

# Chick Corea and Postbop Harmony

KEITH WATERS

This article begins by responding to Steven Strunk's "Tonal and Transformational Approaches to Chick Corea's Compositions of the 1960s." It initially uses the work of Proctor, Satyendra, McCreless, and Cohn on diatonic and chromatic tonalities and suggests that Chick Corea's compositions of the 1960s formed part of a broader, postbop, harmonic practice that emerged in the wake of tonal jazz practices of the first half of the century. In contrast to Strunk's view of Corea's "Windows" and "Litha" as unambiguously monotonal, I suggest that their harmonic progressions challenge or erode hierarchies of tonal organization. These single-section compositions (that is, they do not contain the repeated sections heard in AABA or ABAC song forms) blend cyclic transpositional schemes along with more functional progressions. The result suggests a heterarchical, rather than strictly hierarchical, view of harmonic organization.

The article then examines ambiguous harmonic progressions in two other Corea compositions. In "Song of the Wind," an  $ic_4$  transpositional schema appears in the melodic dimension. Rather than supporting the  $ic_4$  schema, the accompanying harmonic progression instead relies on a particular set of harmonic substitutions. It thus provides a second-order grammar in lieu of a first-order grammar that would be provided by an  $ic_4$  transpositional schema. "Inner Space" combines four schemata, two of which similarly rely on a second-order grammar that arises through substitutions. The article closes by considering these substitution principles in light of Strunk's substitution sets (Strunk 1979), and by viewing points of contact and friction between evolutionary views of European harmony and of jazz harmony.

Keywords: jazz, jazz harmony, postbop, harmonic substitution, transposition operation, Chick Corea, Steven Strunk.

The study of the expansion of tonality in jazz is one of the unfinished tasks facing jazz theorists.

– Steven Strunk (1988, 492)

## PART I. POSTBOP PRACTICES

Steven Strunk's 1988 call to address problematic tonal structures in jazz was one that he himself answered enthusiastically. In the wake of several groundbreaking articles that modified Schenkerian methods for the analysis of tonal jazz and his magisterial entry on "Harmony" for the *New Grove Dictionary of Jazz*, Strunk turned to the close scrutiny of difficult 1960s compositions by Wayne Shorter and Chick Corea before his untimely death in 2012.<sup>1</sup>

In his essay "Tonal and Transformational Approaches to Chick Corea's Compositions of the 1960s," Strunk relies on a broad array of theoretical models: experiential, Schenkerian, his own layered analysis, Neo-Riemannian, and pitch-class set theory. For the opening two compositions ("Windows" and "Litha"), Strunk's essay uses Schenkerian and layered models for their tonal structure. For "Litha," "Tones for Joan's Bones," and "Steps," he invokes Proctor's transposition operation and Neo-Riemannian moves to examine equal-subdivision and other non-functional progressions. Finally, he uses a [5, 3, 1, 9] *Tonnetz* to model a quartal harmonic passage in "Now He Sings, Now He Sobs." Strunk's pluralistic theoretical orientation is a fitting

response to a highly regarded and prolific jazz composer during a time of intense artistic ferment. Corea's 1960s compositions synthesized principles of tonal jazz with those of an emerging postbop compositional practice, one strongly influenced by the work of John Coltrane, Miles Davis, Bill Evans, and others.

The analytical approach here differs but complements Strunk's rich and detailed readings of Corea's works. It offers alternative readings to "Windows" and "Litha" before moving to identifying and describing schemata and harmonic grammar in two other Corea compositions, "Song of the Wind" and "Inner Space." It suggests that Strunk's Schenkerian and layered analyses of "Windows" and "Litha" may overstate the degree to which those works are unambiguously monotonal. Although "Windows" and "Litha" use progressions at the end of their forms to link back to the opening harmony and return to the top of the form (in jazz parlance, this is known as a "turn-around"<sup>1</sup>), the intervening material establishes cyclic designs that challenge more conventional tonal designs. These transpositional cycles, once initiated, follow their particular course. In this sense, then, the turnarounds at the end of the form create a type of tonal intervention. Turnarounds end the unfolding

<sup>1</sup> Strunk (1988, 490) defines a turnaround as follows: "The chord pattern at the end of the final phrase is called a 'turnaround' or 'turnback' because it leads back to the beginning of the theme and prepares for the start of a new chorus. In a theme with the form aaba, the first a section may also end with a turnaround. Composed melodies usually rest during a turnaround."

cyclic arguments and link more conventionally to the harmony in m. 1.

The degree of cooperation between tonal prolongational designs and cyclic designs (particularly chromatic mediant progressions) is still very much an open question.<sup>2</sup> For music of the nineteenth century, that question informs a line of theoretical inquiry pursued vigorously by Gregory Proctor, Patrick McCreless, Ramon Satyendra, and Richard Cohn.<sup>3</sup> All these writers take as a point of departure Proctor's evolutionary view of tonality: that common-practice tonality through ca. 1825 was fundamentally diatonic (with chromaticism emerging through tonicization and mixture), and a nineteenth-century chromatic tonality (or "second practice of nineteenth-century tonality") emerged out of and then coexisted with diatonic tonality after ca. 1825. Because of the latter point, the degree to which nineteenth-century second-practice compositions retain or transform diatonic tonality is fluid.<sup>4</sup>

