A Contemporary Improvisational Methodology for the Cellist

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UNIVERSITY OF MIAMI

A doctoral essay submitted in partial fulfillment of
the requirements for the degree of
Doctor of Musical Arts

A CONTEMPORARY IMPROVISATIONAL METHODOLOGY
FOR THE CELLIST

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A Contemporary Improvisational Methodology for the Cellist.

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Musical improvisation curriculums are currently in the process of being created as part of the performance training of classical string players. However, as a performance practice there is currently no educational method that addresses technical methodology as related specifically to the cello. This dissertation provides background research into areas of learning that include theories of improvisational methods specifically designed for the cellist and creative practice approaches that compliment conservatory-style repertoire based education. This is all framed within a new approach to fingerboard visualization as maps of tonal harmony for creative interpretation and continual study. Recommendations for further study and additional uses of these methods are included.
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Chapter 1

Background

My introduction to Professor Vincent Maggio came in the Spring of 2017. I was a student in his graduate performance seminar that he calls Concepts of Classical Improvisation. Vincent Maggio is an inspired musician and educator. He created the jazz piano program at the University of Miami in 1970 while performing with and teaching some of the greatest improvising musicians of the twentieth and twenty-first centuries. He retired from his position at the school in 2004 but was asked to come back in 2010 to develop curriculum and methods for training classical musicians in improvisation; an interest he is passionate about and has been exploring since the 1980’s. Earlier forms of his curriculum first began working with students at the Aspen Music School and Music Festival. In various summer seminars of his own design, he began examining how he could help classically trained musicians realize the possibilities of improvisation as an extension of their classical training.

Prof. Maggio recognized that classical players have highly developed technical mastery of their instruments, from the study of classical music, but do not practice harmonic improvisation as a part of that technical training. Instead, a major pillar of the classical foundation of pedagogy is based solely on developing sensitive, and accurate reading-based interpretations from preconceived compositions. This is a vital part of the training of all musicians that begins the process of musical fluency. In 2015 Prof. Maggio stated in an interview for Keyboard Magazine that a large part of his time teaching his Concepts of Classical improvisation is spent educating classical musicians in simple melody line construction “...how to interpret [simple] chord symbols with a
voice-led line that [has] no harmonic errors in it.”¹ When he first began working with students in Aspen, his initial hypothesis was that classical musicians would be great improvisers due to the advanced technical training they receive. This turned out not be the case, as most classical musicians rely solely on their reading based skills for the creation of music making.

As a master improviser and keyboard performer it is Prof. Maggio’s belief that music is a language, but improvisation is a craft that spans all styles of music. This is an important distinction and an insight that seems quite relevant in today’s musical landscape as more institutions of higher education are creating and implementing curriculum based on improvisational training. Going back to Maggio’s original statement that music is a language, the study of jazz is in his opinion considered a dialect. By removing afro/Caribbean-centric rhythmic practices found in jazz and swing styles, Prof. Maggio prefers to teach improvisational practices based on a foundation of Western Euro-centric harmonic studies that has formed the basis of western tonal theory for several hundred years. As a basis for discussion and practice, this harmonic study serves as the basis for connecting classical training to improvisational practice; what is known to the acquisition of new skills.

Regarding the lack of improvisational training in classical educational institutions, which Prof. Maggio considers to be a problem, he goes on to say that “unfortunately for classical musicians, improvisation as a requirement in conservatories stopped around 200 years ago. But composers like Bach, Beethoven and Mozart all improvised their own music, and in fact those improvisations were often the highlights of their musical

¹ Keyboard Magazine, Jan Regan “Everybody digs Vince.” June 6, 2015
gatherings.” As an approach that often begins this exploration for the classical musician he states that “, [I am] teaching classes in classical improvisation that focus on melodic improvisation, something I always wanted the jazz education industry to pay attention to.”

Melody in music is something that everyone can relate to, for the musician often performs pieces exchanging roles that are sometimes soloist and sometimes accompaniment. In this way, harmony informs melody and melody informs harmony. Together, they can cultivate in the performer a desire to be creative and expressive as one begins to understand that within ourselves there is a potential of music to be spoken and creatively improvised.

During my time in the graduate student level course of Concepts of Classical Improvisation our lab band consisted of two cellists, a violist, a classical pianist, and one clarinet player, all with performance training from some of the top music schools in the country. From our diverse backgrounds and with a unified interest in harmonic studies, Prof. Maggio gave us tools to explore works by Bach, Chopin, Saint-Seans, and Beethoven, in equality with contemporary melodies by Maggio himself, as well as selected works from the American Songbook of jazz and popular music. As a course of study over one semester, I had the pleasure of seeing exponential musical growth occur in everyone as studies progressed, new skills were acquired, and tested, leading to a deeper understanding of music.

Improvisation from melody study encouraged the class to critically examine ourselves as performers, reflect upon the choices we make when we play over the selected melodies and chord structures, while gaining the confidence to use our training

\footnote{ibid.}
to describe our role in any piece of music; improvised or performed from a score. The
demystifying of a composer’s mindsets, mirroring our own experiences, clarifies why
they may have chosen any particular melody note related to a harmonic structure.
Looking at simplified melodic and harmonic movements we experience the feeling,
rather than the formulae, of voice leading lines one from another. In this context,
freedom to explore other possibilities such as substituted harmony, harmonization, and
chromatic embellishments to the original melodic materials, is also simplified. This
compression of information and concepts from Prof. Maggio’s insight was our model for
imitation, and everyone found their own unique and personally relevant ideas, idiomatic
to their instruments, that provided context for harmony and improvised solos.

One of the most important takeaways from my study with Maggio was the
realization of my own didactic reinterpretations of his concepts as the retranslation of
those ideas to fit the technical limitations of the cello. As a result, what forms the
subject matter of this dissertation, is that by creating solutions adaptively, specific to the
cello, my musical practices were elevated. My classical study is now enhanced with
deeper listening skills, a greater awareness and fluency with harmonic patterns and their
formal goals in “classical” music, along with the ability to explore, reengineer, and
observe music with a greater sensitivity to rhythm, and my role in it as performer.
Creating a system of diagrammatic representations of harmonic structures for the cello, as
tonal maps, was my approach to limiting harmonic errors. These tonal “road-maps”
helped me gain harmonic fluency on my instrument, having to interact, to speak with my
cello, in improvised settings. I had to find a way to make my classical technique work
for me in a way I had not considered or practiced until meeting Prof. Maggio.
For the classical cellist, harmonic studies are often theoretically understood from taking all our normal and essential theory courses. A patterned based visual map of harmony is an immediately accessible and usable model for those trained “classically”. With a little practice, tonal maps will start connecting, become internalized, and reduce the amount of thought that takes place when choosing what to perform when creating melodies improvisationally. My own recent studies with two cello improvisers also known for their backgrounds as classical and jazz musicians via Mark Summer, of the Turtle Island String Quartet, and Greg Byers, a University of Miami Graduate who double majored in classical and jazz performance (B.M 2007) now teaching cellists at Christian Howes seminars, have further solidified my belief that the distance from being a reading based practitioner of music to understanding harmony as process of creative practice is not such a big leap. At least, not as much as when I sat down with Prof. Maggio in our first meeting to try to improvise over the chord changes to “Happy Birthday.”

Looking back, I can see how each step of Prof. Maggio’s system gave students a chance to observe and understand many kinds of music. As a process for the contemporary player, this equality of understanding is important in our musical lives. With a foot in both camps, of improvisation and classical training, Prof. Maggio has said “[the] things I learned studying at the American Conservatory in Chicago, and by watching pianists like Horowitz and Rubinstein as a kid, I never approached teaching with technique first. I wanted to fix musical problems. But in order to do so, you often have to address technical problems.” As a classical musician, cellist, and “reader”, I was very fortunate to have met Prof. Maggio during my time in the performance program at
the Frost School of Music at the University of Miami. He gave me the questions I was not aware I was searching to answer. Can improvisational practices for the classical musician help us to find equality of key, modulation, and form without taking away from our regimen of traditional performance study? I think the answers is yes. For me, improvisational practice has only enhanced my classical training.

**Statement of Purpose**

As a classical cellist, the experience, real and imagined, of distance between music theory and music practice is part of the twenty first century musical paradigm. The way we think of music is so greatly removed from the psychological reasons we perform, that music theory for the performer, is often considered a hindrance more than a help. However, there has recently been a growing demand for educational integration of instrumental performance training to include improvisational practices. The classical musician studying performance on a string instrument is now being given the opportunity to learn what most improvisational specialists already know but are not quick to advertise; ear training and chord knowledge need not be divorced from instrument-specific, repertoire study. However, as more Universities begin developing improvisational course materials for the classical musician they will need methods that are effective as the pace of learning continues to build.

This dissertation discusses a cello-specific method for developing an improvisational practice for the instrument that uses graphic representations of harmonic structures as a unity of chord to scale knowledge. I am calling these charts tonal maps of harmony. They are a similar distillation of harmonic studies that improvising pianists
and guitarists use to simply and remember what must be learned in order to create music spontaneously. My hope is that much of this work, which I explored with Prof. Vincent Maggio, Mark Summer, and Greg Byers, will be readily approachable for future generations of cellists who do not know what to study for music making in a creative improvisational environment. Several topics will be discussed that will help develop fluency of harmonic systems on the cello. While the tonal map will be used throughout, skill acquisition on the instrument will range from developing intervallic structures as the division of the octave, a simplified understanding of the overtone series and its relation to contemporary musical theories, diatonic harmonies and common sequences of harmony, and extended harmonic studies based on George Russell’s Chromatic Lydian Concept and its application for creating chromatic lines similar to jazz improvisers of the mid-twentieth century.

For those of us with a primary background in classical music, I can think of no reason why these practices cannot co-exist in equality with our traditional forms of performance training. The reproduction of music interpretively from reading-based skills is not dissimilar from the reproduction, generation, or origination of personally relevant, original, and individually creative music. By mapping tonal harmony, a practice of the theoretical understanding of music can be made accessible for the cellist. The goal is to enhance clarity where harmony and theory are concerned while imbuing our technical routines with new connections to the experience of harmony. When we are called upon to create, are we really hearing harmony and choosing to consciously make it work for us, or are we just playing kinesthetically learned patterns the mind and body know? At this time, the cellist does not have a method in the classical world or training that is
designed to help us become critical evaluators of our use of harmonic language in the
same way an improvising musician does. This dissertation seeks to address this issue and
facilitate the further creation and discussion of possible future methods.

Literature Review

Theoretical Concept Development for the Cellist

While realization of tonal mapping in this dissertation is an original realization,
there are several authors who influenced how I came to this idea. Developed to facilitate
solutions to complex technical problems, there are many theoretical texts available to the
student of music. Of these, there is one that will help inform new approaches to harmony
useful to the cellist in creating an improvisational practice. George Russell’s critical text
The Chromatic Lydian Concept of Tonal Organization (1959) is a study of harmony that
uses as its primary mode of operations the cycle of fifths and its relation to the natural
overtone series. Chordal structures, in Russell’s view, are heard as stable, individually
contained universes of harmonic expression. With a few alteration processes, they have
the potential to describe harmonic patterns generating seven Lydian scales in diminution
and augmentation and four scales derivative of common practice music. As a system of
thought, these eleven parent scales form a chromatic view of harmony with certain orders
of tonal gravity. For the improvising musician, the Lydian concept of organization has
been in use for decades as the raw material for generating interesting melodic concepts
and relations to diatonic and altered harmonies. However, it can also describe harmonic
function, albeit from a Lydian perspective, of all practices of western tonal harmony.
The main shift in Russell’s organizational process begins with the author’s thoughts on tonal behaviors of an Ionian system of tonic, with a natural perfect fourth interval generated from the tonic chord to its modal scale. The natural behavior of the tritone within the Ionian major scale, or as a chord playing F natural over a C major/major seventh chord, creates a state harmony Russell’s describes as outgoing. The note F places the scale to the chord in a state of active resolution as an outgoing harmony. Once this note is introduced harmony is outgoing and unstable. Most have experienced the “rub” or “suspension” of E against F, as seeking a modulation away from tonic, a gravity away from the tonality of C major. In an improvisational setting, playing this note F over C major/Major 7 is akin to stepping in mud. If you step on this note unawares, it may be best to move on quickly and/or resolve. For Russell, the C Ionian scale therefore is not the best tonality for expressing the unity of chord to scale for the Major Seventh chord. Instead, he is most concerned with a theory based on stability, as he calls it chordscale unity, with a scale to chord relationships best describing the most perfect stability of that chord as an ingoing harmony.

Russell’s solution is to shift to a Lydian Major tonic where each chord is in unity with its Lydian parent scale. C Lydian in an Ionian system is found starting from scale degree four of G major, F# as the raised fourth. Going back to Ionian C major, with the natural perfect fourth F, it can be said that the Lydian parent of C major is therefore F Lydian. F Lydian, the B natural as the raised fourth from F. In improvisational training performers also learn that the Lydian major, again also a major seventh chord like Ionian tonic, does not contain any avoid notes. The sound of a Lydian scale played over a major
seven chord does not seek an outward motion and is not reliant upon the natural fourth of the Ionian tonic.

As a twentieth and twenty first century practice, Russell also bases his theory on the acknowledgement that our musical world is based on the practice of equal tempered tuning systems. This is all chromatic relationships we can find the same equality of unity, of twelve equally tempered semitones. Russell began developing his theoretical models realizing modulations are perceived equally in complicated sounding improvised music heard as inside or outside sound over any given chord. This is something both Bach and Rameau described, Bach in the Well-Tempered Klavier and Rameau in his theory treatises, several hundred years before Mr. Russell. Due to evolving systems of tuning however earlier generations prior to the twentieth century may have treated certain keys and their minor relatives on a case by case basis practically. Today, the realization and application of equal tempered systems extends to all instrument families including keyboards, wind, brass, percussion, and string families. However, it is clear many earlier generations of composers realized the limits of tuning during their lifetimes and of course could imagine theoretically a system of equal temperament.

