</sup> / / / G<sup>7</sup>/B / / Bbm<sup>13</sup> / Bbm<sup>(b6)</sup> /

3 Abm<sup>13</sup> / / Gb<sup>13</sup> / / / Db<sup>7</sup>/F / / Em<sup>13</sup> / Em<sup>(b6)</sup> /

Transcribed bass improvisation:

Dm<sup>13</sup> C<sup>13</sup> G<sup>7</sup>/B Bbm<sup>13</sup> Bbm<sup>(b6)</sup> Abm<sup>13</sup> Gb<sup>13</sup> Db<sup>7</sup>/F Em<sup>13</sup> Em<sup>(b6)</sup>

Gopucca

\*entire solo progresses through increasingly faster subdivisions grouped in 7s

Half notes grouped in 7s:

Dm<sup>13</sup> C<sup>13</sup> G<sup>7</sup>/B Bbm<sup>13</sup> Bbm<sup>(b6)</sup> Abm<sup>13</sup> Gb<sup>13</sup> Db<sup>7</sup>/F Em<sup>13</sup> Em<sup>(b6)</sup>

Quarter notes grouped in 7s:

Dm<sup>13</sup> C<sup>13</sup> G<sup>7</sup>/B Bbm<sup>13</sup> Bbm<sup>(b6)</sup>

Abm<sup>13</sup> Gb<sup>13</sup> Db<sup>7</sup>/F Em<sup>13</sup> Em<sup>(b6)</sup>

Dm<sup>13</sup> C<sup>13</sup> G<sup>7</sup>/B Bbm<sup>13</sup> Bbm<sup>(b6)</sup>

Abm<sup>13</sup> Gb<sup>13</sup> Db<sup>7</sup>/F Em<sup>13</sup> Em<sup>(b6)</sup>

21  $Dm^{13}$   $C^{13}$   $G^7/B$   $Bbm^{13}$   $Bbm^{(b6)}$

23  $Abm^{13}$   $Gb^{13}$   $Db^7/F$   $Em^{13}$   $Em^{(b6)}$

Eighth notes grouped in 7s:

25  $Dm^{13}$   $C^{13}$   $G^7/B$   $Bbm^{13}$   $Bbm^{(b6)}$

27  $Abm^{13}$   $Gb^{13}$   $Db^7/F$   $Em^{13}$   $Em^{(b6)}$

Sixteenth notes grouped in 7s:

29  $Dm^{13}$   $C^{13}$   $G^7/B$   $Bbm^{13}$   $Bbm^{(b6)}$

31  $Abm^{13}$   $Gb^{13}$   $Db^7/F$   $Em^{13}$   $Em^{(b6)}$

33  $Dm^{13}$   $C^{13}$   $G^7/B$   $Bbm^{13}$   $Bbm^{(b6)}$

35  $Abm^{13}$   $Gb^{13}$   $Db^7/F$   $Em^{13}$   $Em^{(b6)}$

Ending:

37  $Dm^{13}$   $Dm^{(b6)}$  /  $C^{13}$  / / /  $Ab^{\circ}/B$   $G^7/B$  /  $Bbm^{13}$  /  $Bbm^{(b6)}$  /

39  $Abm^{13}$   $Abm^{(b6)}$  /  $Gb^{13}$  / / /  $Db^+/F$   $Db^7/F$  /  $Em^{13}$  /  $Em^{(b6)}$  /

# Bass Etude in E minor

CD3 Track 11

composed by Lyndon Gray

This piece is based on a solkattu exercise featured in "Solkattu manual" by David Nelson, p. 61.



# 1062956 Blues

composed by Lyndon Gray

## CD4 Track 1

This composition is the centrepiece of the "Culmination" CD and incorporates elements from all five chapters of the exegesis: mora, sub-mora, gopucca, srotovaha, korvai, tisra nadai, khanda nadai and koraippu. In addition to this, the piece progresses through different levels of rhythmic intensity and speed through the use of nadai while maintaining a consistent 70 bpm pulse over the entire 26 minute performance. This is comparable to the structure of a large scale Carnatic piece and its underpinning tala.

Whole group improvisation:

Bass improvisation:

$E_b\text{maj7}(\#11)$   $\text{♩} = 70$   $E_b\text{maj7}(\#11)$  Open til cue

3 on cue:

Srotovaha mora \*the expansion in this mora is expressed in the Y phrases

$E_b\text{maj7}(\#11)$   $X = 30$

5 Tenor Saxophone: *mp* Guitar: *mp*  
Trumpet: *mp*  
Guitar & Piano: *light comping*

7  $E_b\text{maj7}(\#11)$   $X = 30$

$Y = 16$  *p*

9

Y' = 22

11  $E_b$ maj7(#11) X = 30

**Mora**

Gtr, Pno & Bs:

X = 28

**Gopucca**

\*X phrase constructed with orderly reduction

13 7 6 5 4 3 2 1 TS & Tpt:

Y = 22

X = 28

15 Gtr, Pno & Bs:

Y = 22

17 TS & Tpt:

X = 28

19 Gtr, Pno & Bs: **Fine**

Trumpet improvisation:

\*Solo progresses from bass pattern 1 to bass pattern 2

BASS PATTERN 1:

BASS PATTERN 2:

21  $E_b$ maj7(#11) Open til cue  $Bb$ m7 Open til cue

*korvai structure:*

three speed korvai

6 3  
5 5 6 3  
6 6 6 3  
9 - 2 - 9 - 2 - 9

Korvai

6 3 5 5

23 Tenor Saxophone:

section one (*orderly expansion*)

Trumpet:

6 3 6 6 6 3

24

X = 9 Y = 2 X = 9 Y = 2 X = 9

26

section two (*mora*)

Korvai

\*Same structure as previous korvai expressed in a 3-to-a-pulse context.