To be sure, chromatic tonality as described by these authors is not limited to cyclic or chromatic mediant harmonic progressions.<sup>5</sup> But cyclic principles (particularly Proctor's "transposition operation") play a central and pivotal role in chromatic tonality.<sup>6</sup> Furthermore, such harmonic progressions and connections may appear on different levels of tonal structure. For example,  $ic_3$  or  $ic_4$ -related harmonies may connect directly, or they may be mediated by intervening dominants. In the latter case, the result creates a bifurcated view of tonal organization: conventional cadences support local harmonic progressions, but those arrivals form mediant relationships that guide the middle-ground.<sup>7</sup>

Such approaches to nineteenth-century tonality inform our understanding of Corea's 1960s compositional practice, as is made clear by Strunk's essay. But I would like to go further than Strunk's point that Corea, Herbie Hancock, and Wayne Shorter all contributed "significantly to the repertoire of the

period." Beyond this, they all participated in forming a postbop practice of jazz harmony that emerged from tonal jazz practices of the first half of the twentieth century. Tonal jazz refers to the set of harmonic procedures that relies on functional harmonic progressions (often V-I or ii-V-I), that typically place the cadences at important formal junctures, that occur in a fundamentally monotonal environment, and that may be clearly represented through structural levels (McGowan 2005; Martin 2011). Postbop jazz harmony challenged those procedures by unleashing other centrifugal designs. By using  $ic_3$ ,  $ic_4$ , and other cyclic transpositional schemes, it offers alternatives to monotonicity, and by relying on ambiguity, it calls into question the degree to which a tonic key is rhetorical or instead arises through conventional tonal processes.<sup>8</sup>

Two further historical points may be made relative to Corea and other postbop composers. The first is that the syntax of 1960s postbop jazz was evolutionary in a dynamic way. I will claim that 1960s postbop compositions adopted (and often transformed) significant schemata of works of the late 1950s. My interest is not necessarily to demonstrate a direct line of influence from an earlier to a later model. Instead, it is to propose that later composers absorbed—either directly or indirectly—these schemata.<sup>9</sup> The second point is that postbop composers displayed a

8 For further discussion of rhetorical tonics, see Harrison (1994, 75–90). Martin (2012–13) examines a number of harmonically ambiguous compositions of John Coltrane of the late 1950s and early 1960s. In highly ambiguous cases, he determines tonics and interior harmonic arrival points through "prolongation by arrival," which accords enhanced structural weight to beginnings or endings of four-measure, eight-measure, and sixteen-measure hypermetrical units. In the absence of more clearly evident tonal cues, I would argue that such tonics (or interior arrival points) correspond more closely to Harrison's rhetorical tonics than to tonal prolongations.

It is possible to draw loose—but qualified—analogies between postbop jazz and second practices of European harmony from the standpoint of harmonic progression. Further, there is an analogous relation of vocabulary to syntax. Both postbop jazz and second practices of nineteenth-century tonality rely largely on conventional ("first-practice") harmonies that might nevertheless progress and link unconventionally. For nineteenth-century music, Cohn (2012, xiv) adopts the term "pan-triadic" for a "tonally indeterminate progression of triads"; for jazz, Strunk uses the term "passages of nonfunctional harmony." Despite some inviting analogies between second practices of nineteenth-century European tonality and jazz tonality, the units of vocabulary differ. Triads are the primary units of European chromatic tonality, and harmonies of four and more pitches those of postbop jazz tonality. (Cohn's evolutionary model [2012, 207] does take into account a shift to four-note, or "Tristan genus," chords in the nineteenth century. With this evolutionary stage, "a hitherto secondary member of the lexicon has been promoted to primary status.") Morgan (1999) suggests that the practices of nineteenth-century harmony are too vast to be placed under a single label such as "second practice."

9 For more on schemata, see Gjerdingen (2007). Cope (2003, 11) provides a more general five-stage continuum for assessing such musical references: "My taxonomy for referential analysis includes Quotations (as in citations, excerpts, or renditions); Paraphrases (as in variations, caricatures, or transcriptions); Likenesses (as in approximations, translations, or similarities); Frameworks (as in outlines, vestiges, or redactions); and Commonalities (as in conventions, genera, or simplicities) . . . Clearly, potential for listener

2 Kopp (2002, 128–34) discusses different analytical approaches that either reconcile or dissociate tonal prolongation with chromatic third relations.

3 Proctor (1978), Satyendra (1992), McCreless (1996), Cohn (2012). Satyendra also uses the terms "architectural" tonality and "transformational" tonality to distinguish between the diatonic and chromatic. See also Cinnamon (1986).

4 See Kinderman and Krebs (1996).

5 For example, see Part 1 of Kinderman and Krebs (1996), all of whose essays treat "tonal pairing" and alternatives to monotonicity. Krebs (1981 and 1985) further explores that topic.

6 Proctor (1978, 158) distinguishes between the "simple symmetrical division" of diatonic tonality and the "transposition operation" of chromatic tonality based on the "operations of traditional counterpoint": "If the voice-leading accords with the operations of traditional counterpoint, but a leading voice moves through some symmetrical division . . . simple symmetrical division holds. If the voice-leading does not conform to the operations of traditional counterpoint, the *transposition operation* is present."

7 For an analysis of Liszt's *Consolation* no. 3, see Cohn (2012, 186–89), which introduces a convertible *Tonnetz* to address the "syntactic interaction" that arises from  $ic_4$ -related harmonies mediated by dominants. Cohn refers to the coexistence of diatonic and chromatic tonalities as "double syntax"; Satyendra (1992, vi) describes their interaction as "stacked spaces."

keen interest in single-section formal designs, often bypassing the AABA and ABAC (usually thirty-two-measure) song forms that provided the core of small-group tonal jazz repertory through the 1950s.<sup>10</sup> The performances of single-section forms discussed below follow the standard head–solos–head–chorus structure characteristic of jazz practice. But while entire single-section choruses repeat, those choruses have no repeated (typically eight-measure) subsections heard in AABA and ABAC forms. Corea's "Windows," for example, is a forty-eight-measure single-section composition; "Litha" a sixty-two-measure one.<sup>11</sup>

The reasons for a postbop interest in single-section forms are likely varied. By omitting repeated subsections, uninterrupted single-section compositional designs allowed composers to explore expanded cyclic harmonic spaces, as well as an ongoing approach to motivic development and longer middleground linear progressions. They also allowed compositional designs that are progressive (e.g., that move through varying stages of harmonic design, harmonic rhythm, and meter/tempo/feel) or that aggregate distinct schemata as they progress. Repetition only at larger hypermetric levels rather than at the eight-measure level arguably provides greater freedom during the improvisations, allowing improvisers to confect a longer narrative design that matches the ongoing thread of the head statements.

## PART II. "WINDOWS" AND "LITHA": A RESPONSE

### "WINDOWS"

*Harmonic Structure.* Strunk provides a number of paths through the harmonic structure of "Windows," a composition he describes as a "study in tonal and harmonic ambiguity." His initial "experiential interpretation" portrays "Windows" as requiring a series of tonal revisions as the listener proceeds through its forty-eight measures, since many of the direct harmonic connections continuously challenge previously established assumptions. That analysis ultimately suggests that the harmony and melody sufficiently corroborate B (minor at the outset, major as the piece progresses) as the ultimate tonic. Strunk's two Schenkerian-style graphs depict the overall tonal orientation slightly differently from one another. The first depicts an interior

recognition proceeds from strong to weak through these categories, and the potential for stylistic integration proceeds inversely." Jan (2007) develops a model for schemata through memes, or units of cultural evolution. Jan defines the success of memes through "copying-fidelity," although (like genes) memes are subject to "mutation."

- 10 For more on single-section compositions in the 1960s, particularly those by Wayne Shorter, see Waters (2011, 27–29). Shorter's twelve-bar blues compositions do not appear in the list of single-section compositions, since they are single-section in the hands of most jazz composers, tonal or otherwise.
- 11 Corea's single-section compositions are further distinguished because, unlike most song-form jazz compositions, the repeated choruses do not provide tonal closure at the end of the repeated form. Rather than cadencing on tonic, each of the Corea compositions under discussion ends with a turnaround that links to the m. 1 harmony. Each performance thus ends with a coda or vamp.

prolongation of IV (E major) without a final dominant harmony, suggesting an overall subdominant (plagal) orientation. In the second Schenkerian-style graph, that plagal area is followed by a dominant harmony (this is the final C7 harmony, a tritone substitute for the more conventional F♯<sup>7</sup>). Finally, his layered analysis characterizes the overall motion as i–IV–V–I. However, even in this analysis the IV harmony is conceptually prior to the V (i.e., IV is retained in the penultimate Level 8, while V is not), aligning this interpretation with that of the subdominant axis of the initial Schenkerian graph. Each of Strunk's analyses points to E major (as IV) as a marked interior arrival point of the composition.

In contrast, I offer a different view of the piece. It relies on a schema heard in the Bill Evans composition "34 Skidoo."<sup>12</sup> Example 1 shows this progression as one that involves a tonal reinterpretation, with the first chord heard first as tonic harmony in D minor but subsequently recast as iv once the following ii–V–i motion (Bmin7b5–E7–A minor) is completed.<sup>13</sup> These four measures effect tonal movement from one minor harmony to another one a fifth above.<sup>14</sup>

In "34 Skidoo," the schema appears once as a single T<sub>7</sub> move at the outset. With Corea's "Windows," however, that schema becomes the premise for the first forty-one measures of the forty-eight-measure composition. The harmonic organization relies on a series of cyclic moves through this T<sub>7</sub> space. The result is an upward spiral of tonicized keys, moving from B minor through F♯ minor, C♯ minor, and onward to A♭ minor. Example 2 includes the progression to "Windows" with annotations that show this large-scale harmonic motion.

Example 2 presents "Windows" as a series of four overlapping tonal stages. The last harmony of each stage becomes the first harmony of the next, so that tonicized harmonies at mm. 1, 9, and 35 become enlisted as iv chords en route to a new tonal destination. The final stage ends the ascending fifth series. Stage 4 interprets A♭ minor as vi of the opening key and effects an elaborated turnaround, ultimately returning to B minor at the top of the ensuing chorus.

Each stage differs according to duration or harmonic rhythm. During Stage 1 (mm. 1–9) the motion from B minor to F♯ minor occurs directly. The opening Bmin<sup>7</sup> harmony becomes iv of F♯ minor as the harmonies progress through the predominant (A♭min7b5) and the dominant (D♭7). The schema here appears in unambiguous fashion.

During Stage 2, the route from F♯ minor to C♯ minor (mm. 9–35), the schema is less evident, given the additional harmonies at mm. 13, 17, and 33–34.<sup>15</sup> This suggested stage

12 For further discussion of "34 Skidoo," see Waters (2010).

13 The progression also includes a passing minor-seventh chord in m. 1.

14 Evans explored this schema in other compositions, such as "Waltz for Debby" (mm. 27–29). In mm. 17–31 of "Bill's Hit Tune" the harmonies move through A minor, E minor, B minor, and F♯ major. This progression appears at the opening to "Blue in Green" (Gmin11–A7–Dmin7) and again transposed (Dmin–E7–Amin) at mm. 7–9.

15 I discuss the harmonies at mm. 17–24 and 33–34 below. The text does not address the harmony at mm. 13–16, the Amin7/D. This is more

	m. 1	2	3	4
	Dmin7	Cmin7	Bmin7(♭5)	E7
D minor:i				Amin7
A minor	iv	(P)	ii	V7
				i

EXAMPLE 1. *Opening progression from “34 Skidoo” (Bill Evans, How My Heart Sings, 1962)*

Stage 1

	m. 1	5	8	9
	Bmin7	A♭min7(♭5)	D♭7	F♯min7
B minor :	i			
F♯ minor:	iv	ii	V7	i

Stage 2

	m. 9	13	17	25	33	34	35
	F♯min7	Amin7/D	Emaj7(♯11)	A♭7 (A7) A♭7	Emaj	D♯min7	C♯min7
F♯ minor:	i	Vlsus7					
C♯ minor:	iv	Vllsus7 of III	III	V7	III	(P)	i

Stage 3

	m. 35	36	37	38	39	40	41
	C♯min7	C♯min7/B	B♭min7(♭5)	B♭min7(♭5)/A♭	E♭7/G	E♭7	A♭min7
C♯ minor:	i						
A♭ minor:	iv		ii		V7		i

Stage 4

	m. 41	42	43	44	45	46	47	48	1
	A♭min7	A♭min7/G♭	D♭7/F	D♭7	Emaj7	E♭min7	C♯min7	C7	Bmin7
A♭ minor:	i								
B major/minor:	vi		V7 of V	IV	iii	ii	V'7	i	

EXAMPLE 2. *Harmonic progression and analysis of “Windows” as series of ascending-fifth motions: B minor–F♯ minor–C♯ minor–A♭ minor*

diverges from Strunk’s Schenkerian and layered interpretations. They emphasize E as a prolonged scale-step on IV within the overall tonality of B from m. 17 through m. 44 or 45 (in the Schenkerian analyses) and from m. 17 m. 48 (in the layered analysis). My analysis, on the other hand, deemphasizes the appearances of this harmony. Example 2 relegates Emaj7 to a subordinate role within Stage 2, participating in the larger move from F♯ minor to C♯ minor.

I think there are compelling reasons for Strunk’s choice to highlight E as either the most (or, along with the substitute V at m. 48, one of the two most) salient interior events of the

commonly described as a “sus” (suspended) chord. In this instance, the third above the D bass (F♯) is replaced by a fourth (G), transforming a more conventional D7 harmony. The analysis in Example 2 posits this as a pivot chord: D7 relates to F♯ minor as VI7 (in common-practice harmony, this chord functions as a German augmented sixth); and D7 relates to the ensuing Emaj harmony as VII7. Strunk reads the m. 17 arrival of E through both the F♯-minor harmony (as ii of E) and the Amin7/D (as iv7 —with a D bass—of E).

work. Certainly duration and hypermetric inflection play a role: Emaj7 launches two (of the composition’s six) eight-measure phrases. Given the eight-measure regularity of most jazz standard compositions, the beginnings of eight-measure sections are likely heard as structurally significant. Furthermore, that harmony occupies an entire eight-measure section at mm. 17–24 (and this section varies the opening melody). Its reappearance at m. 33 also suggests an interior departure-and-return strategy that Strunk represents as prolongational. Yet neither duration, hypermetric inflection, nor departure/return is sufficient for prolongation. As Strunk acknowledges, that prolongation is carried out in an unorthodox manner, through A♭7 (mm. 25–32), a harmony in a chromatic third relationship with E.<sup>16</sup> For him, III♯, indicated in his Schenkerian graphs with the

16 And for Strunk, E remains prolonged through m. 44 via a lower chromatic mediant harmony, C♯7. See his note 10 in the accompanying essay. I retain here Corea’s enharmonic spellings (e.g., A♭7 rather than G♯7, D♭7 rather than C♯7).

Salzerian label EM for “embellishing chord,” prolongs E. (The elaborating Ab7 is itself elaborated by an upper chromatic neighbor chord A7: as Strunk indicates, that harmony is a tritone substitution harmony for a more conventional Eb7 chord.)

There are compelling alternative readings. The first is that in Example 2, which suggests an indirect but conventional local V7–i relation between Ab7 (mm. 25–32) and C# minor (m. 35), one mediated by the Emaj7 and the passing D#min7 harmonies (mm. 33–34). This interpretation, then, conflicts with Strunk’s by promoting the more conventional tonal relation while demoting the rhetorical (through duration and hypermeter) inflection. As Example 2 suggests, Ab7 is heard more explicitly as V7 of C# minor than III# of E major.<sup>17</sup>

Another alternative, not captured by Example 2, would be to propose a substitution strategy that acknowledges the close relation between C# minor and E major. E major, rather than appearing as III within the local orbit of C# minor (as in Example 2), might be better described as a substitute for C# minor.<sup>18</sup> Substitutions—such as relative major/minor ones—provided postbop composers with powerful methods to evoke tonal relationships but avoid more conventionally predictable tonal moves.<sup>19</sup> Example 3 provides a dual interval cycle that alternates ic<sub>3</sub> and ic<sub>4</sub>, indicating that relative relationship as a potential inclusion relation.<sup>20</sup> The cycle—as a ladder of thirds—provides the range of standard possibilities in jazz practice for minor and major-seventh chords that may, but need not, include standard extensions of ninth, eleventh (#11 with major-seventh chords), and thirteenth. The lines above and below indicate Emaj7 as a subset of C#min9, and Emaj7#11 as a subset of C#min13. For jazz musicians, a more common description of that particular subset relation is to describe Emaj7 as a rootless C#min9, or Emaj7#11 as a rootless C#min13.