Russell’s, like other theorists since the time of Pythagoras, also rationalizes his organization of tonal gravity from the natural acoustic phenomenon of the overtone series using the cycle of fifths as a Lydian stability. The note C does not sound an F natural as part of its resonant frequencies. In fact, it resonates with an F# in its upper harmonic series with a perfect fifth at its base. As a simplification, a bottom structure of the perfect fifth from a fundamental can cycle up as a series of fifths in sequence or as a chordal stack. In either case, by taking seven notes of that cycle and reordering them within a
single octave we spell the parent Lydian scale. Starting from C that cycle would be CGDAEBF#. At an octave equivalence it generates the Lydian Tonic CDEF#GAB. Chromatically any note can be used as the fundamental to spell a Lydian tonic and as such each chromatic tonic will have an order of tonal gravity from that tonic.

During his lifetime and while was writing his book, Russell expressed the need for continuing, extending, and evolving the language of tonality during a time when streams of musical style were colliding; mainly jazz, serialism, electronic, and mid twentieth century art music. The modal stability expressed by Russell in his Lydian Chromatic Concept influenced the first generation of improvisers of modal jazz like Bill Evans, John Coltrane, and Miles Davis. At the same time institutions of higher learning were first exploring curriculums for pedagogy to teach jazz as an improvisational style. They were also influenced by this theory. As an approach to tonal theory and improvisation, the Lydian concept is still taught at the New England Conservatory, where Mr. Russell was a professor until 2004. His student, David Baker, continued to train musicians at Indiana University with Mr. Baker’s fully realized, and simplified, method Techniques of Improvisation Vol. 1: The Lydian Chromatic Concept. Many other programs continued to use his ideas of parent scales shifted back to an Ionain major tonic. In any case, his system of organization by no means a contradiction but rather an alignment with hundreds of years of compositional thought, pedagogy, and theory. As a practice, it is a well-earned set of studies to work through that builds upon has the potential to inform reading based practices and extended views of harmony as contained in singular chordal structures.
From Russell, it is a short traverse towards examining the chromatic language of the great twentieth century bebop improvisers. Scott Black’s book *Bebop Scales, how to Understand, Practice, and Use* is a great manual further extending the chord-scale work Russell’s chromatic Lydian vocabulary describes. Scott Black was a student of David Baker at Indiana University before working with the jazz educator Barry Harris in New York City. A section of materials building upon Russell’s chord scale language is included in later chapters with suggestions for practice. Black’s approach to melody creation will be familiar to most cellists, albeit with new harmonic implications.

W. A. Mathieu’s comprehensive text on musical theory from 1997, *Harmonic Experience: Tonal harmony from its Natural Origins to its Modern Expression*, is perhaps the natural evolution of George Russell’s work from. As a young musician, Mathieu studied with one of the greatest jazz arrangers of the twentieth century in William Russo as well as the concert pianist Easley Blackwood Jr. in the 1960’s, at the age of 22, Mathieu would become the compositional arranger for both Stan Kenton and Duke Ellington. In 1970, he began serving on the faculties of the San Francisco Conservatory and Mills College. As a pianist versed in jazz, classical, and composition he was also a student of Indian Classical Music. The audio-didactic method of singing and scale construction found in India is also founded upon Lydian major unity. As an expression of the contemporary musician today, crossing from classical, to jazz, and non-western music, his work is perhaps the only attempt at reconciling ancient harmonic systems of just-intonation with modern twelve tone equal temperament systems. Not unsurprisingly, this is achieved by singing along with what we play. His encouragement to sing, which is a standard method of teaching in Indian Classical music, can be the great
decider for all our improvisatory lines when we begin to judge critically if we are really hearing melody notes or playing lines unawares due to our familiarity with them. His text recognizes, as does this dissertation, the pronounced need for experiential kinds of learning, to reconnect the way we think about music with the way we perform music, regardless of style or genre. Mathieu’s writings and comparative based models of music can be of help to any classical musician seeking engagement with their own musical creativity.

To that end, I make the translation to the cello of several techniques outlined by Shelly Berg in his book *Jazz Improvisation: The Goal Note Method*. Berg’s methodology can help further foster shorthand mastery of formulaic choices once we begin exploring harmonic mapping on the cello in later chapters. From chord to chord, sequence to sequence, Berg has devised strategies to target notes that help to sustain harmonic function. Berg is a Grammy award winning performer and Dean of the Frost School of Music at the University of Miami who has roots in both classical and improvised music. Written in 1990, Berg’s method explains that tonal systems inform how we hear and approach our classical practice and have the potential to lead our minds and bodies to informed creative choices when playing in improvisational settings. Using triadic and seventh chord constructions Berg presents many exercises we can adapt functionally to the cello. Primarily written with the pianist in mind, tonal maps are closely related to pianistic chord voicings. While we cannot overtly produce those rich pianistic harmonies, we can imagine the territories of harmony on the cello. Quoting George Balanchine in this preface Berg states “. . . we do not create, it’s already there. . .we just choose.”

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long-time tenured musical educator, Berg acknowledges the burden of theoretical improvisational formulae and seeks with his method to create a performance practice that emphasizes harmonic consonance, being able to hear and just choose what to play. There is a lot of resonance in this text that is not surprisingly echoed in Prof. Maggio’s Concepts for Classical Improvisation studies. Music improvised, like all music, like all language, relies on imitation. With practice, we continue to assimilate and connect modes of speaking, creating deeper experiences in our conversations.

Of all these works, the only contemporary textbook-guided approach of study is Edward Sareth’s *Music Theory Through Improvisation: A new Approach to Musicianship Training*. Since 2010, the University of Michigan has implemented this text as part of its training of classical music students. While it is not dissimilar from other course studies that focus on an experience of music curriculum it is one of the only programs that does use an actual textbook. While Mr. Sareth is an award-winning author and jazz musician, his work is one of the only fully realized manuals being used for improvisation pedagogy of the classical musician. It is worth mentioning here, as it may become a model for future text manuals. It follows a conventional series of steps from common practice textbooks, diatonic to non-diatonic harmony, but with stylistically diverse approaches that explore form, melody, and harmony from classical music, with the language jazz, world-music, and pop-music. While it is not an instrument specific oriented approach, which I would argue is needed, it does present goal oriented learning skills, where those skills are tested often and in varying forms. Classical improvisation pedagogy is still being explored, and is in a process of realization today. It is to the advantage of the cellist improviser to use some of the rubric guidelines in Edward Sareth’s book should
they wish to design coursework to teach improvisational practices to other cellists. These include self-tests, critical solo evaluations, and the application and creative use of strategies for individual practice.

The Paradigm of the Twenty First Century “Classical” Improviser, Third-stream, and Hybridization

As the idea of the twenty first century classical improviser continues to be defined, it is of interest to form an understanding of how improvisation has become a part of the training of classical musicians and the contemporary establishments re-inclusion of improvisation as a part the paradigm of performance practice. The violin family, specifically the cello, rose to prominence at a time of unprecedented creative equality between performers and composers. String players of the Baroque Era were expected to be able to create an ensemble part or improvise melodic solos with only the shorthand of figured bass as a guide, improvise diminutions or counterpoint to a tune and vary any repetitions, know when to employ rhythmic alterations, and to have command of a rich vocabulary of ornaments. Soloists would also have been expected to improvise freely in a variety of contexts, from the skeletal adagios of the sonatas of Corelli and his contemporaries, to the various cadential embellishments that foreshadowed the cadenzas of the Classical Era. Later developments in composition, such as the development of sonata form, led to a shift in the balance of responsibility between composers and performers in the late eighteenth century. Although the practice of ornamentation continued, the freedom once allowed to performers was increasingly restricted as composers began including ornamentation in the score. Phillip Whitmore, noted musicologist, points out that the cadenza in the classical concerto was one of “the last
surviving bastions of the performer’s rights to participate in the creation of a musical composition,” and by the turn of the century, it too had fallen.\(^4\) As the nineteenth century progressed, the roles of composer and performer became clearly delineated, and the performer’s role as an interpreter of a fixed musical works would remain unchanged until the latter half of the twentieth century, with few notable exceptions. However, the upheavals of the twentieth century would have a dramatic impact on all art forms. The supremacy of traditional western tonal music would face numerous challenges, including Serialism, Jazz, and music from other cultures. Composers and performers in the twentieth century have explored improvisation in a variety of contexts, from free to carefully circumscribed, and invented a wide variety of notational systems and extended techniques which make new demands on performers while expanding the tonal palette of instruments that had not substantially changed in three hundred years.

While the practice of improvisation has been neglected in music schools, recent trends indicate a reawakening of interest in the subject. For those trained classically, an interest in historically informed performance has influenced the way in which music is performed by mainstream soloists and ensembles. The improvisatory aspects of baroque interpretation have come to be recognized as fundamental to the performance practices of this era. The classical concerto has also benefited from the introduction of new cadenzas for the standard repertoire, rescuing audiences from the endless repetition of stock material and restoring an element of surprise. The experimental and avant-garde music of the late twentieth century requires performers to participate in the realization of the final form of a composition, with or without carefully defined parameters, often

obscuring the distinction between composer, performer, and listener.⁵ A performer who understands the influence of improvisation on the history of western art music and will be more stylistically aware, more versatile, and ultimately better equipped to survive in today’s diverse musical environment.

The contemporary classical musician today is engaged in many musical discussions that crossover stylistic distinctions, having the potential for multiple interpretations. The lines of absolute genres for performers are becoming blurred and open. Blurred Distinctions; Beyond Third Stream – A Study in Composition of Confluent Hybrid Musical Styles: The Amalgam of Jazz and Classical Concert Music is a dissertation that was written in 2017 at the University of Miami by Dr. Rafael Picolotta De Lima. In it he outlines historical roots from music of the early twentieth century leading into third-stream music, to what Dr. Rafael Picolotta De Lima now calls musical hybridization techniques incorporated into twentieth century music confluence.⁶ Redefined as musical hybrids, it can be seen how Gunther Schuller, observing the nineteenth century categorization of music from Bach to Beethoven as a “classical golden age” was not a wholly satisfying outlook of music after World War II:

There is no really adequate general name for this lady of music, ‘classical’ being merely broader and less offensive than terms like ‘symphonic’ or ‘serious music’, which are either too narrow or misleading.⁷

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Classical music for Schuller was often a world of education and training where set methods, techniques and ideals are passed down from generation to generation. The result of this is a canonization of a set list of any number of concert masterpieces. This is for him, a reverence and preferential practice to standardize a set literature. On the other end of the spectrum is folk music from the German expression *Volk*, in relation to its emergence in nineteenth century Europe. As another broadly encompassing term it’s connotation in the United States encompasses everything from Bluegrass, Native American Song, including Jazz styles. However, jazz, arising from twentieth century practices, became more than folk music or song, with composers eventually incorporating further elements of musical complexity and virtuosity into their compositions. Referring to Da Lima, a composer who is an excellent jazz musician who has also been trained as a classical musician, he notes that he has seen the incorporation of jazz into what he feels is American classical music, being studied as a serious art in Universities. As such, classical improvisation becomes more difficult to define. An awareness of the evolution of improvised music moving into the concert hall, with roots both Pan-American, American, African-American and Western European, continues. However, with improvisation as a key element, many musicologists have expressed “, the collective impacts of these various fusion effects—whether the sources of inspiration were rock, ethnic, or classical music had succeeded in tremendously expanding the boundaries of [music itself].” As we search for contemporary curriculum for the classical improviser, Da Lima seeks a parallel need for further research into the subject saying “, the resulting hybrids created through fusion can sometimes be so distant from the origins that we

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might question [what the results might be called].” As a cellist trying to improvise this could be a positive development with the renewed interest in educating classical musicians to form their own improvisatory practices.

Gunther Schuller coined the term “Third-Stream” in a lecture he presented at Brandeis University in 1957. Since that time his terminology has been accepted by musicologists as a resultant attempt to define the fusing of elements of jazz into concert music. As a popular idea, this fusion is not limited to one or the other and can be a combination of any styles of music distantly related. To clarify, Third Stream is “the result of two [musical] tributaries – one from the stream of classical music and one from the other stream, jazz- that have recently flowed out toward each other in the space between the two main streams undisturbed, or mostly so.”

Looking further into literature from Schuller he thought it fused “the improvisational spontaneity and . . . vitality of jazz with the compositional procedures and techniques acquired in Western music during 700 years of musical development.” An interesting curio from the New England Conservatory also influenced the mixing of improvisation with classical musical study that continues today. Released in 1981, the conservatory, where Schuller taught for many years, released a promotional brochure citing what Third Stream is not.

1. It is not jazz with strings
2. It is not jazz played on “classical” instruments

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12 Schuller, Gunther. Musings pg. 119
3. It is not classical music played by jazz players.
4. It is not inserting a bit of Ravel or Schoenberg between bebop changes-nor the reverse
5. It is not jazz in fugal form
6. it is not a fugue performed by jazz players
7. It is not designed to do away with jazz or classical music; it is just another option amongst many for today’s creative musicians.

Perhaps because of this list, no particular group or schools of “stream” emerged immediately, though even Schuller admits that “streaming’s” effects have carried over into the twenty first century. As a very broad concept, Stream received a lot of criticism but was a prescient notion. Leonard Bernstein aware of this musical phenomenon some years earlier said “, [Improvised music] has begun to be a kind of chamber music, an advanced sophisticated. . . art mainly for listening, full of influences of Bartok and Stravinsky, and very. . . serious.”