Bracketing has been omitted for ease of reading: refer to previous diagram for analysis.

Tisra nadai

28

31

Korvai

Double speed tisra nadai

34

36

Guitar improvisation:

38

Bbm7 Double speed tisra nadai      Open til cue      A7alt. tisra nadai      Open til cue

♩. = 70

Mora \*X and Y values are related to the sixteenth note subdivision

$X = 32$   $Y = 12$

43 Bs:

$X = 32$   $Y = 12$

45

Sub-mora \*this is the previous mora converted to a sub-mora

$X = 32$   $X = 32$

47 Gtr:

$Y = 12$   $X = 32$

49

$Y' = 6$   $X' = 16$   $Y' = 6$   $X' = 16$

51

half duration sub-mora

Mora  $X = 16$   $Y = 6$   $X = 16$

53 Pno:

$Y = 6$   $X = 16$  Sub-mora  $X = 16$

55 Pno, Gtr & Bs:

$Y = 6$   $X = 16$   $X' = 8$   $Y' = 3$   $X' = 8$   $Y' = 3$   $X' = 8$

57

half duration sub-mora

Piano improvisation:

60 Tisra nadai G<sup>11</sup> *mixolydian sounds* **Open til cue** Khanda nadai G<sup>7</sup>(#9) *funkier sounds (8-note, blues etc.)* **Open til cue**

♩=70

Khanda nadai \*After groove is established, group improv occurs, giving way to sax solo

62 B<sup>b</sup> **Open til cue**

Saxophone improvisation:

63 B<sup>b</sup> Khanda nadai **Open til cue** B<sup>b</sup> Tisra nadai **Open til cue**

Drum improvisation:

65 Tisra nadai **Open til cue**

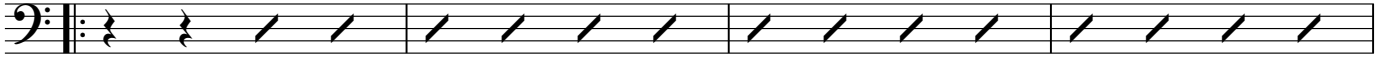
# Koraippu

Tisra nadai

## Phase 1 :

66

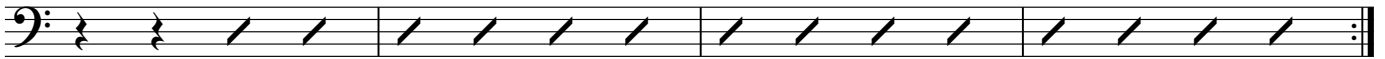
Drums: \* improvising with groups of 7



70

Bass: \* improvising with groups of 7

4 times



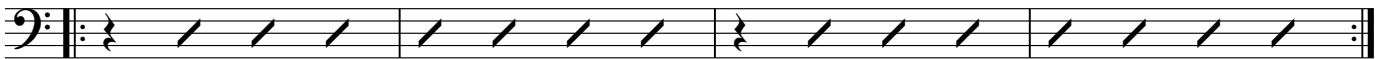
## Phase 2 :

Drums: \* improvising with groups of 7

Bass: \* improvising with groups of 7

74

4 times

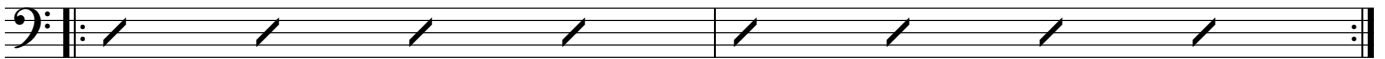


## Phase 3 :

78

Drums:

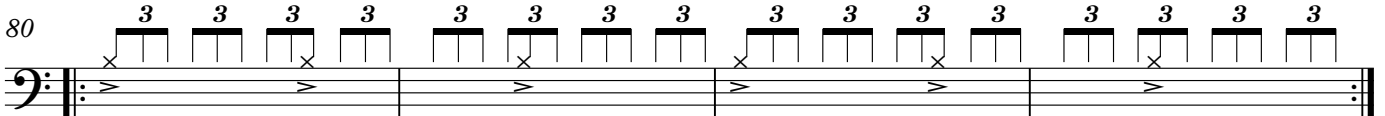
Bass:



## Phase 4 :

80

Drums: Bass: Drums: Bass: Drums: Bass:



## Phase 5 :

**D.C. al Fine**

84

Drums: Bass: Drums: Bass: Drums: Bass:

