

# APPLYING 20TH CENTURY HARMONIC TECHNIQUES TO JAZZ IMPROVISATION

(A Starter's Guide)

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Thanks for coming, I realize this is yet another event at the end of a busy semester of recitals. And also it's cinco de mayo, though as Dariusz puts it that's a perfect day to talk about some interesting harmonies...

But I'm very glad that I can talk about this—it's a topic I've been trying to figure out ever since I got here.

# PRESENT-DAY JAZZ PIANISTS WHO “BORROW” FROM CLASSICAL COMPOSERS



Because practically all of my favorite teachers and players “borrow” from 20th century classical music. To name a few that I’ve interacted with or heard first-hand stories about: Billy Childs, who came here last semester and cited Hindemith as an influence, Bill Cunliffe, who I met a few summers ago, my current teacher Harold Danko who took some lessons from Chick Corea when he was stationed in New York. And of course my previous teacher Bill Carrothers, who you could frequently find in his office singing along with Stravinsky. These guys are all “students of the music.”

And really people have been borrowing from 20th century music since Duke Ellington’s use of Debussy and Ravel, etc.

All of these pianists say that classical techniques have helped shape their style.

We’re lucky, we have Sibley. You could spend a lifetime in there.

Plus, we all have a bunch of scores by now...theory classes, ensembles, private lessons, etc. The question becomes what to do with all that stuff.

# COMMON 20TH CENTURY

## INFLUENCES

(A very short list)

Alban Berg

Béla Bartók

Dmitri Shostakovitch

Alexander Scriabin

Igor Stravinsky

Sergei Prokofiev

Heitor Villa-Lobos

John Ireland

Ned Rorem

Charles Ives

### Today's Focus

Paul Hindemith

Oliver Messiaen

Vincent Persichetti

Howard Hanson

John O'Gallagher

I've heard some of these players talk specifically about a few influences. The list is way, way longer than this, but on the left side are a few that are especially worth mentioning.

The most influential on me thus far have been Hindemith, Messiaen, and Persichetti, partly because all of these composers wrote volumes about their own processes. Those writings give us a lot of insight into how we can apply their harmonic language to our own work.

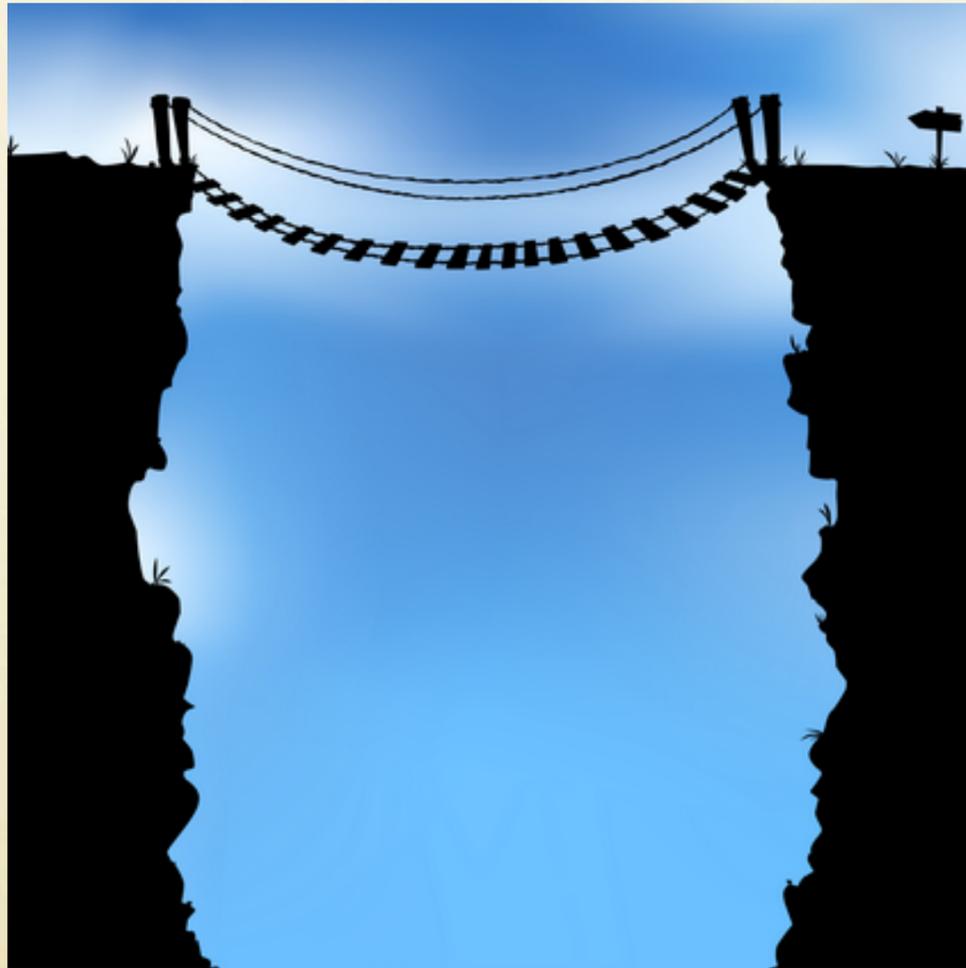
Also Messiaen was an improviser and his system of pedagogy is far more advanced than a lot of Jazz pedagogy since it was so well-developed in the organ tradition. It's really worth studying these systems since they've been around way longer than Jazz has.

Messiaen was also synesthetic and very in touch with color and emotion. These are things sometimes Jazz musicians forget to think about.

And they all end up getting at the same thing in different ways. It's all about transforming shapes anyways...

# THE QUESTION

- How can educators help their students apply 20th century harmonic techniques in a way that is musical and organic?



So this leads us to the question...read it.

And how do we make this material engaging and rewarding from the very beginning rather than a bunch of very abstract concepts?

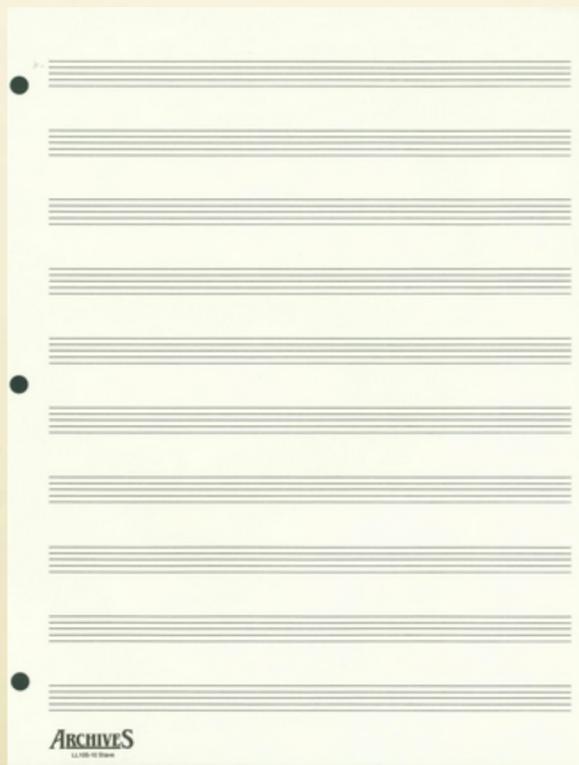
As Harold would say, what do you do when a student comes in and doesn't get it?

What are some ways of jumpstarting the creative process?

It's about bridging the gap between "I like this sound or concept" and being able to have it come out of your playing in an organic way.

# AMBIGUITIES/PITFALLS

- Composition vs. Improvisation
- “Mathematical” playing vs. organic development of ideas
- With complex harmony, context is everything



However, it's not easy to use the information we have. It's very difficult to figure out how to practice this stuff, there's a serious learning curve.

Common issues that come up include the above. In order, here are some comments about these bullets:

You don't have time to think about math while you play. And that leads a lot of people to think "this stuff is for theory majors, not for me."

You also don't want it to sound like you're forcing things in. Playing a standard and all of a sudden here's a 10-note chord, etc.

My interaction with Gary Versace—context is everything

It's all part of the process and you try forcing things in, but at the same time, how do you practice using this stuff in a way that's organic and musical?

# TODAY'S FOCUS

**Persichetti:** Synthetic scales, harmonies, and  
compositional exercises

**Messiaen:** Chords derived from the modes of Limited  
Transposition  
Alternative “Chromatic chords”

**Hindemith:** Harmonic fluctuations and chord  
analysis

**O’Gallagher:** Linear approaches to complex  
harmony, set-class improvisation with trichords, 12-  
tone rows, and “steering.”

There’s a lot here...but I’ll try to give an overview of some of the really exceptional harmonic materials these composers present.

And throughout I’ll try to include examples of how to integrate those sounds into your playing. Most of the time, the answer involves composing vamps to practice over or writing tunes based on the concepts or material. Then if you start paraphrasing your own material, you end up with some interesting ideas.

# Persichetti's Treatise on 20th Century Harmony: an overview

11/18/70 just under 6.20

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Not a “speculative treatise...rather, it is an account of specific harmonic materials commonly used by twentieth-century composers.”  
(p. 10)

“For and about creativity”  
(p. 10)

The whole book is worth reading, but I'll give a very brief overview today.

Summarize table of contents—focus mostly on the scalar stuff.

What I like about this is that it's descriptive, not prescriptive. So you go from sound to ways of thinking about generating similar sounds.

# PERSICETTI ON SYNTHETIC SCALES

## Deriving Modes

44) 2 · SCALE MATERIALS

Ex. 2-21

Super Locrian Neapolitan Minor Neapolitan Major

Oriental Double Harmonic Enigmatic

Hungarian Minor Major Locrian Lydian Minor  
(4th mode of Double Harm.)

Overtone Leading Whole-tone Hungarian Major

Eight-tone Spanish Symmetrical

PENTATONIC AND HEXATONIC SCALES (51)

Ex. 2-33

1st mode 2nd mode 3rd mode

C diatonic pentatonic scale

Transposed to same tonic for comparison

4th mode 5th mode

Endless possibilities...

This is the page that changed Harold's life—you have a bunch of materials including the double harmonic scale.

[play through a few of these]

And of course you can derive modes of all of them

# MULTI-OCTAVE SCALES

A second type of two-octave scale is built by combining two different one-octave scales with common tonics.

Ex. 2-30



New scales may be so built with similar or dissimilar tetrachords that the tonic is not repeated at the first octave. When the octave is missed and the tetrachords are continued, a two-octave scale or multi-octave scale may evolve.

Ex. 2-29



Why are we confined to a single octave?

And why confine yourself to a single octave? You can either combine two octave scales starting on the same note, or you can “miss” the octave and end up starting the second octave a half step away.

I can definitely think of some lines from players like Lovano that are best explained this way.

Set different octaves as parameters—I’ll play super locrian down here, lydian minor up here. Or write a piece, paraphrase it...

Play the second multi-octave scale example, not the first

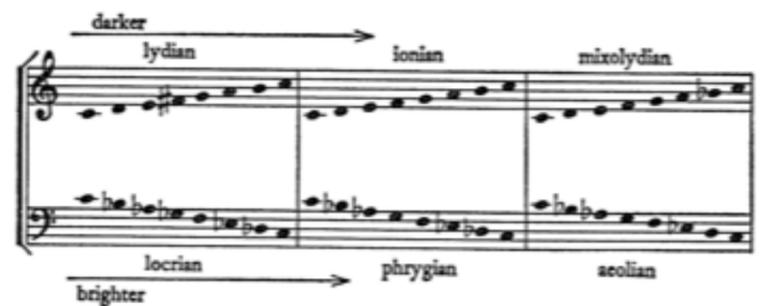
# Mirror Scales

Some scales are reflectively identical, inversion producing an exact duplication of the original scale in retrograde.

Ex. 2-26

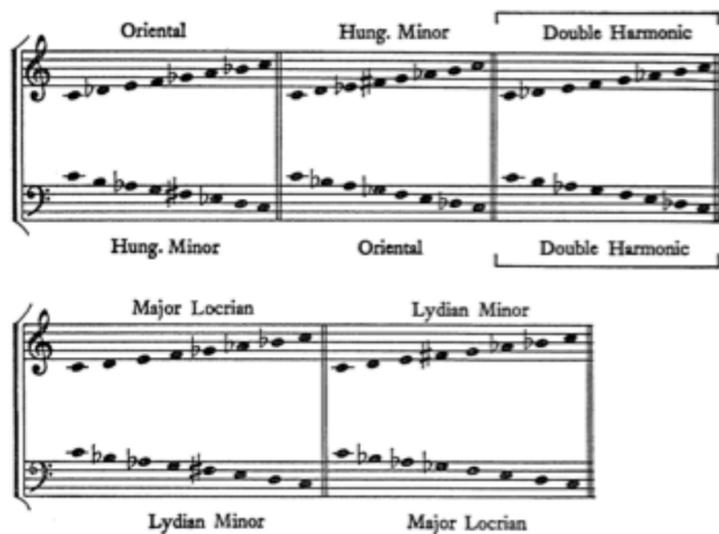


Ex. 8-21



Any scale may be reflected. The following illustrates synthetic scale mirroring.

Ex. 8-22



## Harmonic Implications

Reflective scales imply mirror harmony.

Ex. 8-23



The other thing (which Harold is also into) is that each scale has a mirror. You reflect it over an axis, then you generate another scale entirely.

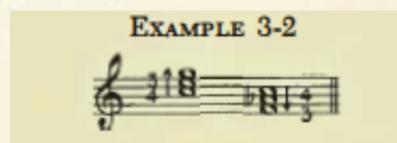
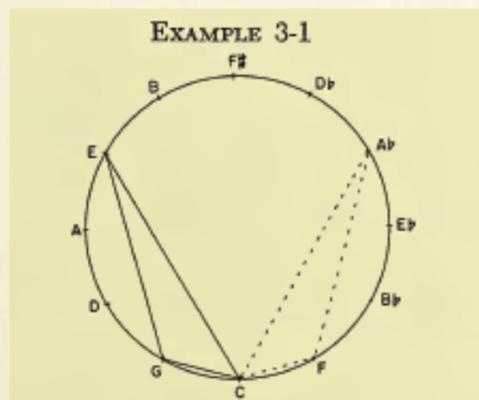
This is really good for pianists that are trying to teach their weaker hand to imitate their stronger one because the mirror scales have the same fingering descending as the original has ascending.

And the harmonic implications are endless, especially when you put them together.

You end up with a polymodal system already when you combine them. That's coming next

# HANSON: "INVOLUTION"

Reflecting a triad over the lowest note



## Involution of triads

EXAMPLE 14-5

Triads *pmn* and involutions

and the triads  $C_7G_4B$ ,  $E_7B_4D\sharp$ , and  $A_b(G\sharp)_7E_b(D\sharp)_4G$ , *pmd*, together with their involutions  $C_4E_7B$ ,  $E_4G\sharp_7D\sharp$  and  $A_b(G\sharp)_4C_7G$ :

He defines simple involution as reflecting a chord over the axis to generate a different sound quality. This is a good graphic.

Isometric involution generates the same sound. In other words, the original is symmetrical. And enharmonic involution is kind of like chords of transposed inversion actually.

And you don't have to just do this with triads...

# HOW TO USE A SCALE

SYNTHETIC SCALE FORMATIONS (45)

Ex. 2-22

Enigmatic

1st mode      2nd mode



Transposed to same tonic for comparison

3rd mode      4th mode



etc.

The harmonic usefulness of new scales is determined by surveying their indigenous chordal materials. Each synthetic scale contains a set of chords within its own intervallic make-up. The primary chords are the tonic plus the two triads that include the scale step or steps containing the most determinable characteristic colors of the scale in question. If a major-scale tetrachord is present

How do we generate tension and release  
with our traditional modes?  
How do we create compelling melodies?

At this point it's all pretty overwhelming...but Persichetti relieves us of some of the burden here.

Practice as a raga...how Indian musicians do it



# POLYTONALITY AND POLYMODALITY

## One of Persichetti's Exercises

## Persichetti on Polychords

11. Extend the following polymodal and polytonal passage.  
*Ex. 2-56*



*Ex. 7-14*

ma-mi. polychords



## Recommended listening/score study

### Source Material

#### Polychords, two triadic units:

Béla Bartók, String Quartet No. 5, p. 87 (Boosey)  
Peter Racine Fricker, Piano Concerto Op. 19 (red.), p. 40 (Schott)  
Roy Harris, Soliloquy and Dance, for viola and piano, p. 7 (G. Schirmer)  
Arthur Honegger, Symphony No. 5, p. 1 (Salabert)  
Charles Ives, Piano Sonata No. 2, p. 65 (Arrow)  
Albert Roussel, Bacchus et Ariane, p. 57 (Durand)  
William Schuman, Symphony for Strings, p. 8 (G. Schirmer)  
Igor Stravinsky, The Rake's Progress (red.), p. 195 (Boosey)

And when you put one of these scales over another, you end up with a polytonal/polymodal complex.

This is what we do all the time as Jazz musicians anyways, we superimpose things. Putting altered over mixolydian, etc.

Persichetti goes through polychords and categorizes all of them years before any Jazz musician was playing with it...

And the source material he mentions is amazing—this is a small list, but it's all great.

# MAJOR MAJOR

Score

## Major Major

All over a G pedal Gary Peacock

G B

C E♭ A

D♭ B♭

A♭ E G♭ F D G

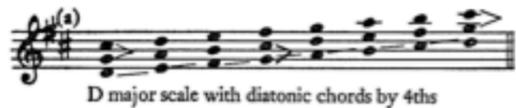
Can you think of other “études” written by jazz musicians?

Play through and improvise a little on this—it’s really great

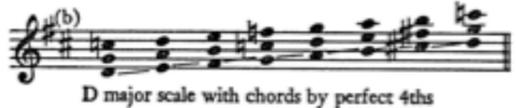
If you were to do that with all these other synthetic scales, that would be a great compositional project. Pedal tones are great.

# Quartal Harmony

Ex. 4-9



D major scale with diatonic chords by 4ths



D major scale with chords by perfect 4ths

## Source Material

### Quartal harmony:

Alban Berg, *Wozzeck* (red.), p. 45 (Universal)  
Leonard Bernstein, *Seven Anniversaries for Piano*, p. 3 (Witmark)  
Valentino Bucchi, *Piano Sonatina* (1938), p. 3 (Zerboni)  
Aaron Copland, *Piano Fantasy*, p. 2 (Boosey)  
Paul Hindemith, *Nobilissima Visione* (orchestral suite), p. 49 (Schott)  
Arthur Honegger, *King David* (red.), p. 5 (Foetisch)  
Arnold Schoenberg, *Kammersymphonie Op. 9*, p. 1 (Universal)  
Roger Sessions, *Symphony No. 2*, p. 67 (G. Schirmer)  
Igor Stravinsky, *Septet*, p. 11 (Boosey)  
William Walton, *Concerto for Viola and Orchestra* (red.), p. 12 (Oxford)  
Anton Webern, *Piano Variations Op. 27*, pp. 5-6 (Universal)

## B Section of “Gertrude’s Bounce” (Bud Powell)

Other jazz examples of plaining in fourths: “So What” voicings...

Another way of explaining Quartal harmony, other intervallic structures...of course people like McCoy have been doing this for years. Plaining within a scale, you could do this with a synthetic scale, etc...

So basically I would compose a series of vamps or motives from a synthetic scale as opposed to telling a student to use the whole thing right away. This kind of gets into the idea of truncated modes too, though that might be a bit much for this presentation.

Truncated modes—try this with mode 2 just to demonstrate quickly

# MESSIAEN: MODES OF LIMITED TRANSPOSITION

Mode 1: Whole-Tone Collection, 6-35 [0,2,4,6,8,10]; 2 transpositions

Mode 2: Octatonic Collection, 8-28 [0,1,3,4,6,7,9,10]; 3 transpositions

Mode 3: 9-12 [0,1,2,4,5,6,8,9,10]; 4 transpositions

Mode 4: 8-9 [0,1,2,3,6,7,8,9]; 6 transpositions

Mode 5: 6-7 [0,1,2,6,7,8]; 6 transpositions

Mode 6: 8-25 [0,1,2,4,6,7,8,10]; 6 transpositions

Mode 7: 10-6 [0,1,2,3,4,6,7,8,9,10]; 6 transpositions

Of course this is exactly what Messiaen does with his compositions

Here you have 7 synthetic scales each with a set of properties. And by examining how he uses them, we get some good ideas of how he generates color, tension, release. And that shows us how we can do the same thing with other scales of our choosing to create our own language. And that's what you want to encourage students to do at a certain level.

# MODE II

The image displays musical notation for Mode II, organized into three sections:

- Mode 2/i**: A single staff showing a melodic line with eighth notes, starting on a middle C and ending on a G. The notes are: C, B, Bb, Ab, G, F, F#, E, D, C.
- Succession of Parallel Chords**: Two staves showing a sequence of chords. The top staff shows chords in the right hand, and the bottom staff shows chords in the left hand. The chords are parallel triads extracted from the mode.
- Perfect Cadences**: Two examples of cadential gestures. The first is labeled '2<sup>1</sup>' and shows a melodic line with a slur over the notes G, F, F#, E, D, C. The second is labeled 'ou :' and shows a similar melodic line with a slur over the notes G, F, F#, E, D, C.

Let's take first a mode that all Jazz musicians are familiar with—the octatonic collection. Here you have successions of parallel chords that are built by extracting every other note. You end up with some interesting patterns that are akin to “plaining” through that mode.

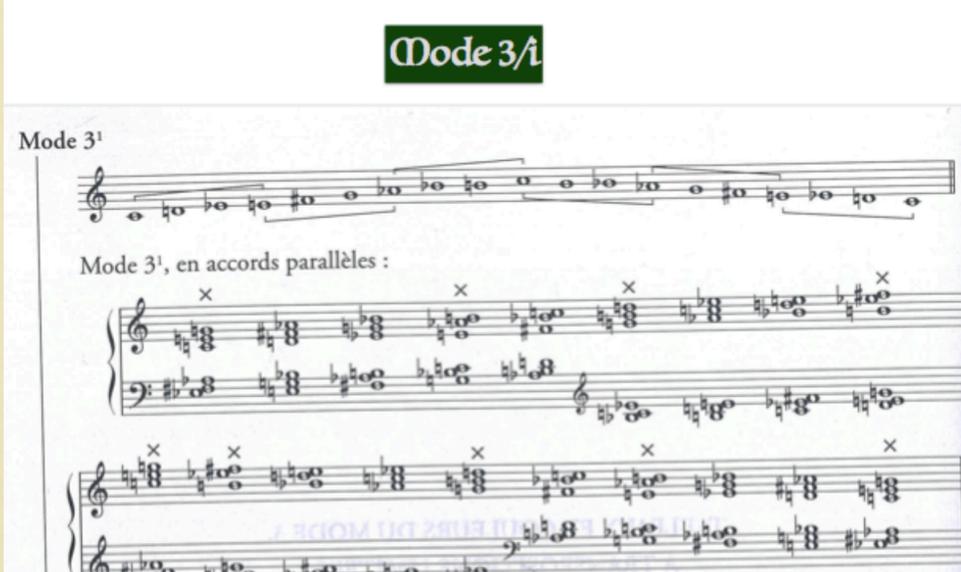
And from there, Messiaen does exactly what Persichetti suggests—he develops cadential gestures that outline the color notes of the mode.

For us Jazz musicians, these gestures are incredibly useful. We can see this example as an expansion of Eb major or C major. Or we can superimpose this succession of parallel chords over a static bass note.

# MODES III, IV

## Harmonic Implications of Mode III

Mode 3<sup>1</sup>

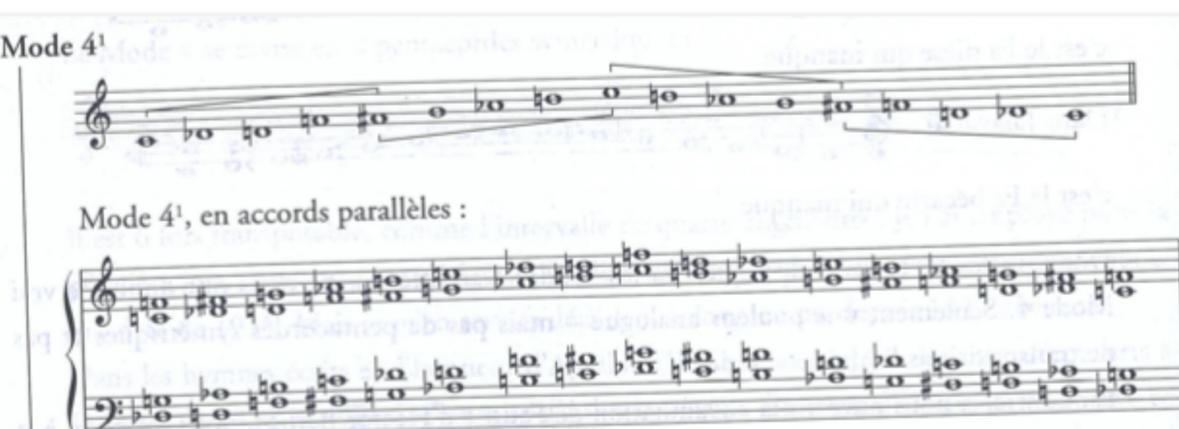


Mode 3<sup>1</sup>, en accords parallèles :

The image shows musical notation for Mode 3<sup>1</sup>. At the top, a single staff displays the mode's scale: C, D, E, F, G, A, B, C. Below this, the text 'Mode 3<sup>1</sup>, en accords parallèles :' is followed by two systems of piano accompaniment. Each system consists of a grand staff (treble and bass clefs) showing a sequence of parallel chords. The first system has six chords, and the second system has six chords, with an 'x' above each chord symbol. A watermark 'LES FUS DU MODE' is visible in the background.

## Harmonic Implications of Mode IV

Mode 4<sup>1</sup>



Mode 4<sup>1</sup>, en accords parallèles :

The image shows musical notation for Mode 4<sup>1</sup>. At the top, a single staff displays the mode's scale: C, D, E, F, G, A, B, C. Below this, the text 'Mode 4<sup>1</sup>, en accords parallèles :' is followed by two systems of piano accompaniment. Each system consists of a grand staff (treble and bass clefs) showing a sequence of parallel chords. The first system has six chords, and the second system has six chords. A watermark 'LES FUS DU MODE' is visible in the background.

The possibilities are endless when you get to the other modes, which are even more complicated. Mode IV in particular has some quartal characteristics worth exploring.

And actually sometimes the shorter modes are more interesting because you end up with wider intervals.

The sequences aren't quite symmetrical—that's what makes them so appealing in the end. With Mode III, your cycle repeats about every three chords. And that asymmetry gives improvisation and composition an organic quality.

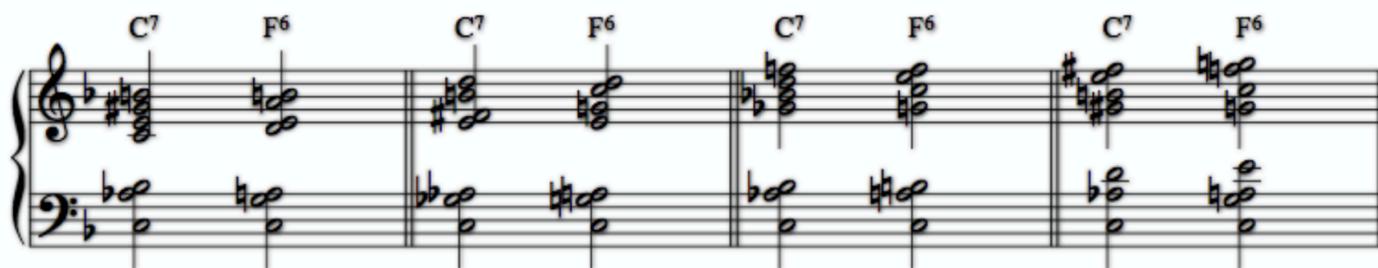
[Give an example of a symmetrical sequence and an asymmetrical sequence] I'll play a little McCoy that illustrates this later, but for now just keep it in mind.

Messiaen was fascinated with the idea of establishing a pattern and breaking it, just like every other good composer...

# APPLYING MESSIAEN'S MODAL HARMONY TO A JAZZ CONTEXT

## Jazz Usage of Modes of Limited Transposition

**MODE 6** on  $\hat{5}$  works well over C7, F, G7 (and, other chords within the F tonality, but creates more tension and needs to be treated with caution - voice-leading considerations)



As chromatic expansion of C7:

As chromatic expansion of F:



Here's Dariusz's breakdown of mode 6 and the process of using those expansions.