Gunther Schuller’s creations during this mid twentieth century period saw the composer seeking a reconciliation of serial music and jazz as creations of art not meant for commercial entertainment. Schuller further clarified his intentions when he wrote “, the idea embedded in the basic philosophy of Third Stream was its concept of an offspring begotten from the marriage of two equal mainstreams-and I emphasize the word equal.” Da Lima’s research led him into earlier confluences of style describing the works of Satie, Ravel, Stravinsky, and Milhaud who were also attempting to blend elements of improvised and non-linear idioms into symphonic music. More non-idiomatic studies of Copland’s Clarinet Concerto and Stravinsky’s Ebony Concerto ultimately meet Da Lima’s hybridization criteria as works that provided references understood by listeners

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that were not necessarily recreations of jazz or improvised music. In our world today, the classical improviser displays many of these same traits. Noted confluences can also be found in the works of George Gershwin, Duke Ellington, and Billy Strayhorn who was schooled in western European traditions for orchestration. Forty-three years after Schuller advocated for his terminology, he wrote:

“When I first coined the term back in the late 1950s, I did so to at least have a handy descriptive for a category of music that had already existed for at least half a century, namely composition that in one way or another attempted a rapprochement between classical music and jazz (or ragtime). These included Debussy’s ‘Golliwog’s Cakewalk,’ Stravinsky’s and Ives’s several flirtations with American ragtime, jazz-fascinated and jazz-influenced works by composers as diverse as Ravel, Milhaud, Schulhoff, Copland, Grenberg, Hindemith, and Weill, as well as the ultimate masterpiece of this early 20th century genre, Milhaud’s ‘Creation du Monde.’”14

Intriguingly, he also points out that much of the criticism, as negative reception or as failed attempts were directly related not from his “stream” works themselves but as a result of the performers inabilitys to interpret the music. According to him, most musicians did not understand what was being attempted and as such were not prepared for the demands of the music. As being a few years ahead of its time, Schuller goes on to say in the same article:

“If there were some failures in the 1960’s, it was not much the fault of the composition per se as it was because at the time there was only a small cadre of ‘bilingual’ musicians who could perform on both sides of the music stylistic fence. Those who could swing and improvise couldn’t read too well (and certainly not complex atonal scores), while those who could read well couldn’t swing or improvise. But today this is no longer a problem, since scores of musicians fluent in both classical and jazz traditions abound, not only in the United States but in Europe and beyond.”15

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15 Ibid.
Schuller defends that all sides of the musical divide have something to learn from one another. The classical musicians can improve their timing, rhythmic accuracy, and harmonic language study in the same way a jazz musician can improve their reading abilities, dynamic contrasts, and utilization of extended techniques of western art music. If we consider these elements as continuing into today’s musical landscape, the classically trained musician is also shifting in attitude and incorporating new practices. As Da Lima shows from his hybridization research, acknowledging improvisation has given it credence as a powerful musical tool not limited to the study of jazz.  

Leon Crickmore, a noted academic and who since 2000 has been conducting interdisciplinary research in music, had this to say of Third Stream in 1961:

To assert that the future of music lies in such a third stream would be to be guilty of starry-eyed idealism; it is realism, however, to suggest that no serious musician (composer, performer, critic, teacher or music-lover) can any longer afford to neglect the phenomenon of [improvised music], except at the peril of his own survival.  

Schuller himself echoes this assertion several decades later as millennial generations are experiencing the renewed interest from educational institutions in training classical musicians to improvise:

Many young or youngish musicians are already Third Streaming, even if they don’t realize it or call it that. The field is wide open; so are the musicians’ ears and minds. . . . The original concept of third Stream now called by any number of other marketable commercial labels, world music, fusion, crossover, even New Age, is at its best, not only alive and well, but has broadened from a single stream to a veritable delta of tributary, rivers, accurately projecting my original utopian ideal

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of a brotherhood-sisterhood-of music’s, all influencing and fructifying each other in wondrous and unpredictable ways.”

It important to realize that while these tributaries were being explored, it is only since the turn of this century that improvisation pedagogy in musical curriculum has become an important part of educational research. This began after the National Association for Music Education’s promotion of the National Standards for Arts Education in 1994. Surveys by C.L. Bell (2003) and S.J. Byo (1999) confirmed amongst music specialists that teachers identify musical improvisation as one of the most difficult standards of musical education to implement. Considering this research, universities and conservatories are now at the forefront of this movement to connect the training of classical musicians with improvisational practice. As such, just as jazz has been recognized as worthy of study by academia, young musicians are becoming exposed and trained to walk the line between streams, with the influence of improvisational creation in ascension within that curriculum. Today, many musicians are entering the field of music without prejudices that may have been a characterization of generations past. As we look to the future, we see that renewal “, whether careful or radical, consists of the gradual idiomatic transformation, [of] adopting the contemporary and relevant while discarding the old and irrelevant.”


As a base for improvisation studies, I hope that cellists will eventually be able to benefit from the internalization and recombination of all this information and through practice just simply hear the changes and effect all melodies. The contemporary musician will need to have the ability and musical knowledge to participate in “. . . the spontaneous invention and shaping of music while it is being performed [which] is as old as music itself. The very beginnings of musical practice can scarcely be imagined in any form other than that of instantaneous musical expression—of improvisation.”

Methodology

Use of this essay is directed towards cellists with a working knowledge of, and technical facility on the instrument. It can also provide the intermediate cellist with a more comprehensive knowledge of fingerboard concepts and harmonic theory that has the potential to influence accuracy of knowledge transfer to reading based skills and analysis. Therefore, the subjects outlined in this essay progress in a fashion from relatively simple internalizations of interval concepts to more complex uses of harmony via tonal mapping techniques and chord-scale knowledge that can describe complex chromatically derived melody constructions. The information found in later chapters is based on the Chromatic Lydian Concept developed by Goerge Russell, it’s applications to the cello fingerboard landscape, and further integration using it application to chromatically complex melody constructions of mid-twentieth century improvisers.

Several computer-based applications exist that may be of practical use as accompaniment for improvisers. Any performer with familiarity of digital audio workstations can record their own accompaniments or create M.I.D.I sounds using any available software. Notation software can also be used to generate accompaniments with the added advantage of creating notation should other performers wish to study together. Comprehensive applications such as iReal Pro or Band-in-a Box, which contain large volumes of lead sheets that generate accompaniment sounds, are a most practical choice for the creation of original practice materials or as play-along exercises from prepackaged songs included with the applications.

As a pedagogical concept and limitation of this essay, I acknowledge the fact that the use of tonal mapping does not necessarily require musical literacy. It is interesting to think of how someone would learn the cello this way in the same way a guitarist might learn from tablature alone. Many early twentieth century “jazz” musicians were not literate in musical notation, instead relying on chord maps of a song. As a delimitation that may be surpassed, the internalization of tonal mapping will aid in fostering a state of instrument mastery where improvisational creation is achieved, as if without preconceived thought. The perceived state of flow during improvisational creations, in reference to recent scientific and neurological studies, is not discussed in this essay. However, as a student of the method outlined here, science is showing that improvisational practices have lasting and beneficial effects for the human mind.  

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24 Pinho, A. L. et al. (2014) Connecting to create: expertise in musical improvisation is associated with increased functional connectivity between premotor and prefrontal areas. J. Neuroscience. 34 (18)
my body knows, that my mind remembers from performing on the cello. Concerning a wider spectrum of abilities, I imagine tonal mapping as a yet unapproached way of reconciling an internalization of kinesthetic thought that connects aural and technical based work. This is as opposed to an experience of the internalization of music as interpreted from the page. I have found no published method or approach for the cello that describes a mapping of harmony in the way I have imagined as a diagrammatic outlining. As derived from classical training we often discuss this kind of methodology when internalizing a work from a page, as memorized for performance. How do we map the choreography to be reproduced later in concerts? Visualization patterns for interpretation, just like in improvisation, are based on specific goal oriented movements. Of course, there is no argument that developing cellists should become literate to enjoy, learn from, and interpret the repertoire of current and past composers. The developmental concepts derived from tonal mapping have the potential to give the all cellists a view of the instrument they may not yet have considered consciously.

As an outgrowth of learning from musical literacy, the exchange from reading to writing to performance is one that will most likely be developed over an extended period of practice. I want cellists to think about and practice harmony from the instrument in addition to exercising that knowledge on paper and in the classroom. However, we can begin mapping new shapes onto the fingerboard informed from a fluency with chromatic intervals from stationary notes and harmonic sequences. This will ultimately inform the formation of chord-shapes as interval constructions of specific qualities and note behaviors. Realizing this type of thinking on the cello specifically leads to comparative analysis. With development of fluency with nomenclature and terminology, it will
become clearer in progression to see how, just like the guitar or piano, sometimes even more so, almost all primary shapes of interval, scale, and chord are transposable on the cello. Informed from my own studies using and developing this method, I have found an increased awareness of how the overtone series functions, how many musical theories synthesized from this natural phenomenon were informed from common practice theory, as well as the development of higher levels of fluency with note systems that use twelve equally tempered semitones.

By mapping tonal harmony for the cello, we can experience the same active or resting behaviors of note to harmony found in all forms and styles of music in a way unique to the instrument. I hope this approach will continue the discussion of what it means to be a classical improviser to encourage more critical processes of engagement in the training of cellists. As musical lines become crossed and performance practices of those hybrids comes to equilibrium, these improvisational practices can give the classical cellist a harmonically driven set of goals to use as part of the daily menu of scale, arpeggio, and etude studies. For those less inclined to give up the page, improvisation studies for the section and chamber music cellists can help to develop greater awareness of harmonic recognition, intuition into melody and accompaniment roles in context, as applicable in all performance situations for any work that is being performed. This subject matter continues to be explored as I am sure everyone, improviser, or reader will come to their own unique didactic understanding of the information presented here.
Conclusions

The skills and concepts presented in this essay are not the only skills necessary to become conversant musically as an improviser. This essay does not delve into the discussion of fully serialized improvisations, atonal improvisations, twelve-tone improvisation, multi-media interactions, electronic improvisations, or other concepts and forms of spontaneous music. However, from my own experience having met several musicians who have allied their strengths as a classical reader with practice in improvisational harmony, I believe a confidence in both can be achieved by an examination of the tonal approaches to an equally tempered, twelve semitone system as found in this essay. The connection between both forms of practice will enhance all aspects of music making for the cellist. As such, the trend towards including this training as part of the education of classical musicians is something that has taken many years to be realized, built upon the work and continued expansion of each generations ideas of what music can be, and what it is to be a musician their own lifetimes. To develop and enhance all musical skills, this work is my own didactic approach that was an essential part of teaching myself how to adapt to a new musical soundscape, as experienced in my studies in the Concepts of Classical Improvisation seminar taught by Professor Vincent Maggio. In order to teach oneself it is helpful to become open to the varied forms of creative energy around us at all times. Realizing they are not separate from us, but a part of us, we can tap into the confidence from within to evade diminishing results of negative judgement. Instead, with the aid of the concepts from tonal mapping of harmony on the cello, we can assuage those inner judgements and feed the voice within, allowing creativity, synthesis, and intuition to grow louder.
Chapter 2
Describing Intervallic Terminology

In a system of twelve equal semitones we can describe distances within an octave as intervals. A common ground for description, terminology or nomenclature for these distances is essential. Therefore, we can also clarify distinct measures of distance within this system as intervals. As such, this dissertation will use three main methods to describe and communicate the division of an octave as intervals. The half-step division will be the smallest unit of distance, as found in common practice Western tradition. We can describe this division using several methods. By alphabetic note name within an octave, by intervallic distance from a root, and by numerical notation as related to chordscale and chromatic sequences from a root. Unless an alphabetic name is prescribed, as a note name, all interval distances and numeric notations can be transposed to any scale degree of the twelve semitones. The descriptions of these methods is outlined as follows in Figure 2.1.

Fig. 2.1 Methods for Naming the Half-Step Division of the Octave

AS NOTE NAME

<table>
<thead>
<tr>
<th>C</th>
<th>C#</th>
<th>D</th>
<th>D#</th>
<th>E</th>
<th>F</th>
<th>F#</th>
<th>G</th>
<th>G#</th>
<th>A</th>
<th>A#</th>
<th>B</th>
<th>(C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Db</td>
<td>Eb</td>
<td>Gb</td>
<td>Ab</td>
<td>Bb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AS INTERVAL DISTANCE FROM A ROOT (Transposable to any alphabet in sequence)

<table>
<thead>
<tr>
<th>R1</th>
<th>m2</th>
<th>M2</th>
<th>m3</th>
<th>M3</th>
<th>P4</th>
<th>(Aug4/Dim5)</th>
<th>P5</th>
<th>m6</th>
<th>M6</th>
<th>m7</th>
<th>M7</th>
<th>(P8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(P1)</td>
<td>(TT)</td>
<td>(Dim7)</td>
<td>(R1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P=perfect; m=minor; M=Major; Aug.= Augmented and Dim.= diminished
AS NUMERIC NOTATION FROM CHORDSCALES (Transposable to any alphabet in sequence)

<table>
<thead>
<tr>
<th></th>
<th>b9</th>
<th>9</th>
<th>#9</th>
<th>3</th>
<th>11</th>
<th>#11</th>
<th>5</th>
<th>b13</th>
<th>13</th>
<th>b7</th>
<th>7</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(b3)</td>
<td></td>
<td></td>
<td>(b5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(1)</td>
</tr>
</tbody>
</table>

COMBINED AS MIRROR INVERSION (Descending)

<table>
<thead>
<tr>
<th>C</th>
<th>B</th>
<th>Bb</th>
<th>A</th>
<th>Ab</th>
<th>G</th>
<th>Gb</th>
<th>F</th>
<th>E</th>
<th>Eb</th>
<th>D</th>
<th>Db</th>
<th>(C)</th>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>(C)</td>
</tr>
</tbody>
</table>

| R1 | m2 | M2 | m3 | M3 | P4 | (Aug4/Dim5) | P5 | m6 | M6 | m7 | M7 | (P8) |
|----|----|----|----|----|----|             |    |    |    |    |    | (R1) |
| (P1) |     |    |    |    |    |             |    |    |    |    |    |     |

<table>
<thead>
<tr>
<th>1</th>
<th>7</th>
<th>b7</th>
<th>13</th>
<th>b13</th>
<th>5</th>
<th>#11</th>
<th>11</th>
<th>3</th>
<th>b3</th>
<th>9</th>
<th>b9</th>
<th>(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(+5)</td>
<td></td>
<td>(b5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(#9)</td>
</tr>
</tbody>
</table>

In western harmony, these twelve equally tempered intervals present an order from smallest to largest (ascending) and describe intevallic distances within an octave.

Moving from outside to inside as a mirror inversion, the octave polarities formed around the symmetrical division of 6 semitones looking left and right from the middle, also describes the relationship of each interval when moving in the opposite direction (descending) from R1. For the purposes of numeric notation and increasing familiarity at an octave equivalence with upper chordal structures, I am using the extensions 9, 11, and 13 to represent scale degrees 2, 4, and 6. Other alterations used in context will include the use of #9 or b3, #4 or b5, 5 or +5 (b13) as interchangeable and dependent upon harmonic context. Conceptually, a numerical counting in ascension follows a logic of 1 – 8 (9, 3, 11, 5, 13, 7) as opposed to (9, 10, 11, 12, 13) the repetition of the seventh followed by one.
In Figure 2.1 several common definitions as intervallic nomenclature can be used to describe the closed cycle of seven notes from a chordscale. Many improvisers tend to think of a unison, octave, and root as conceptually the same. It is a useful abstraction to imagine all alphabet processes as occurring at an octave equivalence, despite actual register changes, and as transposable. However, there are limitations for the cello when an actual doubling is chosen as a P1 (unison), two of the same note sounding at once. This is due to the physical dimensions of the cello and limited by the parallel fifth tuning of the instrument. In the lower positions the notes G, D, and A can be sounded as unison by the coupling of an open string with its fingered note on the lower adjacent string in fourth position (sounding at the same pitch, same octave). In transitional upper positions, unison occurs in extended thumb positions. The fist bariolage section of Bach’s Sixth Suite Prelude in D major displays this secondary creation of a unison. The thumb comes to rests on E (fourth position) on the A string while the third finger sounds the same note on the adjacent lower string D with an extended third finger. As an aural description of a unison, the effect of these actual doublings is the same as if two players were sounding the same note at the same time. The unison is therefore a strengthening of that note. As an intervallic description, these are the only ways a true unison can occur on the instrument.

Thinking a bit more abstractly, it can also be imagined that the P1 and P8 are octave equivalent and simply framing the other notes of a scale or harmony. In serial or twelve tone music, all semitones are described in integer notation from 0 – 11. If one ignores the effect of the octave changes, the actual change of pitch, alphabet processes
simply revolve, as a fixed set, around an axis of P1, P8, or R1 at octave equivalence. The cycle around that axis can then become a primary, or retrograde movement of alphabet processes; the same process found in integer notation as the axis 0 is crossed. As an improvisational tool this simplification takes advantage of the symmetrical parallel fifth tuning of the cello as many processes become transposable. This will be described in later studies via their tonal maps, as pattern recognition is expanded. While this is easily accomplished in our reading based practices, with little thought, the internalization and practice of ingoing, to a unison (perceived singularly or actually doubled) and outgoing (moving away from or back to that axis) interval structures is something that is valuable to memorize. However, creating an actual unison two notes, within the same octave, has its limitations for cellists and is to be used at the creative discretion of the performer. The Figure 2.2 describes the limitations of the unison:
Figure 2.2  The Limited possibilities of the Unison as shown on the cello fingerboard

Open String Unisons from fingered notes, adjacent below at fourth position with open strings (GIV, GIII)

More unisons possible in upper thumb and transitional fourth positions. Thumb is adjacent below with third finger extended above (EI, EII)
The Augmentation and Diminution of Intervals on the Cello

In common practice music, the term augmented or diminished can be used to describe the alteration by distance of any interval from another note. This description is an alphabet process that alters that distance by one semitone. An augmented distance increases an interval by a half step while a diminished interval decreases an interval by one half step. In Figure 2.3 we can see this applied to the perfect intervals of the fourth and fifth. Due to their interval designation as perfect, they do not promote a major or minor quality to a chord. Therefore, their alterations are normally labelled from a primary form as augmented in interval or diminished in interval. To that end, the fifth is commonly altered by alphabet processes as increased by one half step (augmented) +5 or decreased by one half step (diminished) as the b5. The same rules apply to the perfect fourth though in improvisatory music this description will often take the form of the numeric label as 11, or #11. As mentioned before, the use of this designation is used to increase fluency when naming upper structures. For augmentation of the second (Aug 2) or the diminishing of the seventh (dim7) this essay will use the numeric spellings based on contextual chordal harmonic usage. The second takes the form in augmentation or diminution as the b9 - 9 - #9 (which is b3) with the interval of a diminished seventh as described as the M6 (bb7). Clarity of these descriptors will become familiar with use and practice. Notice the how the tethered intervals push out or in as a shape from the stationary notes as roots. Being aware of distances as interval relationships and patterns by note name, vertically and horizontally, is an important concept when practicing harmony on the instrument.
Figure 2.3  Augmenting and Diminishing the intervals of the fourth and fifth
The Octave Enclosure on the Cello

It is important to note that through visual mapping of intervals we are already seeing the possibilities of choice available from pattern recognition on the cello. As a harmonic enclosure, the octave is no exception. Advanced players are familiar with the constant measuring of intervals on the instrument. As we move higher, from lower positions, the distance of the octave from low to high shortens and is present upon any string family instrument. Each repetition represents a new closely related or distant measurement. At the same time the shortening of string length creates the effect of higher and higher pitches, the reverse being true moving back towards open string length. As a rationalization for the tonal mapping of octave possibilities we can say that through experience our perception measures this distance though the idea of an octave can remain a constant shape as a pattern. Therefore, while our physical connection to the cello measures each consecutive shortening or widening of distance for each octave interval, we can conceptually pattern an equality of shape in our tonal mapping. As we cross horizontally or vertically from octave to octave, the pattern or shape of the octaves will resemble one another. All octaves shapes enclose other members of the chromatic scale and can be described individually as being any point of that sequence. Two main fingerings are possible as thumb and third finger, in any position, or for those with larger reach, an extended first finger to fourth. Figure 2.4 shows the physical limitations and patterns of the octave as shown on the cello:
Figure 2.4 The Limited possibilities of the Octave shape

1. Octaves from Open Strings with fingered octave above (first position)

2. Octaves from Open Strings with fingered and harmonic octaves above (fourth position)

3. 8va above open strings, Thumb position octaves shapes possible from thumb lower adjacent to 3rd finger above at top octave.

4. 8va above open strings, Thumb positions octaves possible in many harmonically related possibilities

**Larger distances in lower positions

Shorter distances surrounding fourth position with use of thumb available**

**Octave at 1st overtone division from open string

All describing as from thumb positions
**The Second, Third, Sixth, and Seventh on the Cello**

Thinking in intervals within alphabet systems is an important practice to incorporate away from our reading based training. As familiarity and fluency increases the connection between the feeling and sensation, aurally and kinesthetically, is strengthened. Because of this I hope cellists will start to internally visualize and hear the intervals patterns as generated from their experience of playing the cello. Having described the unison, octave, and treatment of fourths and fifths there are only four other types of interval distances we can describe. Types of seconds, thirds, sixths, and sevenths. The second forms either a half step or whole step enclosure around a stationary note. As such there are only two alterations we can make to describe this distance. If we consider a stationary note as a root note the minor second will describe the note b9 above and #7 below. As a major second it describes natural 9 above and b7 below. The distance of a minor third from a stationary note can also be seen in the same way. From above it may describe the b3 (or #9 if indicated contextually) and the 13 below. For the major third above we find major three or 3 and below b13 (also +5 as seen in figure 2.3). Referring to figure 2.1, this view of these close intervals describes the ascending and descending application of these distances on the cello. However, learning these distances backwards and forwards will make future chordal concepts easier to understand as generated from the twelve notes of the chromatic scale sequence. For every four note or three note chord, all the other nine or eight notes still exist at interval distances. Notice how the interval distances within the octave point out and around as an expression of those intervals for the cello especially as mirror inversions above, below, and around a stationary note. The stationary notes can be thought of alternatively as enclosing these
intervals within the octave. Figure 2.5 describes several conceptual ways to begin viewing these distances related to another note as enclosures of a stationary note both descending and ascending in construction.

Fig. 2.5  Concepts for viewing interval distances from stationary note locations
Putting Intervallic Fluency Together Using Methods for Naming the Half-Step Division of the Octave

Concept 1: Note Name System Fluency by Target - Using figure 2.1 one observe there are at least three methods for naming the half-step division of an octave. While this figure uses C to describe the beginning note name of the sequence, any alphabet name may start the sequence ascending or descending. Starting from C# the ascending pattern would end on C before cycling through the system again. The mirror inversion of this is also true descending. Ascending and descending we can limit our possible beginning notes to one out of eleven before the sequence starts again. As such, there are five notes out of those eleven that are commonly used in their enharmonic spellings. As a system of pattern recognition see figure 2.6 as the tonal map of these possibilities. Here are several ways to use the note name chart on the cello conceptually:

1. Play everything enclosed within the notes C to C, within the octave ascending. Any note can be the progenitor (enclosure) of the sequence chromatically or at interval distance. Practice at random within the enclosure or from a stationary note and target intervallic goals

   EX. C to C# = m2, C to D# = m3, etc.

   EX. Using other stationary notes D to Ab = dim 5 or aug 4, A# to F# = m6, etc.

   Ascending cycle  ⎯⎯→  ⎯⎯→  ⎯⎯→  etc.

   C   C#   D   D#   E   F   F#   G   G#   A   A#   B   (C)
   Db  Eb   Gb  Ab  Bb

2. Everything enclosed within the notes C to C, within the octave descending (use inversion of distance from ascending). Any note can be the progenitor (enclosure) of the
sequence chromatically or at an interval distance. (descent read left to right). Use descending intervals only at random or from a chosen station note.

EX. C to C# = M7, C to D# = M6, etc.

EX. Using other stationary notes D to Ab = dim 5 or aug 4, Bb to Gb = M3, etc.

Descending Cycle---→------→------→ etc.

C     B     Bb    A     Ab    G     Gb    F     E     Eb    D    Db    (C)  
     A#    G#    F#    D#    C#  

3. Everything viewed as surrounding a beginning note looking in ascending and descending directions, symmetrically divided from the middle. Using the original sequence, the former position of the tritone location is now the stationary note. Practice intervals at random around the stationary note, recognizing each interval distance and from the stationary note.

EX. Try imagining cycle five and four movements as ascending and descending.

EX. Cycle other intervals at mirror distances as in M3 up to M3 down, M7 up to M7 down.

EX. Cycle movements as inversions P4 up to P5 down, M3 up to m6 down, etc.

Concept 2: The numeric system of notation from chordscales is transposable upon any sequence, ascending and descending using the stationary note name superimposed with the numeric designation as 1. In sequence, we can superimpose these
numeric chordscale names as equal to note names where any note name is called 1 from
its numeric designation. See figure 2.6 for conceptual mapping on the cello fingerboard.

EX. As you perform operations up and down say the note name and define it
from the stationary note 1 to b9 = C to C# (Db), etc.

1. Note names with numeric chordscale designations superimposed. Ascending sequence:

<table>
<thead>
<tr>
<th>Note</th>
<th>G</th>
<th>F#</th>
<th>E</th>
<th>D#</th>
<th>Eb</th>
<th>C#</th>
<th>C</th>
<th>Db</th>
<th>b9</th>
<th>9</th>
<th>#9</th>
<th>3</th>
<th>11</th>
<th>#11</th>
<th>5</th>
<th>b13</th>
<th>13</th>
<th>b7</th>
<th>7</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Gb</td>
<td>F</td>
<td>E</td>
<td>D</td>
<td>Db</td>
<td>C</td>
<td>Db</td>
<td>C#</td>
<td>A#</td>
<td>Bb</td>
<td>Db</td>
<td>E</td>
<td>F</td>
<td>D#</td>
<td>Gb</td>
<td>F#</td>
<td>G</td>
<td>E</td>
<td>D</td>
<td>Db</td>
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<tr>
<td>1</td>
<td>b9</td>
<td>9</td>
<td>#9</td>
<td>3</td>
<td>11</td>
<td>5</td>
<td>b13</td>
<td>13</td>
<td>b7</td>
<td>7</td>
<td>(8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Note names with numeric chordscale designations superimposed. Descending Sequence:

| Note | A# | G# | F| Eb | D | Db | C# | C | Db | D# | G | F | E | Ab | Gb | G | A | A# | B | (C) |
|------|----|----|---|----|---|----|----|---|----|----|---|---|---|----|----|---|---|-----|---|----|---|
| C    | Bb | B  | A | Gb | F#| E  | D  | Eb| C  | D# | G | F | E | Ab | G | F | E | D | Db | (C) |
| 1    | 7  | b7 | 13| b13| 5 | #11| 11 | b3| 9  | b9 | (1) |

3. Note names with numeric chordscale designations superimposed. Symmetrical division as 1 looking out, above and below:

| Note | G | F# | E | F | G | G# | Ab | A | A# | B | (C) |
|------|---|----|---|---|---|----|----|---|-----|---|----|---|
| C    | Db| C# | D | D#| E | F  | Gb | F | G  | Ab | A | A# | B | (C) |
| #11  | 5 | b13|13 | b7 | 7 | 1  | b9 | 9 | b3 | 3 | 11 | (#11) |

| Note | G | F# | E | F | G | G# | Ab | A | A# | B | (C) |
|------|---|----|---|---|---|----|----|---|-----|---|----|---|
| C    | Db| C# | D | D#| E | F  | Gb | F | G  | Ab | A | A# | B | (C) |
| #11  | b9| 9  | 3 | 11 | (#9) |

| Note | G | F# | E | F | G | G# | Ab | A | A# | B | (C) |
|------|---|----|---|---|---|----|----|---|-----|---|----|---|
| C    | Db| C# | D | D#| E | F  | Gb | F | G  | Ab | A | A# | B | (C) |
| #11  | 5 | b13|13 | b7 | 7 | 1  | b9 | 9 | b3 | 3 | 11 | (#11) |

| Note | G | F# | E | F | G | G# | Ab | A | A# | B | (C) |
|------|---|----|---|---|---|----|----|---|-----|---|----|---|
| C    | Db| C# | D | D#| E | F  | Gb | F | G  | Ab | A | A# | B | (C) |
| #11  | b9| 9  | 3 | 11 | (#9) |

Concept 3: The intervallic distance name from a root, as describing the interval, is also true in application from any chromatic stationary note. Its mirror inversion can be applied the same way as in concepts 1 and 2:
1. Ascending:

\[
\begin{array}{ccccccccccc}
R1 & m2 & M2 & m3 & M3 & P4 & \text{(Aug4/Dim5)} & P5 & m6 & M6 & m7 & M7 & (P8) & (R1) \\
(P1) & & & & & (TT) & & & (Dim7) & & & & \\
1 & b9 & 9 & #9 & 3 & 11 & \#11 & 5 & b13 & 13 & b7 & 7 & (8) & (1)
\end{array}
\]

2. Descending:

\[
\begin{array}{ccccccccccc}
R1 & m2 & M2 & m3 & M3 & P4 & \text{Aug4/Dim5} & P5 & m6 & M6 & m7 & M7 & (P8) & (R1) \\
(P1) & & & & & (TT) & & & (Dim7) & & & & \\
1 & 7 & b7 & 13 & b13 & 5 & \#11 & 11 & 3 & b3 & 9 & b9 & & \\
(1) & & & & & (+5) & & & & & & & \\
& & & & & & & (b5) & & & & & (#9)
\end{array}
\]

3. From the middle, symmetrically divided looking out in both directions:

\[
\begin{array}{ccccccccccc}
(+4, -5) & P4 & M3 & m3 & M2 & m2 & R1 & m2 & M2 & m3 & M3 & P4 & (-4/+5) \\
& & & & & & & & & & & & \\
#11 & 5 & b13 & 13 & b7 & 7 & 1 & b9 & 9 & b3 & 3 & 11 & (#11) \\
(b5) & & & & & & & & & & & & & (+5) & \\
& & & & & & & & & & & & & (#9) & (b5)
\end{array}
\]

Concept 4: Observation of these patterns as intervalllic maps of the cello fingerboard Figure 2.6 – While there are many possibilities, we can observe from any stationary note several phenomena that occur as we tether intervals to a stationary location ascending, descending, and from a middle location. This will be from a stationary note paying attention to distance on adjacent strings. Becoming familiar with these shapes will help facilitating ease of construction for diatonic chords and chordscales. So much of what we do as classical readers is almost automatic, beginning the process of pattern recognition will require conscious naming out loud and/or as an internal process:
1. Practice thinking the interval names ascending.
   A. Also as note name and numeric spelling.

2. Practice thinking the interval names descending.
   A. Also as note name and numeric name.

3. Practice thinking the interval names beginning on any random note from the middle.
   A. As enclosed in an octave, from the symmetrical division. Octave displacements can be an added challenge to this mode of thinking as you progress through the sequence. Remember all shapes are transposable, the same from a stationary note.
   B. From ascending try to imagine the mirror inversion going down (also as interval, note, and numeric spelling)
   C. From descending try to imagine the mirror inversion going down (also as interval, note, and numeric spelling)
Figure 2.6  Describing Interval sequences from a Stationary Note

In Ascending Order Low D,
(Transposable starting from any note)

b9          9          b3 (#9)          3

11 (p4)     #11        5           b13 (+5)

13          b7         7

Repeats at next octave
Fig. 2.6 Cont.

In Descending Order High D, (Transposable starting from any note)

<table>
<thead>
<tr>
<th>7</th>
<th>b7</th>
<th>13</th>
<th>b13 (+5)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="fig26a.png" alt="Chord Diagram" /></td>
<td><img src="fig26b.png" alt="Chord Diagram" /></td>
<td><img src="fig26c.png" alt="Chord Diagram" /></td>
<td><img src="fig26d.png" alt="Chord Diagram" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th>#11</th>
<th>11</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="fig26e.png" alt="Chord Diagram" /></td>
<td><img src="fig26f.png" alt="Chord Diagram" /></td>
<td><img src="fig26g.png" alt="Chord Diagram" /></td>
<td><img src="fig26h.png" alt="Chord Diagram" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>b3 (#9)</th>
<th>9</th>
<th>b9</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="fig26i.png" alt="Chord Diagram" /></td>
<td><img src="fig26j.png" alt="Chord Diagram" /></td>
<td><img src="fig26k.png" alt="Chord Diagram" /></td>
</tr>
</tbody>
</table>

Repeats at next octave
Fig. 2.6 Cont. Above, Below and Adjacent Strings
Chapter 3

Using the Cello to Tonally Map the Cycle of Fifths and Fourths

There is a lot of useful information we can generate from using the complete sequencing of fifths. As we progress in fluency with intervals we can also use tonal mapping diagrams to shorthand and simplify this understanding as we begin to approach chord diagrams and chordscale forms. Before discussing these constructions, here is the complete cycle of fifths in sequence starting from the note C:

C  G  D  A  E  B  F#  Db  Ab  Eb  Bb  F
   (Gb  C#  G#  D#  A#)

The cellist will quickly realize that starting from C, the first sequence of fifths is the exact same sequence of notes that forms the standard tuning of a cello. As we learned from intervallic practice, the octave is divided into twelve semitones. In the cycle of fifths, if we take the first four notes, the second set of four notes, and the third set of four notes we generate the following sets: CGDA, EBF#C# (GbDb), and AbEbBbF (G#D#A#E#). In the cycle of fourths, the same four note sets from C produce the retrograde spelling of the cycle of fifths with the following sets of four note groupings: CFBbEb (A#D#), AbDbGbCb (G#C#F#B), and EADG. As we build from intervals to chord constructions, you may have noticed much of what we are doing is generating simple ways to use the cello to remember patterns and shapes. For creative practice, here are the cycles pattern
systems in an is easy to remember shape as a tonal mapping on the cello fingerboard. Recognition of fourths and fifths will enhance chord building. See Figure 3.1 for fingerboard maps of cycle 5 and 4, all cycles can be flipped along the octave axis to be player in thumb positions.

Fig. 3.1 Cycle of Fifths

1. Cycle of Fifths by Tuning in 5ths
   C G D A - E B F♯(Gb) - Db Ab Eb Bb F

2. Cycle of Fourths as Sets of Four Notes
   (adjacent sets & in one position)
   C F Bb Eb - Ab Db Gb(F♯) B - E A D G

Set 1 black circle C F B bBb
Set 2 white circle Ab Db Gb B
Set 3 black triangle E A D G
Almost one position
Red circle end of cycle
Green Triangle second to last of cycle
By the same logic, we have used to view the cycle of fifths and fourths we can also view the cycle five map as several groups of fifths or as four and three voiced chordal structures. If we take the open string set from the circle of fifths (C G D A), it is possible from the bottom note to see this as a thirdless voicing of C major add 9, 13. If the note C is our root, G is the fifth, D the ninth, and a the A the natural thirteenth. This would be derivative of the chordscale formed on scale degree one in C Ionian. As such we can say the natural barring of any position chromatically, if we think of open strings at the nut as a barring across all strings, will also display this same feature. If we had a fifth string on the top, a high E, we could complete the chord with the major third on top as C G D A E – 1 5 9 13 3. If the fifth string was a low F then our chord would be based on a spelling of F Lydian or F Ionian as F C G D A – 1 5 9 13 3. However, if we keep C as our numeric name 1 then the adjacent fifth below head in the other direction as 11. F C G D A E B would then become 11 1 5 9 13 3 7. Reordered as C D E F G A B C these notes also describe C Ionian Major. We can also rename the cycle of fifths (or fourths) in the same way as well to describe this order of tonality starting from any chromatic note in the sequence:

\[
\begin{array}{cccccccccccc}
C & G & D & A & E & B & F# & Db & Ab & Eb & Bb & F \\
(Gb & C# & G# & D# & A#) \\
1 & 5 & 9 & 13 & 3 & 7 & #11 & b9 & b13 & b3 & b7 & 11
\end{array}
\]
Because of the parallel fifth tuning of the instrument it can also be said that this pattern will be emergent as a three-note voicing and as the parallel, perfect fifth interval from two adjacent strings.

Anywhere this ordered sequence occurs in fifths, from observing the mirroring in transposition from cycle five to four, the reverse is also true as a new spelling from the top down. Other possibilities exist for our consideration. For example C G D A in its reverse fourth order could be spelled A D G C. The fourth spelling gives us another chord name to numeric spelling as a from A minor 7 (sus 4)/C (in the bass). The numeric spelling top down would then be 1 4 7 3 (A D G C). In this case, the respelling gives as an option to describe a minor third quality. Other possibilities exist as well (as thirdless voicings, sus 4). This type of thinking will help us realize where we exist within chords and how many notes within positions we have available to complete chordal structures or pass in scalar motion from chord tone to chord tone. If we are implying a key over chordal structures we can also begin to observe inversional relations of a chord or it’s modality. This concept is the first step in realizing the transposability of forms and patterns from tonal mapping. See Figure 3.2 for further possibilities based on the transposable open, cycle five shapes on the cello fingerboard. All operations can also be performed vertically as fifth shapes moving by whole up step to complete a cycle five or four sequence (C up to G, down to D up to A, down to E up to B, etc cycle fourths in reverse in all keys.).
Fig. 3.2   Thinking of open tunings/barred shapes as numeric descriptions

Cycle of fifths, perfect fifth order as numeric names
1 - 5 - 9 - 13 - 3 - 7 - #11 - b9 - b13 - b3 - b7 - 11
Diatonic Modes from Cycle of Fifth Numeric Spellings

Making use of the numeric chordscale relationships previously discussed produces observable modal implications that can be inferred from the mapping of these sequences on the cello. The Lydian Tonic is a seven-note grouping that can be formed as a rearrangement of seven consecutive notes of the cycle of fifths. This can be a great tool for remembering harmonic structures as a simplification for exploring modal harmony. Referring to the cycle from the previous section the first seven alphabet spellings from a note C produce a stack of fifths starting with C and ending at F#. This seven-note set produces all modes of the diatonic major from C from the key G (Lydian Mode). Any seven not sequence will generate the same results. Here is the cycle once more where the Lydian spelling can be observed (from C):

EX. 1

C  G  D  A  E  B  F#  Db  Ab  Eb  Bb  F
(Gb  C#  G#  D#  A#)
1  5  9  13  3  7  #11  b9  b13  b3  b7  11

EX. 2  Seven note set from C (Gmajor, C Lydian)

C  G  D  A  E  B  F#
(Gb)
1  5  9  13  3  7  #11
Now we have all diatonic modes of G major (Ionian), or C Lydian if we use that as an axis for tonic. Figure 3.3 shows the tonal mapping of these respellings, C Lydian, from consecutive fifth reordering. You might notice immediately that as we identify from an Ionian or Lydian tonic each scale degree is surrounded by its modal chordscale. This is generated from the use of the bar spelling using the open strings as a sequence of fifths. As each scale is a respelling of a set of seven notes there are always six note choices that surround each scale degree as it’s modal expression. This is of course related to the quality of the chord that is built from that scale degree. Notice how the scale is fixed while the chordscale root moves throughout the mode. This is a great cycle to practice in all keys. Feel free to mix modes using any chromatic note as the axis (shifting the 1 in the cycle to any other notes). Here is a modal mapping of this concept on a cello fingerboard diagram. See figure 3.3 for C Lydian/G Ionian circle of fifth modes:
Fig. 3.3  Modal C Lydian/G Ionian Tonic Modes (diatonic)
Fig. 3.3 Cont.

From Lydian C Tonic - Circle of Fifths Order
Creating Primary Diatonic Seventh Chordal Forms

Now we can begin considering chord building as tonal maps of harmony. For each seven-note grouping of from the cycle of fifths four qualities of harmony are generated. To create an Ionian tonic spelling we need to start from chord degree 11 (of twelve chromatic possibilities) in the cycle to 1, omitting #11. To generate the mode Ionian, our sequence would be:

11 1 5 9 13 3 7 (FCGDAEB)

As triads, this sequence generates three major chords, three minor chords, and one minor flat five. With the seventh added we can identify four primary constructions. The major seventh chord (Maj 7), the minor seventh chord (m7), the dominant seventh chord (7), and the minor seventh chord with a flatted fifth (m7 b5). Building upon our intervallic practices, modal mapping, and modal chordscale mappings we can also map systems to practice diatonic seventh chords. Each chord should be practiced from each chord tone as a combination of intervallic construction that describes each inversion of the chord. These share an axis relationship as an alteration of the barred form as inversions horizontally (from the open spelling 1 5 9 13 to 1 5 3 7) as well as the vertical location of the chord on each of the four cello strings. Knowing the interval is the key to identification fluency when learning chord shapes from the tonal mappings. As we will see, the patterning of the chord behavior vertically will always contain the same relationships as the chord moves horizontal across each string.
Let us review the intervallic distances for creating diatonic chords from a stationary note. The major seventh chord, from any chromatic cycle five set of seven notes (11 – 7 in the cycle, or 1 to #11), consists of the intervals from a stationary note of a major third, minor third, and major third, followed by the repetition of the root one half step above the seventh. The major seventh occurs twice in the seven-note cycle on scale degree one (Ionian Tonic) and scale degree four (Lydian Tonic). It always contains 1 3 5 and 7. Any minor seventh chord is built from a stationary note, followed by a minor third, major third, and minor third. It is the opposite construction to the major seventh. The repetition of the root is one whole step away. It always contains 1 b3 5 b7. It occurs on scale degrees two, three, and six. The mixolydian dominant seven is a major triad (major third, minor third) with the flat seven scale degree which is a minor third away from scale degree five of that chord (1 3 5 b7). Like the minor seven chord the minor seventh is therefore one half step away from the repeated upper root (scale degree V7). The only other primary chord form from the diatonic modes is the minor seventh chord with a flatted fifth. This occurs from the root found on scale degree seven. It is the only diatonic chord with two consecutive minor thirds (m3, m3) from its root position followed by a major third to the flatted seventh. While we can say all chordmodes are specific, we can reduce the number of diatonic chord qualities to four distinct types in all keys. Before looking at the primary forms and inversions as tonal chord maps, here are the intervallic constructions to keep in mind. Like the cycle of fifths these constructions will cycle up and down in sequence as inversions from the root, third, fifth, or seventh:
1. Any Maj 7 (I, IV) – 1
   3  5  7  1
   (M3  m3  M3  m2)

2. Any m7 (II, III, VI) – 1
   b3  5  b7  1
   (m3  M3  m3  M2)

3. Any 7 (V) - 1
   3  5  b7  1
   (M3  m3  m3  M2)

4. Any m7 b5 (VII) - 1
   b3  b5  b7  1
   (m3  m3  M3  M2)

As a shape for tonal mapping I am basing the primary chord forms from the middle adjacent strings which gives a complete symmetrical shape across all four strings. The root is tethered to a stationary note on the G string where all notes of the chord can be voiced and imagined as played in one position (spelled as some kind of 1 3 5 or 7). The outer strings provide a symmetrical division of the chord where the left or right formation of the chord is expressed in division from outer strings. Before moving onto inversional divisions of the primary chord forms examine the tonal maps for each chromatic location showing the transposable patterns of each from a shared root name spelling.
Fig. 3.4  Primary Forms of Diatonic Seventh Chords
The behavior of these forms can help us practice how to map chordal shapes using the cello. There are two axes to that can be used to divide this shape as a transposable form. As mentioned, the parallel fifth tuning makes all forms symmetrically divisible. This means all patterns possible on the instrument will always be the same grouped anywhere on the string horizontally or vertically. To observe the divisions that will occur from as root locations change first divide the form from the outer strings which describe some kind of fifth on the lowest string (IV) and some kind of third on the highest string (I). On the upper axis (towards the nut) we have the location of the root and fifth, on the lower axis (towards the bridge) we have the location of the third and seventh. As the root is located by string the shape of these halves will repeat in the same horizontal location, useful as a horizontal grouping by hand position. This division, which always displays the outer fifth and third is a quartal division, as you can imagine four notes above and four notes below. Above the 5 and 3 is 1 and 5. Below the 5 and 3 axis is 3 and 7.

The other axis to be aware of is the symmetrical vertical, left to right, division of the primary form. This form displays two pairs of three notes in a triangular shape (from strings IV to III pair, and string II to I pair). From the C and G string we have the fifth, 5, looking to the middle to 1 and 3. From the D and A string we have the third, 3, looking in to the middle at 5 and 7. The middle adjacent pairs form the single major third relationships vertically and parallel fifths horizontally (1 to 3, 5 to 7). Here is the fingerboard mapping of the axis divisions of the primary form of a chord on the cello:
Figure 3.5  Primary Forms Axis Division as Horizontal and Vertically Related
To begin viewing how this primary form of a chord moves from location to location a discussion of vertical and horizontal axis as inversions of the chord should be examined. For each of the four strings a full spelling of the chord can be made. The primary form mapping of a chord begins with the root location in the lower axis (towards the nut) located from a position, as root note of the chord voicing, on the G string. When we move the root to any of the other remaining three strings there are further horizontal and vertical relationships and pattern behaviors that can be observed. For each inversion, horizontally of the chord a vertical behavior occurs. For each vertical inversion, a horizontal behavior occurs. The combinations for the inversion of each chord by string will always transpose to a location in the same symmetry, upon a vertical or horizontal axis, only limited by which string contains the root. The intervallic distance from chord tone to chord tone will thus display the same behaviors as the primary form structure. To map these relationships, we need only look at the chord spelling in a vertical relationship by string individually (complete spelling of seventh chord), and combine it with the same chord tones in that vertical inversion with behaviors along the horizontal spelling of the chord (limited ascending moving from lower to higher, mirror inversion related higher to lower as in below a root). Relate back to figure 3.5 to compare how each axis functions in inversion. The global pattern over the fingerboard is also transposable so all forms can also express the division of all other chromatic notes as roots.
Figure 3.6  Vertical Spelling of Chords as Locations of Each Chord inversion

Vertical Inversions by Chord Tones for Each String

KEY
Red Circle = Root Note Spelling
Red Number = Root Location in Inversion
Square = Numeric Spelling from each string as inversion
Figure 3.7  Horizontally Related Spelling as Realized from Vertical Inversions

Horizontal Inversions by Chord Tones for Each String

KEY
Red Circle = Root Note Spelling
Red Number = Root Location in Inversion
Square = Numeric Spelling from each string as inversion
3.8 Major Seventh Chord as a Full Mapping of a Primary Form and Chordscale
Chapter 4

Creating Chordscale Alterations from the Lydian Chromatic Concept

Much of the Lydian to Ionian tonic understanding has already been discussed as mappings of cycle five and four movements. For a complete understanding of George Russell’s Chromatic Lydian Concepts the cellist improviser should use the author’s own original work from 1959, Andy Wasserman’s updated version of the original text (4th Edition, 2001), or the simplified set of scale studies developed by David Baker as mentioned in chapter one. In any case, there are several operations we can perform to our understanding of previous chapters to describe alterations to the diatonic primary forms. George Russell’s descriptions of modal harmony stems from his interpretation of the overtone series and it’s expression in cycle five (four) operations. At the base of the overtone series, after the first fundamental tone, is a base coupling of a root and fifth. That seven note grouping forms what he calls the Lydian Scale Chordmode. This means the Lydian seventh chord, for Example C – E – G – B is in a stable unity with it’s overtone related chord notes D – F# - A. The Ionian major is for Russell an expression of major in a state of resolution with an ordering from C including natural eleven, F natural, to B. The natural resolution back to a unity with overtone and a self-organized fifth structuring would then resolve, F to F#, from Ionian C major to Lydian C Major. An approach to ionian structures with strategies to avoid notes that behave as tension to resolution notes will be approached later in this chapter.

With a duality of understanding diatonic axis alterations of chordscales can be approached on the cello. For ease of reading and transfer between systems, I will use an
ordering found in other chordscales showing a relation from the middle looking out to describe Russell’s process for chordscale alterations. The Lydian Chromatic concept is a transposable form that can be applied to all notes from an ordering into cycle of fifths sequences. For example let us review the Lydian spelling of C (Ionian G) as the base for chordmode unity:

\[
\begin{array}{ccccccccccc}
\text{C} & \text{G} & \text{D} & \text{A} & \text{E} & \text{B} & \text{F} & \text{Db} & \text{Ab} & \text{Eb} & \text{Bb} & \text{F} \\
\text{(Gb} & \text{C} & \text{G} & \text{D} & \text{A} & \text{B} & \text{C} & \text{Db} & \text{Ab} & \text{Eb} & \text{Bb} & \text{F} \\
1 & 5 & 9 & 13 & 3 & 7 & #11 & b9 & b13 & b3 & b7 & 11
\end{array}
\]

Lydian Spelling (C D E F# G A B) I Lydian Major 7

\[
\begin{array}{ccccccccccc}
\text{C} & \text{G} & \text{D} & \text{A} & \text{E} & \text{B} & \text{F} \\
1 & 5 & 9 & 13 & 3 & 7 & #11
\end{array}
\]

Fifth Unity P5 C E G B, (from overtone series D – F# - A)

Ionian Spelling (from Lydian G A B C D E F# G) V Major 7

\[
\begin{array}{ccccccccccc}
\text{G} & \text{D} & \text{A} & \text{E} & \text{B} & \text{F} & \text{C} \\
5 & 9 & 13 & 3 & 7 & #11 & 1
\end{array}
\]

Perfect fourth as base G – B – D – F# (Lydian Tonic expression)
According to Russell, this expression is diatonic as a literal meaning. The Lydian is an expression of the overtone series but also contains the tension, functional harmonic goals, of an Ionian tonic. Both are available and can describe chord qualities and function, Russell chooses to alter chords from a complete alignment of all chromatic notes as contained within an octave. The Lydian axis is now the over-all parent chordscale related to what is traditionally called a key. For cellists, we can use his system of organization and processes of alteration to study how we can use the non-diatonic, chromatic notes of the chordmodes. From a seven-note grouping, from the cycle of fifths, a five-note grouping is also produced as a completion of twelve chromatic semitones. Those five other notes explain all harmonies from those “altered” chromatic positions as related to any of the chromatic stationary notes. This is an alternative way of viewing functional harmony from a Lydian tonic and chromatic alterations. For the purposes of viewing these scales I will describe them in duality as name, and numeric spelling and mapped as spelled from Russell’s order (seen in previous cycle five spellings).

**Lydian Order of Tonal Gravity**

<table>
<thead>
<tr>
<th>First Seven Closely Related (Diatonic)</th>
<th>(Distantly Related, Chromatic Alterations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 5 9 13 3 7 #11 b9 b13 b3 b7 11</td>
<td></td>
</tr>
<tr>
<td>I V II VI III VII #IV bII +V bIII bVI IV</td>
<td></td>
</tr>
</tbody>
</table>

The beauty of Russell’s thinking, is his study of a root note, any chromatically available note, as a study of all chords from this base parent chordscale. For the improviser, it
allows study of individual chord tonalities, chords in sequences, and modulatory movements that are simply ingoing or outgoing. Those movements as solo or melody construction, related to harmonic construction unity, are therefore closely related (stable, vertical, ingoing) or distantly related (unstable, horizontal, outgoing). As such, operations from chord to scale generate the following formulas for chordscale study.

LYDIAN Parent Scale Chromatic Formulas Vertical (Ionian Diatonic or altered behaviors)

Principal Primary Lydian Chordscales

Lydian Major

C  D  E  F#  (G)  A  B
I  II  III  #IV  (V)  VI  VII

Lydian Augmented

C  D  E  F#  (#G)  A  B
I  II  III  #IV  (+V)  VI  VII

Lydian Diminished

C  D  bE  F#  (G)  A  bB
I  II  bIII  #IV  (V)  VI  bVII

Lydian b7

C  D  E  F#  (G)  A  bB
I  II  III  #IV  (V)  VI  bVII
Lydian Auxiliary Augmented (whole tone, Major Third system)
C  D  E  F#  (#G)  bB
I  II  III  #IV  (+V)  bVII

Lydian Auxiliary Diminished (dim. whole, half spelling)
C  D  bE  F  F#  (#G)  A  B
I  II  bIII  IV  #IV  (+V)  VI  VII

Lydian Auxiliary Diminished Blues (dim. half, whole spelling)
C  bD  bE  E  F#  (G)  A  bB
I  bII  bIII  III  IV  (V)  VI  bVII

Horizontal Spelling using Natural Four

Secondary Horizontal from Lydian

Major

C  D  E  F  (G)  A  B
I  II  III  IV  (V)  VI  VII

Major b7

C  D  E  F  (G)  A  bB
I  II  III  IV  (V)  VI  bVII

Major Augmented

C  D  E  F  (G#)  A  B
I  II  III  IV  (+V)  VI  VII

Horizontal Blues Scale

C  D  bE  E  F  F#  (G)  A  Bb  B
I  II  bIII  III  IV  #IV  (V)  VI  bVII  VII
As you may have noticed, all functional forms of the chromatic concept are created from this process of chordscale operations. The principal functions of vertical spellings seek to produce functional descriptions of the principal form of individual chord constructions, intervallic descriptions, with realized alterations. The Horizontal scales have the outgoing tendency to form resolutions to their tonic Ionian or relative minor stationary notes. As such the difference from a spelling from cycle five, behaves differently from outgoing behaviors of chordscales that are defined with the perfect fourth occurring before the fifth (the reversal of order in the chromatic ordering, C to F is the most distantly related). Now for every primary chord form as a tonal mapping we can apply any of the chordscale operations to describe that chord. The creative choice for each will have the sound of being closely related or as having a sound distantly related. Before moving on, here are example exercises and tonal mappings for experiencing the transition in practice from Ionian (seven note spelling of the Lydian from the cycle of fifths) and the avoidance of horizontal tones as avoid notes from modal chord spellings. Notice that the Lydian chordmode (from Ionian IV Lydian) in the avoid note sequence contains does not have an avoid note and as such displays for each key the unity of chordscale as described by Russell. The cycle of fourths produces the negative mirror inversions of these chords.
Fig. 4.1  Lydian to Ionian Shifting on the Cello

Cyle 5 concept for Cello

The Cycle of 5ths

Stack any 7 in cyle order at octave equivalency, you produce a Lydian Scale

As open cello strings the cycle produces F Lydian IVmaj7 (Lydian I)

*All non diatonic notes are the approach notes above or below, the "other", or "outside", or "wrong", and sometimes avoid notes (depending on the melody) from the circle of 5ths.
Fig. 4.2  Ionian Avoid Notes (Lydian has no Avoid Notes)

Avoid Notes & Chordscales

I maj 7
Tonic  1  T9  3  X4  5  T13  7

II m7
Sub-dominant  AV6  1  T9  b3  T11  5  X6  b7

III m7
Tonic  AVb2,6  1  Xb9  b3  T11  5  X6  b7

IV maj7
Sub-dominant  1  T9  3  T#11  5  T13  7

V7
Dominant  AV4  1  T9  3  T11  5  T13  b7

VI m7
Tonic  AVb6  1  T9  b3  T11  5  Xb13  b7

VII m7 b5
Dominant  AVb2  1  Xb2  b3  T11  b5  Xb13  b7

V7 sus4
AV3  1  T9  X3  Sus4  5  T13  b7
Fig. 4.3  Cycle of Fourths Mirror Inversions of Chordscale (Negative Harmony)

Lydian Chromatic as Cycle of 4ths

The mirror or negative harmony to Cycle 5

Ian Flatt

Stacking 7 notes in an order of Cycle 4 produces the mirror inversion of C Lydian

Here is Lydian C major again for comparison

If we build chords on each note patterns resolve correctly due their Cycle 5 or 4 origins

Enharmonic Spellings

Neo bII use Dom7
neg. of C major = No F#
Fig 4.4 Tonal Mapping of Lydian Scales, Horizontal Scales from C (Transposable to all keys to create parent scales from any chromatic note)
**Chromatic Approaches to Chordscales**

We can continue chromatic processes again as extensions of defining chord tones found in any scale or as an approach to any chord. Shelly Berg’s thinking for this approach can be described as a revelation from the cycle five seven note sets. For any four note seventh chord there are either five chromatic notes we can use to outline that chord, or if thinking from a diatonic mode then we need only choose from the remaining three note sets. All approaches should be practiced creatively. For any chord the diatonic approaches are limited to some kind of 9, 11, or 13. If we are selecting from the other five chromatic approaches those alterations could include bII, +V, bIII, bVI, IV.

Based on approach, working towards playing the changes, we can begin to borrow a set of rules as defined by Mr. Berg for systemizing practices. There is a hierarchy of tones in a chord that in most cases follow certain behaviors. Many cellists may already know this hierarchy. As consonant tones, from our cycle work, these tend towards harmonic definition from ingoing to outgoing (1 – 5):

1. 3rd and 7th
2. root and 5th
3. 9th and 13th (add 6)
4. #11 for major or dominant chord colors, 11th for minor and minor 7 b5 color
5. Altered tones – b9, #9, b13 (+5) – often as dominant colors alterations

We can simply this from the described avoid tones in Ionian Harmony as we realize which notes are left out in tonic, dominant, or subdominant areas. An easy way to memorize this can be viewed like this:
Chordscale Degree Imaj7 IIm7 IIIIm7 IVmaj7 V7 VIIm7 VIIIm7b5
Avoid in Scalemode: 4 6 2, 6 none 4 6 2
In C Ionian: F B F, C none C F C
Chord from C Ionian: CEGB DFAC EGBD FACE GBDF ACEG BDF
Available notes left: AB EG A all AE BD EG

From this we can see that for almost all scalemodes there are almost always six notes available to describe voice leading from chord to chord. The exception is of course the Phrygian three chord, five notes available, and the Lydian chord in which all tones can sound in unity. Continuing possibilities for emphasizing chord movement from chordscales can further help to achieve targeted goal notes:

1. Arpeggio melodies, passing using scales (avoid notes, available notes, etc.), are most important.

2. Scales are generated from chordal alignments by successive filling in of chordtones. As cellists are positional locators, using the left hand, alone, we can see how this filling in works from our intervallic and tonal mapping systems.

3. All chromatic tones are viable, in subordinate to chord tones on principal beats.

4. Skips accentuate notes; therefore, skips are normally made from or to a chord tone. Steps become passive using this rule.

5. Successive skips to non-chord tones produce outgoing harmony and should be avoided in tonal harmonic sequences.
6. The last phrase note is important and with consonance can validate the tonality of improvised lines.

7. Very often the last note of a phrase is the third of the goal harmony. Other possibilities exist in many contexts.

The study of improvisational practices on the cello, as expressed by Berg’s logic, is that all sequences of harmony are spontaneous reordering’s of preconceived data. By learning some idiomatic formula, ironically placing limits for application of information in performance, we create the potential for greater perceived freedom of expression in improvisation. The patterns indicated so far are the realization, just like in our classical practices, that improvisation of alphabet processes for improvisation is practiced by specific means. Here is notation for realizing chromatic approaches around chordtones. These have consequences in ascending and descending melodies, and the choice or approach chromatically to goal notes as coming above or below those notes. Much of the chromatic expression found in romantic era classical music and twentieth century bebop music can be practiced as chromatic approaches to chord tones from the practice of scales using approach notes. (See Appendix I for complete approach note scale studies.)
Chromatic Approach Note Chordscales Ascending

Fig. 4.5  Chordscale Studies (complete study in all keys found in Appendix I)
Common Chord Cycle Sequences for Application of All Concepts

For any stationary note we can generate all chordscale unities as a division of intervalllic constructions, chordscale modes as parent to chord, and implied tonalities based on cycle of fifth or cycle of fourth groupings. The seven note constructions, primary forms included, are thus transposable as tonal mappings. As you may have noticed from the Ionian tonic to Lydian tonic systems the main difference in application is found in the avoidance of modulatory notes versus modal Lydian tonic which can describe unity of scale to chord (no avoid notes). As a tool this sliding scale, ingoing to outgoing, describes a large global form method for approaching harmonic sequences. As Berg says, all chromatic notes are viable candidates for creating melody from chordscale relationships. The cellist should explore diatonic, chromaticism, avoid-note, and Lydian possibilities for each chord from primary form patterns. Here are some practical examples from the American Songbook for imprinting these ideas. Each section end shows primary form constructions as tonal mappings based on selected examples for in each section. As familiarity with these sequences increases, the cellist may start to notice these many of these sequences often occur in our standard “classical” repertoire as well:

Key for Chord Symbol:
7 = dom7, C = maj (7), C = - (minor) 7, dim7b5 = minor seven b5

Key for Numeric Shorthand:
lower case = minor, uppercase = major as in i, I, ii, II, iii, III, iv, IV, v, V, vi, VI, vii, VII.

b=flatted scale degree, #=sharped scale degree, each by semitone.
1. **Common Cycle Five (up by fifths, down by fourths) Movements (transpose for all key studies)**

II V in Sequence (III VI II V I)

\[ \text{| iii VI | ii V | I} \]

"Confirmation" m. 14-16

\[ \text{| A- D7 | G- C7 | F ||} \]

"Donna Lee" m. 29-31

\[ \text{| C- F7 | Bb- Eb7 | Ab |} \]

\[ \text{| iii | VI | ii | V | I} \]

"Bye Bye Blackbird" m. 27-31

\[ \text{| Adim | D7b9 | G- | C7 | F |} \]

\[ \text{#ivdim | VII | iii | VI | ii | V | I} \]

"Woody 'n' You" m. 1-7

\[ \text{| Gdim | C7b9 | Fdim | Bb7b9 | Ebdim | Ab7b9 | Db} \]

"Stella by Starlight" m. 25-32

\[ \text{| E | A7b9 | D | G7b9 | C | F7b9 | Bb} \]

Variation: \[\text{| IV | #iv VII | iii | VI | ii | V | I}\]

"Stablemates"

\[ \text{| Gb | G7b5 | C7 | F- | Bb7 | Eb- | Ab7 | Db} \]

"Ceora"

\[ \text{| Db | Ddim G7 | C- | F7 | Bb- | Eb7 |} \]

\[ \text{IV | #ivdim VII | iii | VI | ii | V} \]
Confirmation Sequence

m. 2-4 in the key of IV:

\[
| F | Edim A7b9 | D- G7 | C- F7 | Bb7 |
\]
F: Bb: #iv VII ii VI i V I

also found in "Blues for Alice," etc.

| iv bVII | iii VI | i i V | I |

"Ornithology" m. -31

\[
| G | C- F7 | B- E7 | A- D7 | G |
\]
I iv bVII7 iii VI ii V I

"Joy Spring" m. 3-7

\[
| F | Bb- Eb7 | A- D7 | G- C7 | F |
\]
I iv bVII7 iii VI ii V I

"Moments Notice" m. 27-31

\[
| Ab | Ab- Db7 | G- C7 | F- Bb7 | Eb |
\]
IV iv bVII7 iii VI ii V I

| IV | iv | iii | biIII | ii | V | I |

or

| IV | iv | bVII | iii VI | biIII bVI | ii | V | I |

"Blues for Alice" m. 6-10

\[
| Bb | Bb- | A- | Ab- | G- C7 | F |
\]
IV iv iii biIII ii V
"All the Things You Are" m. 29-35

| Db | Db- | C- | Bm7b5 | Bb- | Eb7 | Ab |

IV iv iii biiim7b5 ii V I

"It's You or No One" m. 25-31

| Bb | Bb- | A- | Ab- | G- | C7 | F |

Approaching ii V from a half step above: |biii bVI | ii V | I

"Stablemates" m. 1-3

| E- A7 | Eb- Ab7 | Db |

biii bVI ii V I

"You Stepped Out of a Dream" m. 15-16

| Eb- Ab7 | D- G7 || C |

Approaching ii V from a half step below: |bii bV | ii V | I

"Moment's Notice" m. 1-3

| E- A7 | F- Bb7 | Eb |

bii bV ii V I

"Afternoon in Paris" m. 23-25

| Db- Gb7 | D- G7 || C |
Fig. 4.6  

“Donna Lee” m. 29 – 31 (III, VI, II, V, I Sequence)
“Stable Mates” m. 1 – 3 (II V I approach ½ Step Above)

Fig. 4.7

E Minor 7 (bIIIm7 of Db)

A7 (bVI7 of Db)

Eb Minor 7 (IIIm7 of Db)

Ab 7 (V7 of Db)

Db Maj. 7 (I Maj. 7)
Fig. 4.8  “Moment’s Notice” m. 1 – 3 (II V I approach ½ Step Below)
2. Modulations (transpose for all key studies)

Modulation to the key of IV:

"Take the 'A' Train" (m. 15-17)

| C   | G- C7 || F   |

"Misty" (m. 1-3)

| Eb  | Bb- Eb7 | Ab   |

Blues progression (Bb) (m. 3-5)

| Bb7  | F- Bb7 | Eb7  |

"Alone Together" m. 5-7

| D-   | Am7b5 D7b9 | G-  |

Modulation from major to relative minor:

"I Hear a Rhapsody" (m. 7-9)

| Eb   | Dm7b5 G7b9 || C- |

"On Green Dolphin Street" (last 8, m. 25-26)

| F-   | Dm7b5 G7b9 | C- |

Eb: ii c-: ii V i

"My Romance" m. 4-5

| Bb   | D7+9| G- |

Bb: I G-: V i

Modulation from minor to relative major:

"Summertime" (to relative major and back to minor)

| D-   | G- C7 | F   | Edim. A7 | D- |

i F: ii V I D-: ii V i
"Softly as in a Morning Sunrise" (m. 15-17)

| C- | F- Bb7 | Eb |

i Eb: ii V I

Downstep Modulations

Repeated modulation down by interval M2

"Afternoon in Paris" m. 1-5

|| C | C- F7 | Bb | Bb- Eb7 | Ab

Modulation Sequence down by semitones

"Airegin" m. 10-15

| D- G7 | C | C#- F#7 | B | C- F7 | Bb

Modulation down a m3:

"I'll Remember April" bridge

||: C- | F7 | Bb | Bb :||

| A- | D7 | G | G | F#- | B7 | E |

"All the Things You Are" bridge

| A- | D7 | G | G | F#- | B7 | E |

Modulation up a m3:

"Confirmation" m. 17-23

| C- | F7 | Bb | Bb | Eb- | Ab7 | Db |

"On Green Dolphin Street" m. 9-15
|F-|Bb7|Eb|Bb- Eb7|Ab-|Db7|Gb|


Modulation down a major 3rd:

"What's New" (m. 1-3)
| C | Bb- Eb7 | Ab |

"Have You Met Miss Jones" (bridge)
|| Bb | Ab- Db7 | Gb | E- A7 | D |

"Giant Steps" (m. 1-2, 2-3, etc.)
| B D7 | G Bb7 | Eb |

Modulation up a major 3rd:

"I Love You" m. 11-13
| F | Bm7b5 E7b9 | A |

"Giant Steps" (m. 4-6)
| Eb | A- D7 | G |

"Giant Steps" (m. 15-23)
| B | F- Bb7 || Eb | A- D7 | G | C#- F#7 |
| B | F- Bb7 | Eb |

Modulation to V

"How Deep is the Ocean" m. 1-5
|| C- | G7/B | C-/Bb | Aø | D7b9 | G- |
| i | V | i | G-: ii V | i
Fig. 4.9  “Take the A-Train” Modulation to IV

C Maj 7 (Ingoing harmony, stable major seventh chord Key of I)

G Minor 7 (Pivot, outgoing harmony, minor for major V7 of C to II7 of F)

C Dominant 7th (V7 of F, new tritone resolution outgoing to F Major)

F Maj. 7 (Ingoing harmony, stable major seventh chord Key of IV from C major)
Fig. 4.10  “On Green Dolphin Street” Cycle Five Minor Sequence

F Minor 7 (this is minor7 I17 of Eb)

D Minor7 b5 (this is dim. minor7 I17 of C minor, Ab common to D-7b5 & G7 b9)

G7 (b9) - a typical diminished type spelling of V7 (b9) as half/whole dim.

C minor (outgoing harmonies moving to ingoing related minor)
Fig. 4.11
“Summertime” (Minor/Major/Minor) Related Modulation Sequence
3. Blues Chord Changes (transpose for all key studies)

Basic Blues

|| F7  | F7  | F7  | F7  | |
|----|-----|-----|-----|-----|
| Bb7| Bb7 | F7  | F7  | |
| C7 | Bb7 | F7  | C7  | |

Common Bebop Blues Progression

|| F7  | Bb7 | F7  | F7  | |
|----|-----|-----|-----|-----|
| Bb7| Bb7 | F7  | D7b9| |
| G- | C7  | F7  | D7  | G- C7 |

Bird Blues: "Blues for Alice," "Freight Trane"

|| Fmaj7 | Em7b5 A7b9 | D- G7 | C- F7 | |
|----|---------|---------|------|-------|
| Bbmaj7| Bb- Eb7 | A- D7  | Ab- Db7| |
| G-  | C7     | F      | G- C7 |
4. Turnarounds

From I back to I

<table>
<thead>
<tr>
<th>C</th>
<th>D- G7</th>
<th>C</th>
</tr>
</thead>
</table>
I   ii  V   I
| C A- | D- G7 | C |
I   vi  ii  V   I
| C A7 | D- G7 | C |
I   VI  ii  V   I
| C A7 | D7 G7 | C |
I   VI7  II7  V7   I

Turnarounds with Tritone Substitutions

<table>
<thead>
<tr>
<th>C A7</th>
<th>D7 Db7</th>
<th>C</th>
</tr>
</thead>
</table>
I   VI7  II7  bII7   I
| C Eb7 | D7 Db7 | C |
I   bIII7  II7  bII7   I
| C Eb7 | Ab7 Db7 | C |
I   bIII7  bVI7  bII7   I

Lady Bird Turnaround

<table>
<thead>
<tr>
<th>C Eb7</th>
<th>Ab  Db7</th>
<th>C</th>
</tr>
</thead>
</table>
I   bIII7  bVI  bII7   I
Other:

Joe Henderson creates a turnaround by moving down in minor 3rds until arriving back on a tonic.

"Isotope" m. 11-12

| C7 A7 | F#7 Eb7 || C |

Turnarounds can be created with other combinations of bass movements that lead back to tonic as well.

| C Bb7 | Eb7 Db7 || C |

I bVII bIII bII I

Movement is M2 down and up a P4, down a M2 resolving down a half step.
Fig. 4.12  
Turnaround Example 1 - V7 Cycling back to Tonic

C maj. 7

A7 (VI7 and V7 of D)

D7 (II17 and V7 of G)

G7 (V7 of C)

C Maj. 7
Fig. 4.13  Turnaround Example 2 – With Tritone Substitution

C maj. 7

Eb7 (bIII of C, V7 of Ab)

Ab7 (bVI of C, V7 of Db)

Db7 (tri-tone sub for G7 as bII7 outgoing to C)

C maj. 7
5. Diminished Chord Movements - The passing diminished chord is a chromatic move from I to ii, from ii to iii, and from bass notes on scale degrees 4 to 5, usually expressing IV to I/V (b9, #9, 3 | 11, #11, 5). Diminished seventh chords often fulfill a dominant function and are sometimes interchangeable with a dominant 7b9 a major third below. The half whole spelling of the diminished scale in this context will be familiar from many classical works V7 (b9). For Example, F#o7 = D7b9 which can be used in place of VI7 (b9) moving to ii in the sequence.

#io (biio) (sharp one diminished, as approaching upper chordtone, also biio)

"Have You Met Miss Jones" (m. 1-3)

|| F | D7b9 | G-  
or

|| F | F#o7 | G-  

#iio (sharp two diminished)

"Once I Loved" (m. 5-7)

| G- | G#o7 | A-  |

ii  #iio  iii

Rhythm Changes (m. 1-3)

|| Bb G7 | C- F7 | D- G7 |

I  VI  ii  V  iii  VI

or

|| Bb Bo7 | C- C#o7 | D- G7 |
"It Could Happen to You" (m. 1-5)

| Eb | Gø C7b9 | F- | Aø D7b9 | G-

I  iiiø  VI  ii  #ivø VII  iii

or

| Eb | Eo7 | F- | F#o7 | G-

I  #io  ii  #iio  iii

biiio (flat three diminished)

"Body and Soul" (m. 3-5)

| Db Gb7 | F- Eo7 | Eb-

I  IV  iii  biiio  ii

"Night and Day" in Eb (m. 9-13)

| Aø  | Ab- | G- | F#o7 | F-

#ivø  iv  iii  biiio  ii

Turnaround

| C  Ebo7 | D- G7 |

I  biiio  ii  V

#ivo7 Occurs as a passing chord between scale degrees 4 and 5 in the bass, usually IV7 #ivo7 I/V. Note that it parallels ii  #iio7  I/iii.

Doxy m. 9-13

| Bb7 | Bb7 | Eb7 | Eo7 | Bb7

I  IV  #ivo  I
In a Mellow Tone m. 25-27

| Db   | Do7 | Ab  | I
| IV   | #ivo | I

Blues m. 1-3: | I | IV #ivo | I
Blues m. 5-7: | IV | #ivo | I
Rhythm Changes m. 5-7: | I7 | IV7 #ivo | I

io7 - Not a passing diminished chord, but a color chord that creates tension on I.

"Spring is Here" m. 1-4

| Abo7 | Abmaj | Abo7 | Abmaj |
| io7  | I     | io7  | I     |

"Upper Manhattan Medical Group" m. 29-32

| Dbo7 | Dbmaj | Dbo7 | Dbmaj |
| io7  | I     | io7  | I     |

"Upper Manhattan Medical Group" m. 3-5

| Eb-  | Ab7  | Dbo7 | Dbmaj |
| ii   | V    | io7  | I     |

"Misty" m. 1 substitution

| D/Eb Ebmaj | (D/Eb is identical to Eb dim maj7.)
Fig. 4.14  
“Have You Met Miss Jones” m. 1 – 3 #I dim. 7
Fig. 4.15  “Rhythm Changes” m. 1 – 3 with alternative diminished chords

Bb Maj. 7

G7 (VI7 of G)

Or Substitute G7 with Bdim7 (#1dim7 outgoing to C-7)

C minor 7 (II Minor 7 of Bb)
Fig. 4.15  Continued

F7 (V7 of Bb)

We can also use C#dim7 in place of F7 (#II7dim7 passing to Dminor7)

D minor 7 (III7 of Bb)

G7 (VI7 of Bb)
“Upper Manhattan Medical Group” m. 3 – 5, I dim. 7 as color chord
5. Ways to Create Tritone Substitution Over ii V I

ii V I

| D- | G7 | Cmaj |

Include the entire ii V and then the ii V a tritone away.

| D- G7 | Ab- Db7 | Cmaj |

Replace the V chord with a dominant chord a tritone away.

| D- | Db7 | Cmaj |

State the ii and then a minor chord a tritone away from ii.

| D- | Ab- | Cmaj |

State the V chord and then a dominant a tritone away.

| G7 | Db7 | Cmaj |

David Baker Tritone Bridge

"Tritone Bridge" is a term used to describe using tritone substitutions throughout the bridge of a rhythm tune. The tune "Lo Jo" by George Coleman uses a tritone bridge.

Rhythm Changes Bridge (in the key of Bb)

|| D7 | D7 | G7 | G7 | C7 | C7 | F7 | F7 ||

Dominant chords converted to ii Vs

|| A- | D7 | D- | G7 | G- | C7 | C- | F7 ||
Full tritone substitution for each ii V, i.e. the "Tritone Bridge"

|| A- D7 | Eb- Ab7 | D- G7 | Ab- Db7 | G- C7 | C#- F#7 | C- F7 | F#- B7 ||

Equivalencies: G7+9+5 = Db7+11, G diminished whole tone = Db lydian dominant

The diminished symmetry presents possibilities for respelling. The G diminished whole tone scale, Db lydian dominant scale, and the Ab ascending melodic minor scale are identical:

G  Ab  Bb  Cb  Db  Eb  F  G

In "A Night in Tunisia" the chords are | Eb7 | D- | Eb7 | D- | etc. Eb7 can be a tritone sub for A7, the V of D-. Therefore, on the Eb7 you can play Eb lydian dominant or A diminished whole tone. They are the same, but the different axis helps us to hear and perceive other possibilities.
Chapter 5
Conclusions

My study with Prof. Maggio has helped me create cello-centric didactic interpretations that begin the process of unlocking the cello fingerboard for the cellist exploring improvised music. My retranslation of ideas from a pianist improviser can help expand the technical limitations of the cellist. As a result, and what forms the subject matter of this dissertation, is that by creating solutions to visualize harmony as a cellist musical practices continuously elevate as a performer, listener, and interpreter of music. By including improvisation as part of classical study cellists gain deeper listening skills, a greater awareness and fluency with harmonic patterns and their formal goals in “classical” music, along with their ability to explore, reengineer, and observe music with a greater sensitivity to rhythm. As discussed before, creating a system of tonal mapping was my approach to limiting harmonic errors due to a lack of fluency on my instrument with intervallic structures. I had to find a way to make my classical technique work for me in a way I had not considered or practiced during my conservatory training.

For the classical cellist, harmonic study is understood abstractly from what he or she has studied in traditional theory classes. But there are other methods of viewing harmony and theory that are also very useful for expressing our musical selves. By practicing and learning pattern-based visual maps of harmony on the cello, the cellist can create improvisational practices on their primary instrument that will ally and inform reading abilities. With continued practice, tonal maps will begin to connect internally.
The amount of thought required to think improvisationally in music is reduced. It is my hope this will lead the cellist to greater levels of musical freedom where mastery with improvisation becomes equal to mastery of reading musical notation.

Considering the amount of hybridization and “streaming” that has been going on since the mid twentieth century, the reintroduction of improvisation for the classical cellist may not be much of a surprise as we continue forward in the twenty-first century. As a practice, the steps towards becoming a fluent improviser require practice that may be new for the cellist, though not unrelated to studies undertaken to achieve technical mastery. As seen in chapter two, the relearning of intervallic combinations, without standard notation, is a worthwhile strategy. An intuitive fluency of interval recognition and construction can enhance understanding of all forms of music. Creating a strong internal sense of distance as related to tonal harmony and physically is important as we combine theory and performance practices. By mapping these structures visually, as possibilities of twelve equal semitones from a stationary note, the cellist can begin to think harmonically with the instrument as an integral part of the process. To me, this way of thinking is most aligned with the polyphonic thinking that improvisers on piano or guitar use playing their instruments. By considering alphabet processes at octave equivalency, tonal mapping shows us the limitations of harmonic structure on the cello. This is due to the specific tuning of our instruments and the limitations related to hand positions possible for any given note. While the cello is not capable of playing wholly voiced pianistic or guitar-like chordal forms, we can most certainly visualize them on the instrument. This develops our sense of harmonic awareness and the experience of where we are located within those harmonies at any given time.
As discussed in Chapter three, we can use the cello’s open fifth tuning to our advantage to explore the possibilities of harmonic sequencing. The circle of fifths and fourths is particularly useful on the cello. As numeric spellings, we can create shorthand systems for looking at diatonic modes and seventh chords. The vertical and horizontal examinations as seen in the chapter, show a wide variety of possibilities for harmonic exploration. Built from seven note sets from the circle of fifths, the diatonic modes create chordscales where all modal possibilities can be seen from a stationary note. Learning the diatonic modes from scale degree one to seven will most likely be a quick study for the cellist. Internal auraliztion (hearing those modes as an internal process) from practice on the cello, will lead to further recognition of tonal structures.

As an examination of extended harmonies and chromatic approaches, chapter four provides many possibilities, also derived from the cycle of fifths, as outlined by George Russell. His primary axis of tonic thinking stems from Lydian constructions. These Lydian constructions, also seven-note sets of the circle of fifths, can be altered using specific logic showing how many outgoing sounding harmonies relate diatonically to a Lydian tonic. Of course, it is also possible to explore the Lydian Chromatic System from an Ionian axis as well. In each case, the addition of chromatic approaches to modal systems forms a final step for the cellist improviser. Any chord can now be explored using a parent scale to chord-expression for that chord. Alterations to chordal structure can now be explored using any Lydian or it’s Ionian axis spelling. Using some limitations for formal melody construction via Shelley Berg’s Goal Note Method, the cellist can practically, creatively, and systemically begin applying all these new ideas to common chord cycles as found at the end of the chapter.
It is my hope that this essay and the description of non-standard notational diagrams will continue the discussion of what it means to be a “classical” improviser. Educational curriculum is in the process of development at several institutions of higher learning. The Frost School of Music at the University of Miami is certainly one of those leading this movement at the educational level. Frost’s “experiential” curriculum taught at the undergraduate level combines skill and practice-based learning, with improvisation as a weekly part of the theory and sightsinging classes as well as in private instrumental lessons. At the graduate level, Prof. Vince Maggio has given many of his students an extended view of that practice as it applies to music from all eras of composition in equality. At the time of this writing, small groups of cellists globally are investigating and beginning to perhaps codify the best practices on how to teach improvisation from cellist to cellist. I was lucky enough to work with Prof. Vince Maggio, a pianist, whose work was a major influence in my beginning process of how to teach myself how to retranslate harmonic thinking from polyphonic instruments to the cello. It is a difficult process that requires extensive practice. As the paradigm shifts, it may become easier for future generations of cellists to explore these harmonic landscapes of information as improvisational practices become a natural ally to “classical” forms of musical education.
Appendix I  Chromatic Approach Note Studies in all Keys

Chromatic Approach Note Chordscales Ascending
Chromatic Approach Note Chordscales Descending
Chromatic Approach Note Chordscales Descending
Chromatic Approach Note Chordscales Descending
Chromatic Approach Notes Ascending Above
Chromatic Approach Below Descending
Chromatic Approach Below Descending
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