In the case of “Windows,” hearing E major in a relative relationship with and substituting for C# minor addresses concerns raised by the hypermetric and durational (i.e., rhetorical) priority of E. Example 4 models this view.

It may be possible to generalize further, and include the passing D#min7 chord at m. 34 as participating in this expanded C#-minor harmony. Thus the mm. 33–35 progression Emaj7–D#min7–C#min7 stands for C# minor (with “stand for” meaning

C#min9  
C# E G# B D# F# A# C# E#/F...  
Emaj7

C#min13  
C# E G# B D# F# A# C# E#/F...  
Emaj7#11

EXAMPLE 3. *Dual interval cycle and inclusion relationship between relative major/minor*

a transformation that meaningfully relates to and delays the more expected C# minor).<sup>21</sup> This same transformation of C# minor also comes into play during Stage 4 of “Windows.”

This transformation additionally aids in understanding a significant aspect of Stage 3, since the passing bass motion begins with the hypermetrically inflected Emaj7 harmony at 33. Thus, the C#min7 at m. 35, which begins Stage 3, is part of a broader passing motion in the bass. Hearing mm. 33–35 as part of a transformed C#-minor harmony reconciles the beginning of the stepwise line in the bass (m. 33) with the onset of the schema at Stage 3 (m. 35). Stage 3’s schema is more evident than that of Stage 2. It uses passing motion in the bass (C#–B–Bb–Ab–G) that allows the tonicized C# minor to operate as a iv chord, then moves through ii (Bbmin7b5) and V7 (Eb7) chords en route to Ab minor.

Stage 3 is the last step through this ascending fifth cycle, which has moved from B minor–F# minor–C# minor–Ab minor. Stage 4 begins by making a feint toward yet another cyclic move. Stage 4 begins similarly to Stage 3, suggesting yet another instance of the schema. Example 5 compares that hypothetical schema with Corea’s progression.

At m. 43, Corea’s progression diverges from the “34 Skidoo” schema (with Db7/F rather than Fmin7b5), a departure that helps to reinstate the opening key of B. Thus, Stage 4 provides an intervening turnaround, interrupting the ongoing cyclic motion of Stages 1–3. The tonicized Ab minor therefore acts as a hinge. It is the last stage along the ascending fifth cyclic pathway and is reinterpreted as vi (or ii/V) advancing to V7/V at mm. 43–44. Measures 45–47 provide an example of the Emaj7–Ebmin7–C#min7 progression that stands for C#min7, the identical progression discussed at the end of Stage 2. In that interpretation, C#min7 acts as predominant ii (which often follows V7/V in jazz contexts), ceding to C7 (the tritone substitute harmony for F#7, indicated as V’7), ultimately moving to B minor at the top of the form.<sup>22</sup> A more conventional turnaround would move directly to F# at mm.

17 Elsewhere, Corea similarly juxtaposes III with V7 directly in a manner similar to mm. 17–32 of Example 2 above. See “What Was,” a work in G# minor that moves from Bmaj7 to D#7 in mm. 9–12, in Corea (1988, 22).

18 Waters (2010, 153) describes similar substitution strategies that equate relative major/minor harmonies in Herbie Hancock’s “Dolphin Dance.”

19 In this way, I would disagree with Strunk’s assessments that the m. 33 Emaj7 harmony invalidates the idea that the G#7 might be V7 of C# minor; and that hearing Emaj7 as the third, fifth, seventh, and ninth of C# minor is an unlikely interpretation. Ultimately, Strunk’s layered analysis challenges both of his earlier assessments: see his note 17. My essay goes on to propose additional substitution techniques beyond relative relationships.

20 The cycle does not model specific harmonic voicings in practice, which often are personal and distinct among different players. For other uses of the dual interval cycle, see Brown (2003), Gollin (2007), and Lewin (2002 and 2005).

21 In fact, Corea’s copyright deposit lead sheet (Library of Congress, Eu 921706, dated 24 January 1966) shows this: mm. 33–36 are indicated solely by the harmony “Dbmin7.” The Emaj7 and D#min7 harmonies at mm. 33–34 heard on the recording were evidently added later and appear in Corea (1994).

22 The symbol V’7 at m. 48 is taken from Strunk (1979) and is meant to indicate a tritone-substitution chord (C7) in place of a more conventional dominant (F#7).

	m. 17	25	33	34	35
Corea's Progression	Emaj7#11	A $\flat$ 7 (A7 A $\flat$ 7)	Emaj7	D#min7	C#min7
Substitutes for	C#min13		C#min9		
Substitution Technique	Relative		Relative		

EXAMPLE 4. *E major as substitute for C# minor*

Hypothetical Schema	A $\flat$ min	A $\flat$ min7/G $\flat$	Fmin7( $\flat$ 5)	B $\flat$ 7	E $\flat$ min				
A $\flat$ minor	i								
E $\flat$ minor	iv		ii	V7	i				
	m. 41	42	43	44	45	46	47	48	1
Corea's Progression	A $\flat$ min	A $\flat$ min7/G $\flat$	D $\flat$ 7/F	D $\flat$ 7	Emaj7	E $\flat$ min7	C#min7	C7	Bm7
A $\flat$ minor	i								
B Major/Minor	vi		V7/V	IV			ii	V'7	i

EXAMPLE 5. *Comparison of hypothetical ascending-fifth schema with Corea's mm. 41–48 (Stage 4)*

45–48, housing either a four-measure dominant, or a iii–vi–ii–V progression over the F# pedal point. Corea's mm. 45–48, with its stepwise bass, may be heard as a variation of such a turnaround. We also might understand the variation to be one that exchanges the role of bass for melody, since the only melodic pitch heard during mm. 45–48 is F#, the dominant of the ensuing B minor.

This interpretation of "Windows" proposes that Corea takes an important detail heard in Bill Evans's compositions—an ascending fifth sequence of tonicized minor harmonies—and makes it the harmonic premise of virtually the entire composition.<sup>23</sup> Each of those cyclic stages arises via functional progressions (that include iv, ii, and V7 harmonies), although the particular paths vary by means of harmonic rhythm, passing motion, etc.<sup>24</sup> Thus, foreground tonal progressions activate a cyclic design. Only in Stage 4 does the cyclic activity cease. Its turnaround motivates a tonal return to the beginning B-minor harmony at the top of the form. This differs from Strunk's interpretation, whose monotonal readings place the subdominant E major as the primary interior arrival point of the piece. Certainly that harmony is given durational and hypermetric emphasis, although, unlike the B, F#, C#, and A $\flat$ -minor harmonies, it is

never tonicized. My alternative interpretation suggests B minor as tonic in a local and rhetorical sense. It is local since motivated only by the turnaround; it is rhetorical since it appears at the top of the form and launches the cyclic design anew.

Nevertheless, we can acknowledge how aspects of the cyclic design participate in a key-defining role. The B–F#–C#–A $\flat$  pathway of minor-key areas corresponds to a clockwise path around the conventional circle of fifths, a series of adjacent sharpwise steps. The endpoint of that path, A $\flat$  minor, provides a fork that returns the harmony back to B, with B major (rather than B minor) strongly implied by the Emaj7–E $\flat$ min7–C#min7–C7 turnaround at mm. 44–48. This A $\flat$  minor to (implied) B-major link recalls the discussion of substitution strategies above, which suggested a type of equivalence (and inclusion relationship) between relative major and minor harmonies. If so, then not only does "Windows" proceed as a series of adjacent steps sharpwise, but also the net motion down a minor third (from B minor to A $\flat$  minor) creates an overall Picardy effect, substituting for a motion from B minor to B major, as shown in Example 6. The number of cyclic steps is not arbitrary but allows this Picardy effect. That effect is negated or cancelled by the return to B minor at the top of the form and corroborated by the B-major coda that follows the final chorus.

As discussed in the initial section, cyclic designs offer one possible motivation for postbop composers to use single-section compositions. Single-section compositions provide a wider landscape to explore cyclic pathways than do song forms, whose repeated eight-measure subsections would interrupt those pathways. The ensuing discussion of the melodic structure of "Windows" offers another potential motivation.

*Melodic Structure.* In the first section, I offered two possible melodic reasons for postbop composers to explore single-section compositions: they allow an ongoing approach to motivic

<sup>23</sup> The waltz topic of "Windows" further links it with many Bill Evans compositions.

<sup>24</sup> See, for comparison, Cohn's discussion of the ascending fifth sequence in Brahms's Symphony No. 2, mm. 102–18, whose "free fall" in the bass and "free rise" in the upper voices prevent the listener from "predicting the duration of this sequential process" in Cohn (2012, 93). Both Straus (1990, 110) and Wilson (1992, 61–62) make an interventionist claim for the ascending fifth sequence in the second theme of Bartók's Sonata for Piano, first movement. Regarding the sequence, Wilson writes: "It should be clear that no musical process inherent in this theme would bring the succession to a natural close. Viewed abstractly, the cycle of T<sub>7</sub> transpositions might unwind at least until it returned to its starting point, which in this case would be long after pianist and audience had lost all interest in the proceedings."

	m. 1	41–48
Substitution	(B minor)	B major
Corea's Progression	B minor	G# minor (to implied B major)
Substitution Technique		Relative

EXAMPLE 6. *Transformed Picardy effect via descending ic3 motion*

development and longer middleground linear progressions. Strunk's two Schenkerian graphs (his Examples 2 and 3) show the linear orientation of the melody in "Windows." The two graphs are similar in many details, with the primary difference the endpoint of the middleground linear progression in the melody. The *absence* of a structural dominant harmony (and the expanded E plagal axis) in his Example 2 results in a composition with  $\hat{3}$  as *Kopfton* (D at m. 1, D# at mm. 25–33) and a descent to  $\hat{1}$  that coincides with the return of E major at m. 45 ( $\hat{1}$  is anticipated at m. 41 in that graph). The *presence* of a structural dominant harmony in his Example 3 (this appears at m. 48 as C7, a tritone substitution harmony for F#) alters the endpoint of the linear span relative to the earlier example. Now the mixed  $\hat{3}$  moves only to  $\hat{2}$  at m. 37, which is then decorated conventionally by a subordinate third descent to the leading tone A# at the arrival of the substitute V harmony. This harmony leaves the composition tonally open, mandating a return to the top of the form for each consecutive chorus or to the B-major coda at the close of Corea's performance.