You figure out which scale degrees you can start on and what the traditional "chord symbols" would be. And from there you can create cadential gestures and chromatic expansions to try superimposing over traditional chord progressions.

You could go through a tune and either write in these alterations or just play them slowly to get them in your ears.

Reducing things down to a V-I is useful...

And of course the beauty of a lot of these is that given their symmetrical properties and tonal ambiguity, they're going to work over a bunch of different bass notes. Try these two over another bass note...

Play "This Land is Your Land" in a Messiaenic way

# POLY-MODAL WRITING

Ex. 244 from  
Techniques of My  
Musical Language

Piano Prelude No. 5

244  
To voix

Presque lent  
(mode 3) (mode 3)

A (mode 2) B (mode 2)

1<sup>er</sup> terme 2<sup>e</sup> terme

*p* *mf*

7

This musical score for Exercise 244, titled 'To voix' and 'Presque lent', is written for voice and piano. The upper staff is for the voice, marked with a vocal line and a '7' at the end. The lower staff is for the piano, divided into two sections: 'A (mode 2)' and 'B (mode 2)'. Section A is marked '1<sup>er</sup> terme' and section B is marked '2<sup>e</sup> terme'. The piano part starts with a dynamic of *mf* and includes a *p* dynamic marking. The key signature is one flat, and the time signature is 7/8.

302  
Les sons impalpables  
du rêve.

Modéré

Piano

8

8

Cédez a Tempo

*pp* *mf* *ff*

A. L. 20,227

This musical score for Exercise 302, titled 'Les sons impalpables du rêve', is for piano. It is marked 'Modéré' and 'Piano'. The score is divided into three systems, each starting with a measure marked '8'. The first system is marked *pp*, the second *mf*, and the third *ff*. The tempo changes from 'Modéré' to 'Cédez' and then to 'a Tempo'. The key signature is one flat, and the time signature is 8/8.

Of course, Messiaen's pieces often feature polymodal passages where one hand is in one mode and the other hand is in the other.

[Play a bit of the fifth prelude]

And this is especially useful for us Jazz musicians since we're thinking about superimposing things all the time. Altered over mixolydian, etc.

# DARIUSZ'S "DRILLS"

## Oliver Messiaen Harmonic Drills

1

Fm6                      G#m6                      Bm6                      Dm6

The image shows a musical drill consisting of four measures. Each measure contains a pair of chords, one in the treble clef and one in the bass clef. The chords are: Fm6 (F4, Ab4, Cb5, Eb5), G#m6 (G#4, Bb5, D#5, F#5), Bm6 (B4, D#5, F#5, Ab5), and Dm6 (D4, F#4, Ab5, Bb5). The notes are written as half notes.

## 22 Rule of the Octave

mode 5 (accord en quartes)  
"rule of the octave"

The image shows a musical drill consisting of five measures. Each measure contains a pair of chords, one in the treble clef and one in the bass clef. The chords are: Dm6 (D4, F#4, Ab5, Bb5), G#m6 (G#4, Bb5, D#5, F#5), Bm6 (B4, D#5, F#5, Ab5), Dm6 (D4, F#4, Ab5, Bb5), and G#m6 (G#4, Bb5, D#5, F#5). The notes are written as half notes. The text "mode 5 (accord en quartes) 'rule of the octave'" is written in the first measure.

The same way you'd have sequences in figured bass notation, you can turn Messiaen's harmonic patterns into sequences to get them under your fingers. So Dariusz did that and created over thirty sequences to help internalize these passing sounds.

Emphasize—the rule of the octave has been around for a long, long time. This is all basically modal expansions on that.

# Whole-tone plaining over dominant chords

5

C#7 E7 G7 Bb7

## Mode II

9

#0 #0 #0 #0 b0 b0 b0 b0

Here are some of the cadential gestures that we talked about earlier transformed into sequences...

Alternate bass notes

# OTHER CHROMATIC CHORDS

**Summary of Non-Modal Chords**

1. Chord of Resonance      2. Chords of Transposed Inversions on the Same Bass Note

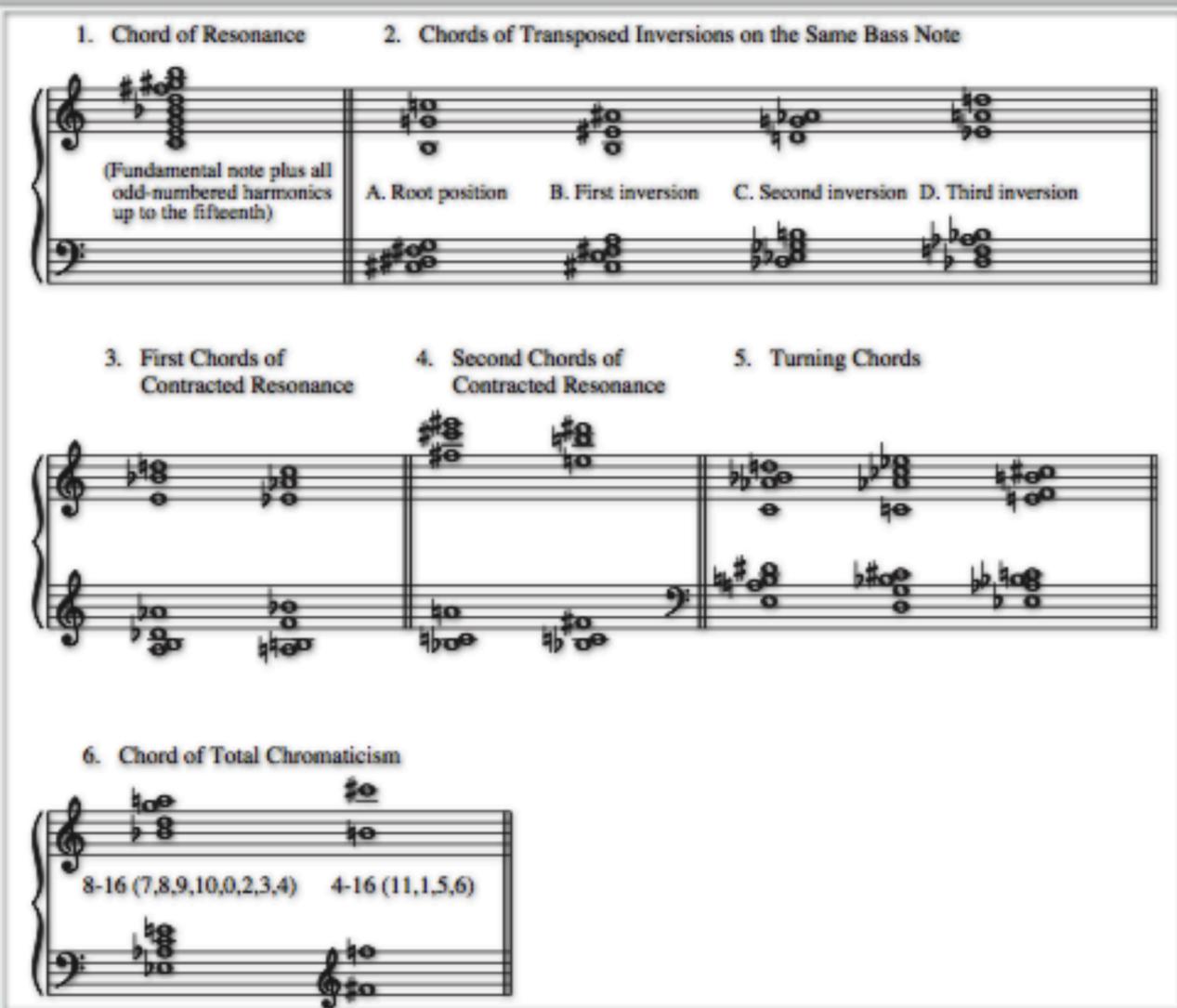
(Fundamental note plus all odd-numbered harmonics up to the fifteenth)

A. Root position    B. First inversion    C. Second inversion    D. Third inversion

3. First Chords of Contracted Resonance      4. Second Chords of Contracted Resonance      5. Turning Chords

6. Chord of Total Chromaticism

8-16 (7,8,9,10,0,2,3,4)    4-16 (11,1,5,6)



The image displays musical notation for six types of non-modal chords. 1. Chord of Resonance: A single chord with a fundamental note and its odd-numbered harmonics. 2. Chords of Transposed Inversions on the Same Bass Note: Four chords (A, B, C, D) showing different inversions of a chord with the same bass note. 3. First Chords of Contracted Resonance: A sequence of four chords. 4. Second Chords of Contracted Resonance: A sequence of four chords. 5. Turning Chords: A sequence of four chords. 6. Chord of Total Chromaticism: Two chords, one on an 8-string guitar (8-16) and one on a 4-string guitar (4-16).

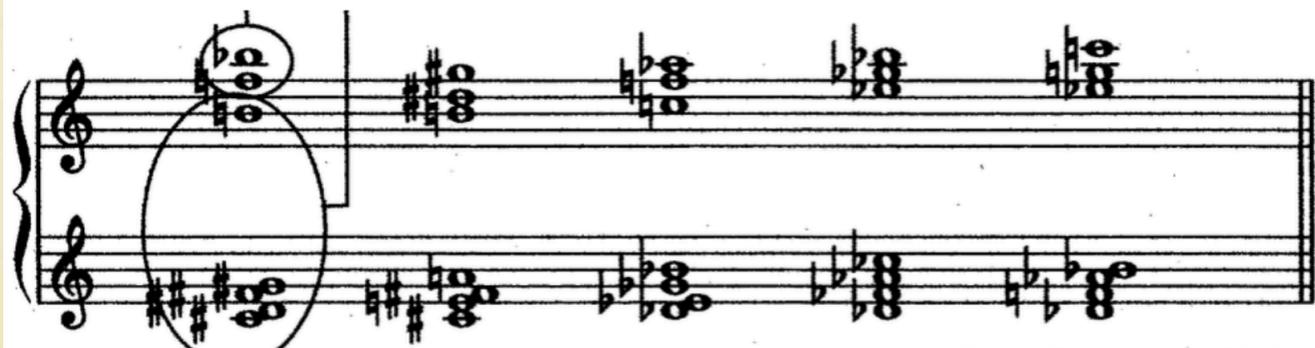
So at a certain point Messiaen felt a little confined by the modes of limited transposition and started playing with other chords. And actually in the end he generated some scales from chords that he liked.

Treatise on rhythm, color, and ornithology was his last project. Just thinking about color, not deriving from scales. He got way more into this stuff but died before he completed the seven volumes.

# CHORD OF TRANSPOSED INVERSION

## Chords of transposed inversion (CTI)

fundamental	1st transposed inversion	2nd transposed inversion	3rd transposed inversion	4th transposed inversion
3̂	3̂	5̂	7̂	3̂
7̂	7̂	3̂	5̂	7̂
4̂	5̂	7̂	3̂	5̂
2̂	4̂	6̂	1̂	2̂
1̂	2̂	4̂	6̂	1̂
6̂	1̂	2̂	4̂	6̂
5̂	6̂	1̂	2̂	4̂



5 Related Sounds over the same bass note

Explain what to do with this, and stress that certain of Messiaen's pieces feature these chords in succession. They create their own sound world really.

Share same function, multiple choices per chord.

# TURNING CHORDS

**Artificial Scales and "Turning Chords" (A)**

The diagram illustrates the relationship between an artificial scale and its corresponding turning chords. The scale is shown on a single staff with notes: B $\flat$ , A $\flat$ , G $\flat$ , F, E $\flat$ , D, C, B $\flat$ . Red arrows point from each note to a chord box below. The chords are numbered 1 through 6. A green box labeled "RP" is positioned above the first chord box.

“Turning Chords” typically feature a fourth in the bass  
Now the chord generates the scale...

Artificial rule of the octave—same as technique of my musical language. But these chords came first.

Inverted chords in a different sense

# “Appoggiatura” chords

8

Musical score for measure 8, showing a sequence of chords in the right hand (treble clef) and left hand (bass clef). The chords are transposed inversions where the upper two voices become accented NCTs.

# Chord of Resonance

19

C7 F7 D7 G7 E7 A7 F#7 B7 Ab7 Db7 Bb7 Eb7

Accord de la résonance

Musical score for measure 19, showing a sequence of chords in the right hand (treble clef) and left hand (bass clef). The chords are transposed inversions where the upper two voices become accented NCTs.

Explain appoggiatura chords—chords of transposed inversion where the upper two voices become accented NCTs.

And the chord of resonance has to do with how the overtone series is built.

# HOW DO WE ANALYZE COMPLEX CHORDS?

Things to consider:

Where is the root?

How does the chord function?

What is the overall color of the sonority?



Complex chords are like exotic spices in a dish—you need to understand how they work, how strong they are, and how they affect the other ingredients around them.

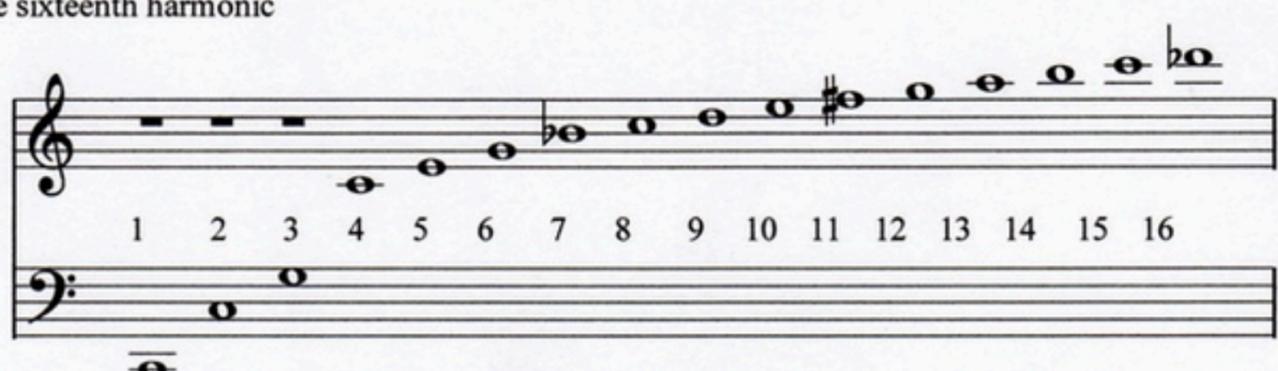
Among the musical questions you may have: where is the root? Is there more than one bass note that would work with these sonorities? How does the chord function? Simply put, is it a tense dominant sound or a relaxed tonic? And what is the overall color or effect?

Messiaen had synesthesia, so he had a leg up on figuring this part out.

# HINDEMITH'S "INTERVAL ROOTS"

**The Harmonic Series**

Fundamental = C  
Series through the sixteenth harmonic

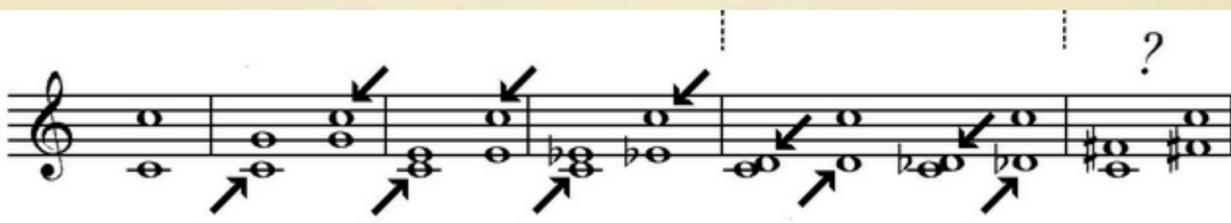


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

C C G C E G B(f) C D E F(s) G A B C D(f)

The "root" of each interval is the pitch that is (roughly) lower in the overtone series

Series 2



When you're looking at complex polychords like that, sometimes you can't even find the root.

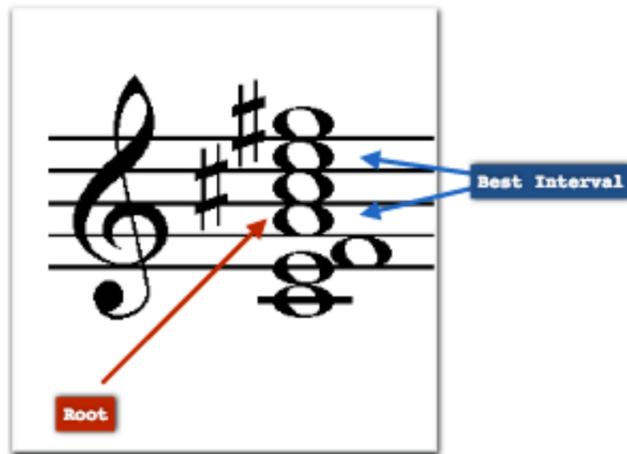
Hindemith didn't believe in inversions, which actually makes a lot of sense. If you invert a major 9th chord, it doesn't really work. And I hate to bash some Jazz theorists like Liebmann, but you can't just invert a chord and turn it into a scale all the time.

What does help is Hindemith's theory of the interval roots.

# “BEST INTERVALS”

Let's look at this one again...

## Root Determination by Best Interval



## Chords of transposed inversion (CGI)

fundamental	1st transposed inversion	2nd transposed inversion	3rd transposed inversion	4th transposed inversion
3̂	3̂	5̂	7̂	3̂
7̂	7̂	3̂	5̂	7̂
4̂	5̂	7̂	3̂	5̂
2̂	4̂	6̂	1̂	2̂
1̂	2̂	4̂	6̂	1̂
6̂	1̂	2̂	4̂	6̂
5̂	6̂	1̂	2̂	4̂



## Roots

- Inversion 1: C#
- Inversion 2: C#
- Inversion 3: C#
- Inversion 4: C#
- Inversion 5: C#

Determine the chord “root” by taking the “best” (most stable) interval

And in analyzing complex chords with many voices, often you just have to figure out what the “best interval” is. He defines “best” as most stable, starting with the octave and then progressing to fifths and thirds.

If you have a fifth or octave in the bass, it's almost like tonality by assertion. It's almost like McCoy's fifths in the bass to establish a root over which he could superimpose his quartal stuff.

# WHAT ABOUT THESE?

**Artificial Scales and "Turning Chords" (A)**

The diagram illustrates six artificial scales and their corresponding "turning chords" (A). The scale is shown at the top, with red arrows pointing to six specific notes. Below each note is a corresponding chord voicing in a piano-style format (treble and bass clefs). The chords are numbered 1 through 6. Chord 1 is labeled "RP" (Right Pedal). The chords are: 1 (C major), 2 (D minor), 3 (E minor), 4 (F major), 5 (G major), and 6 (A major). The bass line of each chord is notably unusual, often missing the fifth or octave, which makes them destabilizing.

These are a little more complicated because you don't have the fifth or the octave in the bass. That's what makes a lot of these left hand voicings so destabilizing, and why they're interesting practice tools for pianists.

The second one is interesting...

# Hindemith's Chord Table

## Table of Chord Groups

GROUP A - I; III; V

Tabelle zur Akkordbestimmung

GROUP B - II; IV; VI

Chords without tritones A Klänge ohne Tritonus	B Klänge mit Tritonus Chords with tritones
<p><b>I Ohne Sekunden und Septimen</b>  <b>I. Chords without seconds or sevenths</b></p> <p>1. Grundton und Bass sind dieselbe    <b>1. Root and bass are identical</b></p> <p>2. Grundton liegt höher im Akkord    <b>2. Root lies above the bass</b></p>	<p><b>II Ohne kleine Sekunden und große Septimen. Tritonus untergeordnet</b>  <b>II. Chords without minor seconds or major sevenths</b>  <i>The tritone subordinate</i></p> <p>a. Nur mit kleiner Septime (ohne große Sekunde) Grundton und Bass sind dieselbe    <b>a. with minor 7ths only; Root and bass are identical</b></p> <p>b. Mit großer Sekunde und kleiner Septime    <b>b. with M2nds and m7ths</b></p> <p>1. Grundton und Bass sind dieselbe    <b>1. Root and bass are identical</b></p> <p>2. Grundton liegt höher im Akkord    <b>2. Root lies above the bass</b></p> <p>3. Mit anderem Tritonus    <b>3. Containing more than one tritone</b></p>
<p><b>III Mit Sekunden und Septimen</b>  <b>III. Chords containing seconds or sevenths (or both)</b></p> <p>1. Grundton und Bass sind dieselbe    <b>1. Root and bass are identical</b></p> <p>2. Grundton liegt höher im Akkord    <b>2. Root lies above the bass</b></p>	<p><b>IV Mit kleinen Sekunden und großen Septimen. Ein Tritonus oder mehrere untergeordnet</b>  <b>IV. Chords with minor seconds or major sevenths (or both)</b>  <i>One or more tritone subordinate</i></p> <p>1. Grundton und Bass sind dieselbe    <b>1. Root and bass are identical</b></p> <p>2. Grundton liegt höher im Akkord    <b>2. Root lies above the bass</b></p>
<p><b>V Unbestimmbar</b>  <b>V. Indeterminate</b></p> 	<p><b>VI Unbestimmbar. Tritonus übergeordnet</b>  <b>VI. Indeterminate. Tritone predominating</b></p> 

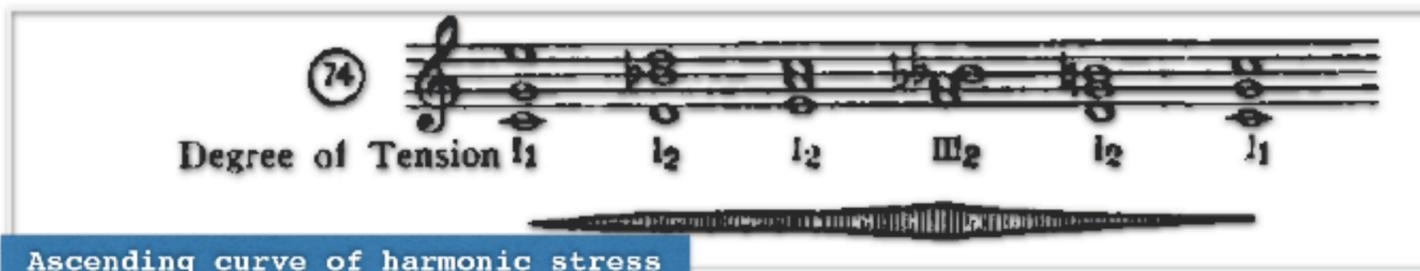
Hindemith also had a way of categorizing dissonance that's useful.

# Graphing Fluctuations

## Harmonic Fluctuation

Rise and fall of tension in the movement of chord groups.

## The shift of harmonic gravity



I<sub>1</sub>

chords without 2nd/7ths/root in the bass

I<sub>2</sub>

chords without 2nd/7ths/root above the bass

III<sub>2</sub>

chords with 2nd/7ths/root above the bass

### Hindemith's Chord Classifications

- I. no seconds, sevenths, or tritones (major and minor triads only)
  - I.1 root in bass
  - I.2 root above bass
- II. at least 1 tritone, m7, and P5 or M3
  - II.a. contains tritone and m7 (only), P5 or M3 (dom7 R357 and R37)
  - II.b.1 contains tritone, P5 or M3, and any M2 or m7, root in bass
  - II.b.2 as above but root is above bass
  - II.b.3 same as II.b.1 or II.b.2, but contains more than 1 tritone
- III. no tritones, includes seconds and sevenths
  - III.1 root in bass
  - III.2 root above bass
- IV. includes m2 and tritones
  - IV.1 root in bass
  - IV.2 root above bass
- V. no tritone, root indeterminate (augmented triad, perfect quartal triad)
- VI. contains tritone, root indeterminate (diminished triad, dim 7)

These categories allow you to map the dissonance level of practically any harmonic progression.

The idea of a “tension” graph would be great for writing chord progressions or analyzing transcriptions.

Remember the “context is everything” problem? You could address this by showing a graph that’s very angular, making the point that dissonance needs to be introduced gradually and deliberately. It’s also a way to track the inversions.

You could adapt this concept for Jazz harmony and come up with some good visuals.

# HANSON: PMNSDT

P = perfect 5th or 4th

M = major 3rd or minor 6th

N = minor 3rd or major 6th

S = major 2nd or minor 7th

D = minor 2nd or major 7th

T = tritone

## Ex. 1: Projection of fifths

What does this tell us  
about each sound?

doad:	$p$
triad:	$p^2s$
tetrad:	$p^3ns^2$
pentad:	$p^4mn^2s^3$
hexad:	$p^5m^2n^3s^4d$
heptad:	$p^6m^3n^4s^5d^2t$
octad:	$p^7m^4n^5s^6d^4t^2$
nonad:	$p^8m^5n^6s^7d^6t^3$
decad:	$p^9m^6n^7s^8d^8t^4$
undecad:	$p^{10}m^{10}n^{10}s^{10}d^{10}t^5$
duodecad:	$p^{12}m^{12}n^{12}s^{12}d^{12}t^6$

Hanson's way of analyzing intervals comes into play here too. His notation indicates the number of consonant and dissonant intervals using his own nomenclature.

He takes the approach of projecting intervals up and down, keeping track of how many dissonances of each type there are.

# The PROJECTION of the Perfect Fifth

Perfect Fifth Triad,  $p^2s$

Perfect Fifth Tetrad,  $p^3ns^2$

Perfect Fifth Pentad,  $p^4mn^2s^3$

pentatonic scale

Perfect Fifth Hexad,  $p^5m^2n^3s^4d$

Perfect Fifth Heptad,  $p^6m^3n^4s^5d^2t$

tritone

Perfect Fifth Octad,  $p^7m^4n^5s^6d^4t^2$

Perfect Fifth Nonad,  $p^8m^6n^6s^7d^6t^3$

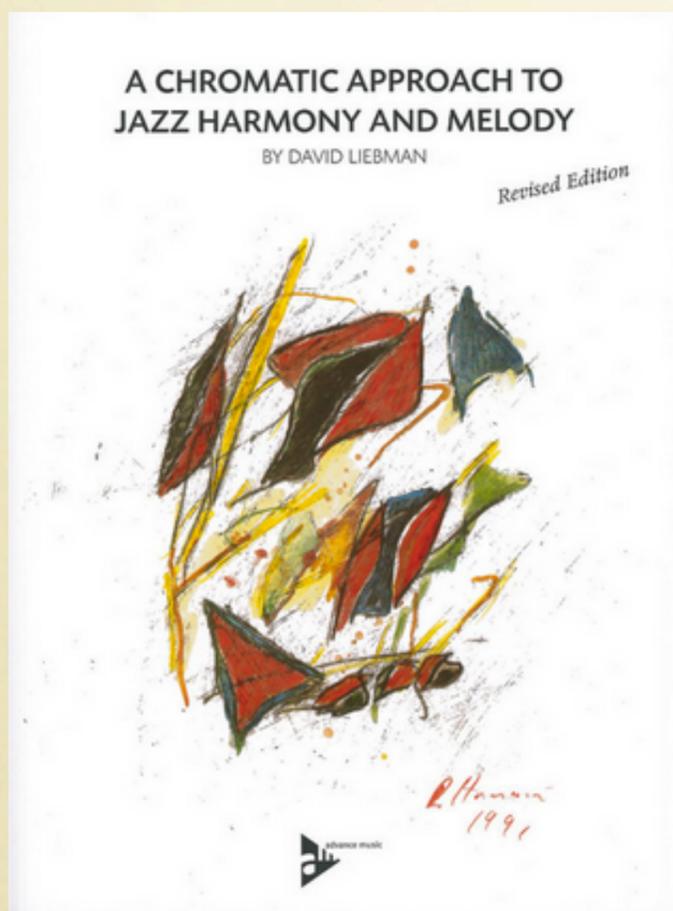
Perfect Fifth Decad,  $p^9m^8n^8s^8d^8t^4$

Perfect Fifth Undecad,  $p^{10}m^{10}n^{10}s^{10}d^{10}t^5$

Perfect Fifth Duodecad,  $p^{12}m^{12}n^{12}s^{12}d^{12}t^6$

Here's his projection of 5ths, thanks to Dariusz's compiling skills. And I like how he reduces each sound to a scale too.

# HOW DO YOU IMPROVISE ON COMPLEX/CHROMATIC CHORDS?



$$\frac{G7^{\#5}}{FM7^{\#5}} \\ Bb$$

That all leads me to another question—how do you improvise over harmony that's multilayered and non-scalar in nature? I remember transcribing dozens of voicings that I liked from Carrothers and realizing that I didn't have the slightest idea how I would shape a line over them.

Liebmann addresses this in his book, but his nomenclature is definitely complicated and abstract. He gets at basically the same thing as these other players I'll talk about, but a lot of young musicians get turned off by his approach.

Most horn players would say to solo over the top layer, and for the most part it works. But the passing tones in between sometimes need tones from the lower layer, etc.

# Permutations of Messiaen's Motives

## Mode V - motivic transformations

214



126



First of all, many of the composers we're talking about wrote lines over their chromatic chords. Look at all the permutations of those first. Messiaen has a great example already.

It highlights just how many compound melodies and contours there are within these sounds when you turn them into lines.

And when you're soloing, you want to be able to take advantage of where you are within the sound to connect that sound to the next one. So you have to be intimately familiar with permutations like this.

# LINEAR APPLICATIONS: JOHN O' GALLAGHER

## THE TRICHORD

In western functional harmony the triad is the basic building block for all chords. Major, minor, augmented and diminished triads are all utilized in a melodic and harmonic framework that establishes tonality in a hierarchy of relationships within a diatonic system. This leaves nine other possible three note chords unused as fundamental harmonic entities.

In our method we will extend this idea of the triad as a basic unit of harmony to include three note chords not used in the diatonic system. The term used in twelve-tone music to describe a group of three pitches is trichord. This term is used to provide clarity so that no reference to traditional harmony is implied. Only twelve trichord constructions are possible using all intervals between three pitches (not just intervals of a major and minor 3). Trichords will be identified by the number of half steps between each pitch in prime form.



Ex.2.1

Prime form (root position) of each trichord is the position in which there is the least distance between the two outer voices. This example shows that in the prime version of this trichord, six half steps are between the first and last pitch where as the first and second rotations have ten and eight.



Ex. 2.2

## Types of trichord broken down

O'Gallagher's work gives us some insight on how horn players approach playing over dense harmony.

Basically, you reduce the chord into separate layers and segment the sound into trichords or tetrachords that best describe the sound. Then you play over those just like you would play over an arpeggio.

# Applying trichord improvisation to each “layer” of a complex sound

Identifying consecutive trichord chains can also be applied to harmonies as well. In these instances the analysis begins on the lowest pitch and ascends to the highest and then the trichords are reduced to prime form.



Ex. 3.3

- 5 + 1      1 + 5

The image shows a musical staff with a treble clef and a key signature of one flat. It contains two measures of music. The first measure has a trichord of notes G4, A4, and B4. The second measure has a trichord of notes C5, B4, and A4. Below the staff, the trichords are labeled as '- 5 + 1' and '1 + 5' respectively, indicating the intervallic structure between the notes.

## Charlie Parker's famous line as a series of trichords

CONSECUTIVE TRICHORD CHAINS



Ex. 3.1

Trichords reduced to prime form.

1+3    1+2    1+3    2+2    2+2    3+3    3+1

The image shows a musical staff with a treble clef and a key signature of one sharp. It contains a single line of music with seven groups of notes, each representing a trichord. The trichords are labeled below the staff as 1+3, 1+2, 1+3, 2+2, 2+2, 3+3, and 3+1, indicating the intervallic structure between the notes.

# MELODIC USE OF TRICHORDS

**BASIC MELODIC SHAPES**

1. **NON REPETITIVE** – playing each trichord pitch once



Ex. 4.1

Each shape should be practiced by itself in all rotations through the full range of your instrument.



Ex. 4.2

## Partial trichords

2. **REPETITIVE (DIFFERENT OCTAVES)** – playing one pitch from the trichord twice

Repeated notes in different octave as 1st and 4th pitches



Ex. 4.3

Repeated notes as 1st and 3rd pitches



Ex. 4.4

Repeated notes as 2nd and 4th pitches



## Hanson: Trichord rotations as melodic material

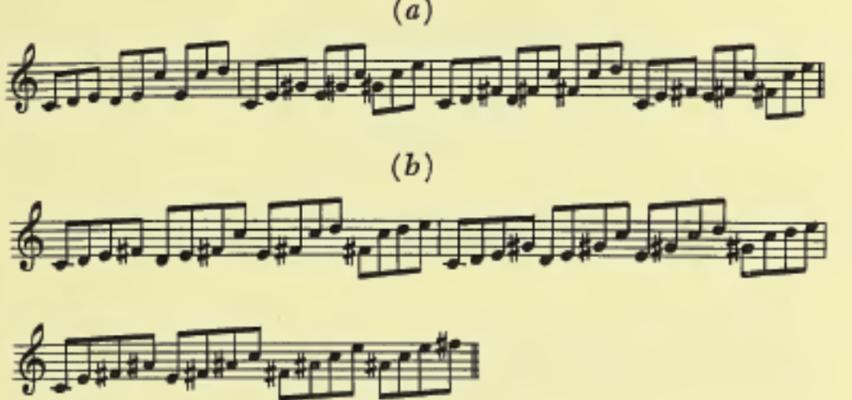
**FIVE AND SEVEN GROUPINGS USING TWO TRICHORDS**

Try using these three ways of organizing groups of five and seven pitches.

- Five groupings using three pitches from one trichord and two pitches from another trichord from the same row.
- Seven groupings using four pitches from one trichord (one repeated pitch) and three pitches from another trichord from the same row.
- Seven groupings using two pairs of incomplete trichords and one complete trichord from the same row.



Ex. 4.5



(a)

(b)

Coltrane talks about this too...a very valuable way of looking at small cell development. It's endless.

And also Slominsky talks about how you can “interpolate” and “exterpolate” different notes to these simple shapes, generating synthetic sounds. Coltrane practiced out of that book for two years, and I think it kind of integrates these kinds of wedge-like progressions with bebop.

# TRICHORD MAPS

## McCoy's Legos

McCoy...and Jonathan Fagan

Musical score for McCoy's Legos, showing a sequence of chords and their trichord maps. The score is written in treble clef with a key signature of one flat (Bb) and a time signature of 4/4. The chords and their trichord maps are: I (026), v (037), bII (037), bII (037), bII (026), bII (037), bII (037), bII (037), I (015), I (026), bvi (037), I (037), VII (026), bVII (037), and bII (037).

Score

## Brave Messiaenic Warrior Trichord Map

Jonathan Fagan

Musical score for Brave Messiaenic Warrior Trichord Map, showing a sequence of chords and their trichord maps. The score is written in treble clef with a key signature of one flat (Bb) and a time signature of 4/4. The chords and their trichord maps are: Bb7 (026), Original Mode ii/I Sequence (mode C 2-1) (037), Fm7 (037), Bb7 (037), Fm7 (026), Same Sequence, Mode ii (2-3) (037), Bb7 (037), Bb7 (037), Eb7 (025), A7(b9) (014), Bb7 (026), Original Sequence-Inverted and Rotated (mode C 0-1) (037), C7 (026), Original, mode ii (0-1) (037), Cm7 (015), Dm7(b9) (026), G7(b9) (037), Cm7 (037), F7(b9) (037), F7 (015), Bb7 (037), C#7 (026), Sequence 2-mode ii/I (F#7), Bb7 (037), Neighboring Motions (Bb7), B-7 (026), E7 (037), Sequence 2 Modified-mode ii (0-2) (A#7), A-7 (026), Further Modified Sequence 2 (D7), G#7 (037), Gm7 (026), More neighboring motions, loosely based on mode ii (C7), Cm7 (037), F7 (037).

Trichord maps have become a great improvisation tool for me, and they come also from a Brookmeyer exercise. The root of that exercise is having a certain trichord that serves as your "target" and forming others around it.

In the second measure of my trichord map, I was thinking of F major as a target. The other sounds voice-lead up to it. It's exactly what Dariusz does with the keyboard exercises. But now the challenge is to put that in linear form.

# BRAVE MESSIAENIC WARRIOR

Score

## Brave Messiaenic Warrior

Jonathan Fagan

Chords: B $\flat$ 7, Fm7, B $\flat$ 7, E $\flat$ 7, A $\flat$ 7(#11), B $\flat$ 7, C7, Cm7, Dm7(b5), G7(b5), Cm7, F7(#11)

Score

## Brave Messiaenic Warrior Trichord Map

Jonathan Fagan

Specify mode collections

Original Mode ii/I Sequence (mode C 2-1)      Same Sequence, Mode ii (2-3)

Chords: B $\flat$ 7, Fm7, B $\flat$ 7, E $\flat$ 7, A $\flat$ 7(#11), B $\flat$ 7, C7, Cm7, Dm7(b5), G7(b5), Cm7, F7(#11)

Compound melodies start to surface with lines based on a trichord map

So in composing this contrafact I noticed several interesting things. First, now you're dealing with rhythmic elements too, which are perhaps the most important things. Also, you end up with interesting compound melodies and you have to be really conscious of how the voices move within.

Practicing your bebop is going to really help with these kinds of instincts too. That's why it's such an important foundation before you get to any of this stuff. It's about being harmonically clear in the same way.

# TRICHORD “STEERING”

Ways to transpose/invert the same trichord to create a 12 tone row

**THE TWELVE BASIC ROWS**

Each row is constructed from one trichord type and expresses the tonal space of that trichord using all twelve pitches.



The image displays twelve musical rows, each consisting of two staves (treble and bass clef). Each row is labeled with a trichord type: 1+1, 1+2, 1+3\*, 1+4\*, 1+5, 2+2\*, 2+3, 2+4\*, 2+5\*, 3+3+3\*\*, 3+4\*, and 4+4\*. The notes are arranged in a sequence that covers all twelve pitches of the chromatic scale.

**INTERVAL STEERINGS OF THE ROWS**

The term *steering* was coined by Peter Schat in his book "The Tone Clock" and is a valuable concept to help us understand the relationships between the twelve rows. It refers to the interval distance between the roots of each trichord in a twelve-tone row.



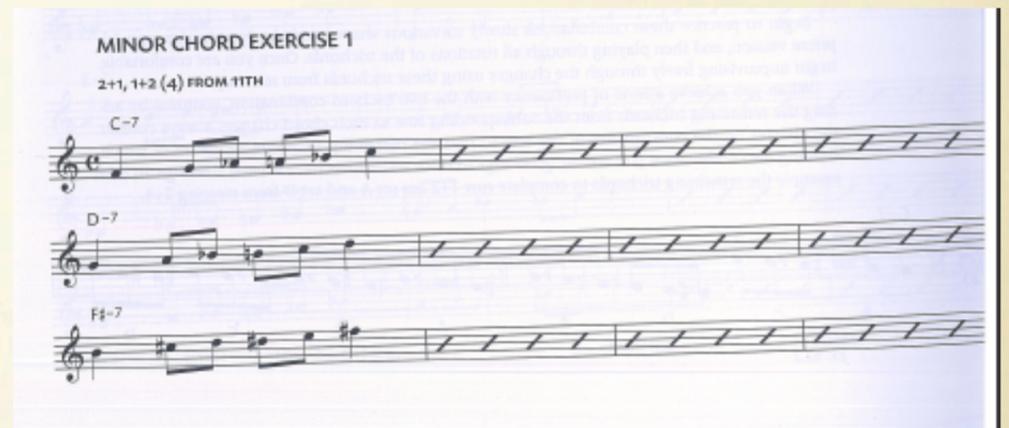
The image shows two staves of music for Row 2+3. The top staff shows the notes of the row. The bottom staff shows the interval steering between the roots of the trichords, with intervals of 4, 2, and 4.

No reason this has to just be 12 tone...

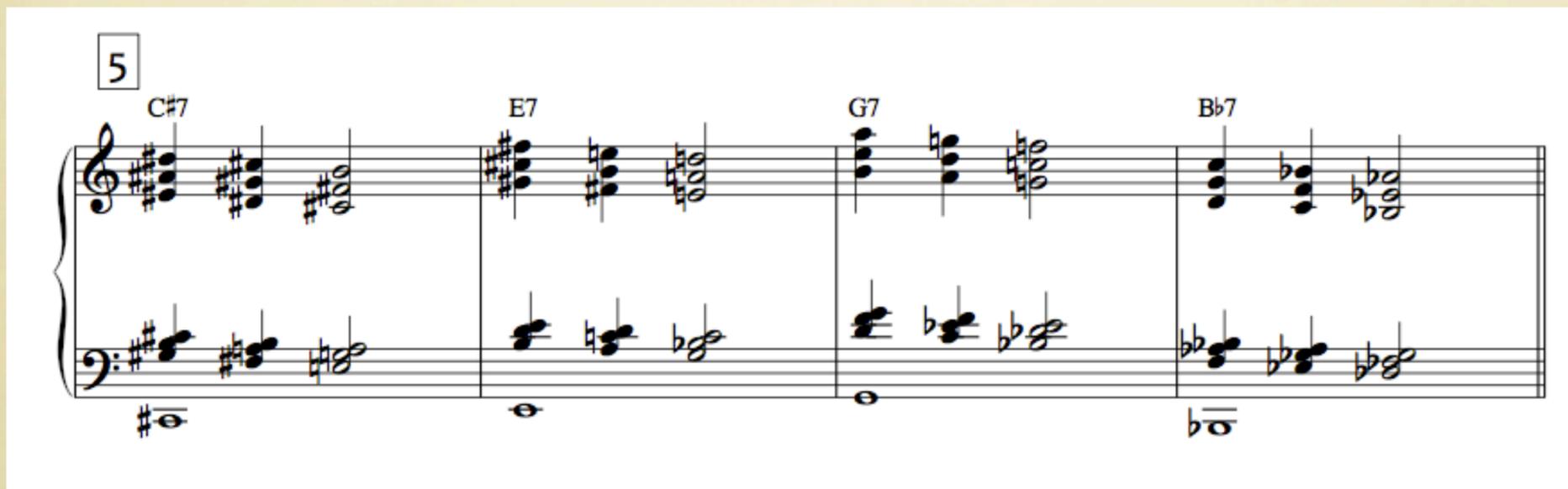
The concept of trichord improvisation extends to improvising twelve-tone rows too, and Gallagher introduces the idea of “steering.”

Steering refers to transposing the same cell or its inversion to form the aggregate—all 12 tones. There’s no reason you couldn’t use the same process to form a 6-tone row, etc. too just how Stravinsky did when he was experimenting with serialism.

# Improvisational Exercises



What is the “steering” for the top staff?

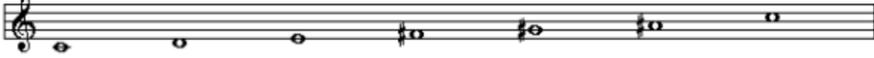


What I like is how he derives exercises from certain trichords and their steering. You could apply these same types of exercises to the types of progressions Messiaen uses.

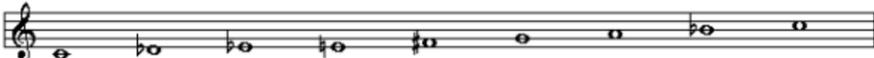
Horn players could think about this bottom example as 027 with a steering of 2. Useful teaching tool for sure.

# “STEERING” APPLIED TO MESSIAEN’S MODES

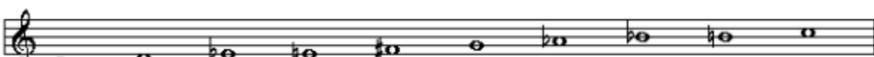
Mode 1: Whole-Tone Collection; 6-35 [0,2,4,6,8,10]; 2 transpositions



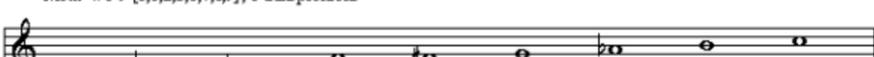
Mode 2: Octatonic Collection; 8-28 [0,1,3,4,6,7,9,10]; 3 transpositions



Mode 3: 9-12 [0,1,2,4,5,6,8,9,10]; 4 transpositions



Mode 4: 8-9 [0,1,2,3,6,7,8,9]; 6 transpositions



Mode 5: 6-7 [0,1,2,6,7,8]; 6 transpositions



Mode 6: 8-25 [0,1,2,4,6,7,8,10]; 6 transpositions



Mode 7: 10-6 [0,1,2,3,4,6,7,8,9,10]; 6 transpositions



Mode 1:[024] with steering 2  
Mode 3:[013] with steering 4  
etc.

What else can you think of  
with a distinct “steering”?

And actually if we think about it, synthetic scales often rely on steering to begin with. Mode 3 is 013 with a steering of 4...

# MY EXPERIMENT: KENNYING AROUND

The image displays a musical score for a piece titled "Kennyning Around". It consists of four staves of music, each with a treble clef and a 7/8 time signature. The first staff begins at measure 5 and features a Dm chord, followed by a G chord, and then G and F chords. The second staff starts at measure 9 with a Dm chord and a G chord. The third staff begins at measure 13 with a Dm chord, followed by G and F/A chords. The fourth staff starts at measure 17 with a Bb chord, followed by A and Dm chords. The music is characterized by a pentatonic-like melodic line with a specific trichord, and the harmonic structure is open, allowing for various resolutions.

I tried my hand at this, composing a 12-tone tune featuring one specific pentatonic-sounding trichord.

The last line is basically a collapsing wedge featuring some of the voice-leading I've gotten from people like Kenny Garrett, Brookmeyer, Dave.

In soloing over it, my idea would be to keep with the trichord and try using different rotations and steerings to add color. The harmonic framework is open enough that pretty much everything works as long as you keep your resolutions clear.

Practicing these types of things over blues or stable vamps really helps—there's a reason why Joe Lovano, Bill Stuart, Ben Street, Abercrombie opened their set by blowing on one chord for 10 minutes. The possibilities are endless.

# SUMMARY

**Persichetti:** Use what the scale gives you

**Messiaen:** Derive your own harmonic language from plaining through different scales

**Hindemith:** Analyze complex chords by taking the “best” (most stable) interval and graph the dissonance level. Hanson gives us more tools to classify interval content and develop mirror harmony.

**O’Gallagher:** Improvise over complex harmony by using trichords and “steerings” that best fit the context

They all obtain pretty similar results, it’s all basically sound exploration. O Gallagher deals with different issues, but you arrive at a very similar place.

It’s all about transforming shapes anyways...but these are some of the best people to look at in my opinion. They’re very practical and simple about it all in a way.

And to quote Einstein, the hardest thing is to make things simpler, not more complicated. It’s about working with this stuff until it becomes intuitive on a certain level.

And again I would suggest writing tunes based on all these concepts, improvising over vamps, then applying those progressions to standards. And if a student is struggling to make the connection, tell them to write it out first. I used to think that there was some kind of shame in that, but it’s part of the process.

Plus you might end up with some tunes that work pretty well...I can think of several tunes that became major parts of the performer’s repertoire but started as exercises for a teacher in school. Dariusz’s class is no exception

Now the beauty of it is that we can all be our own teachers over the summer and beyond and generate some interesting stuff.

This all culminates in having a specific “voice,” just like all these great composers.

# QUESTIONS?

If I can't answer them, Dariusz probably can...

That was a lot of information...questions or comments?

I have a recording of this-message me if you want me to send it to you along with the powerpoint. And I have a lot more stuff too, such as the complete document of keyboard exercises, scores, etc.

I look at it as we're all in this creative process together, we might as well share resources.