My view of the linear orientation of "Windows" also differs from Strunk's. It varies only to a degree but suggests that his Schenkerian Examples 2 and 3 in some ways obscure, rather than clarify, that linear structure. I would propose that not one *Urlinie* but three descending linear progressions guide the composition. Each is bounded by the span of a sixth, with endpoints corresponding to onsets of eight-measure phrases. A reduction of the melody appears in Example 7, and a comparison with Strunk's Example 3 nevertheless displays correspondences. Span 1, mm. 1–9, moves from D stepwise through G# (D–C#–B–A–G#), and there the line skips to C#. Given the tonicized harmonic arrival on F# minor at m. 9, I interpret that C# as substituting for F#. (Compare with Strunk's Example 3.) Span 2 begins at m. 17 with B, which proceeds stepwise (A#–G#–F#) before the octave shift that links to E and finally to Eb at m. 25.<sup>25</sup> The eight-measure section at mm. 25–32 pivots around that melodic pitch Eb (over Ab7 and its T<sub>1</sub> elaboration A7). Finally, Span 3 returns to Eb/D# at m. 33 and proceeds stepwise downward until the end of the composition (D#–C#–B–A#–G#–F#).

These three linear spans all begin at hypermetric downbeats. Endings for the first and second spans also coincide with hypermetric downbeats (at mm. 9 and 25), and the continuation into the next eight-measure section fuels a sense of

continuous melody at those junctures. One might argue that Spans 2 and 3 are themselves linked and continuous, since the former ends with Eb/D# (m. 25) and the latter begins with it (m. 33), following its expansion in mm. 25–32. The result, then, creates a sense of continuous melody spanning mm. 17–48. All of this reinforces the attraction of single-section compositions. Not only do they allow surface motives to proliferate, such as heard in mm. 1–4, 5–9, and (in augmentation) 17–25. But longer-range linear spans arise either through the sequential repetition of those surface motives or independently of them. With "Windows," such linear spans create an ongoing and uninterrupted sense of continuity unavailable with song forms.

"LITHA"

Corea's "Litha," originally recorded in 1966, is a single-section composition that consists of sixty-two measures. A change in feel (from Latin to swing) and a metrical shift from  $\frac{6}{8}$  to  $\frac{4}{4}$  delineate its two halves.<sup>26</sup> Example 8 indicates four smaller subsections: A at mm. 1–7, B at mm. 7–22, C at mm. 23–30, and D at mm. 31–62. Subsections A, B–C, and D also correspond to an expansion of harmonic rhythm, from chords every measure (Subsection A), every four measures (Subsections B and C), and every eight measures (Subsection D). The entire performance opens in D major (the m. 1 harmony) but ends with a coda in E minor (the m. 31 harmony).

Subsection A is a chromatic mediant sequence.<sup>27</sup> Major-seventh harmonies appear in a descending ic<sub>3</sub> pattern every other measure between mm. 1–7. These major-seventh harmonies are followed by minor-seventh chords a half-step below, and the bass root motion moves through the half-whole pattern of an octatonic scale (Dmaj7–C#min7–Bmaj7–Bbmin7–Abmaj7–Gmin7–Fmaj7#11) in mm. 1–7. Strunk describes the intervening harmonies (the minor-seventh chords): "subdominant prefixes . . . take the form of II7 chords mildly tonicizing each of the major seventh chords. . . ." We might also acknowledge a loose tonal relationship between the major-seventh and ensuing minor-seventh harmonies, with the former operating as bII of the latter. Example 9(a) models those local tonal relationships. Examples 9(b) and 9(c) compare Corea's progression with

25 Strunk's Example 3 does not make explicit the m. 25 Eb arrival at the end of the linear span, but m. 25 forms an overlap: it ends that linear span and launches the next eight-measure section that pivots around Eb. My linear analysis does not take into account mm. 13–16 except to show that pitches B–A–D in mm. 13–16 form a direct T<sub>1</sub> relationship with A#–G#–C# of mm. 8–12.

26 Corea recorded "Litha" on *Tones for Joan's Bones* in 1966, and with Stan Getz on *Sweet Rain* in 1967. His copyright deposit lead sheet is dated 18 April 1967 (Eu 990882). Corea (1994) states that it was composed in 1967, but the 1966 recording obviously implies an earlier date.

27 Lynch (2012, 32–33) discusses mm. 1–11 of "Litha."

EXAMPLE 7. *Linear spans in “Windows”*

## Subsection A

m. 1	2	3	4	5	6	7
Dmaj7	C#min7	Bmaj7	Bbmin7	Abmaj7	Gmin7	Fmaj7

## Subsection B

m. 7	11	15	19
Fmaj7	Dmaj7	Ebmaj7	Cmaj7

## Subsection C

m. 23	m. 27
Cmin7/F (F9sus)	B7#9

## Subsection D

m. 31	39	47	55
Emin7	Bb9sus	Amin7	Eb9sus

EXAMPLE 8. *Harmonic progression to “Litha”*

more-directed progressions at mm. 2, 4, and 6. Example 9(b) adds  $V^7$  harmonies (creating  $ii-V$  progressions); 9(c) replaces Corea’s  $ii$  chords with  $V$  chords.<sup>28</sup>

<sup>28</sup> Example 9(c) offers some similarities with Coltrane’s “Central Park West,” which consists of tonicized major-seventh chords in  $ic_3$  and  $ic_6$  relations. For a neo-Schenkerian analysis of “Central Park West,” see Martin (2012–13, 204–208).

There are interpretations of the progression other than the series of local tonal progressions suggested in Example 9(a), and this offers a comparison with the ascending fifth cycle heard in “Windows” discussed above. A dual interval cycle ( $ic_{3/4}$ ) that begins with B models the four arrival stages of “Windows.” As shown in Example 10(a), that cycle represents an ascending fifth cycle as a series of overlapping triads at every other element. Furthermore, the cycle models conventional jazz harmonic extensions. Example 10(b) includes extensions through chordal seventh; additional extensions of ninth, eleventh, and thirteenth may be constructed by extending the harmony further in that space.

The opening seven measures of “Litha” move through the  $ic_{3/4}$  dual interval space every third element. Example 11 indicates that progression as seventh chords, but—again—conventional jazz extensions can easily be constructed by extending the harmony further in that space.<sup>29</sup> In “Litha,” the  $ic_3$  motions become even more direct in the Subsection B (the end of the first subsection

<sup>29</sup> The same progression may be placed on a *Tonnetz* as is clear from Strunk’s Example 12. Since upper extensions of the harmony are optional in jazz practice, the dual interval cycle is to me more intuitive. Harmonic extensions of seventh, ninth, eleventh, and thirteenth do not require a change of shape and appear merely as extensions in the linear space. In contrast, triads—sevenths—nines become triangles—rectangles—trapezoids on a *Tonnetz*. But the similar northeast pathway would obtain with either the ascending fifth progression of “Windows” or the mm. 1–7 progression of “Litha.”



(a)	m. 1	2	3	4	5	6	7
	Dmaj7	C#min7	Bmaj7	Bbmin7	Abmaj7	Gmin7	Fmaj7
	I = bIImaj7	i = iimin7	I = bIImaj7	i = iimin7	I = bIImaj7	i = iimin7	

EXAMPLE 9(A). *Corea's progression to "Litha," (mm. 1–7)*

(b)	Dmaj7	C#min7-F#7 (ii-V)	Bmaj7	Bbmin7-Eb7 (ii-V)	Abmaj7	Gmin7-C7 (ii-V)	Fmaj7
-----	-------	----------------------	-------	----------------------	--------	--------------------	-------

EXAMPLE 9(B). *More-directed progression (ii-V progression at mm. 2, 4, 6)*

(c)	Dmaj7	F#7 (V)	Bmaj7	Eb7 (V)	Abmaj7	C7 (V)	Fmaj7
-----	-------	------------	-------	------------	--------	-----------	-------

EXAMPLE 9(C). *More-directed progression (V chord replaces ii chord at mm. 2, 4, and 6)*

(a)	<u>B minor</u>		<u>C# minor</u>	
	B	D	F#	A
	F# minor		G# minor	
	C#	E	G#	B
	D#	F#	A#	

EXAMPLE 10(A). *Cyclic stages of "Windows" (Bmin-F#min-C#min-G#min) on dual interval cycle*

(b)	<u>Bmin7</u>		<u>C#min7</u>	
	B	D	F#	A
	F#min7		G#min7	
	C#	E	G#	B
	D#	F#	A#	

EXAMPLE 10(B). *Cyclic stages of "Windows" realized as seventh chords (Bmin7-F#min7-C#min7-G#min7)*

overlaps the beginning of the second at m. 7) as Fmaj7 proceeds to Dmaj7, then Ebmaj7 descends to Cmaj7. Strunk's Schenkerian analyses, Examples 6(a) and 6(b), and his layered analysis, Example 7, would seem to argue for a longer first subsection, one ending with the return to Dmaj7 at m. 11. A small detail, perhaps, but it is one that highlights an important aspect of the design within "Litha." There is a decided wrinkle that arises by the conflict between the m. 11 return of the opening harmony and sequential design. Strunk's analyses privilege the former. For him, the m. 11 return of Dmaj7 necessarily constitutes a prolongation of that harmony. That return closes the ic<sub>3</sub> circle begun at m. 1; the endpoint of the sequence at m. 7 (the Fmaj7 chord) is an embellishing chord.

I would question that interpretation for several reasons. Not only does the harmonic (and melodic) sequence cease at m. 7 (rather than at m. 11), but the Dmaj7 at mm. 11–14 plays a particular role within Subsection B, in which instance its sequential context undermines tonal return. Subsection B consists of two

sequential eight-measure phrases at mm. 7–14 and 15–22,<sup>30</sup> thus the D-major harmony is nested within the broader design. The return to D major *in medias res* here might be compared to the reappearance of a global tonic harmony within its prolonged dominant—in that instance, it is heard locally as a IV harmony within the dominant expansion rather than as tonic return. With "Litha," the return to D major, and the return of E<sub>5</sub> in the melody, also shown as prolonged in Strunk's Example 6(a) and (b), may better be heard as an association than as prolongation.<sup>31</sup>

I do, however, think Strunk's layered reading of Subsections C and D (his Example 7, mm. 23–62) explains these passages well. I suggested earlier that "Windows" contained a turnaround in its final four measures that propelled the harmony back to B major/minor. Strunk's layered analysis suggests a similar process in "Litha," but the turnaround has now expanded to occupy mm. 23–62, thirty-eight measures of the sixty-two-measure composition.<sup>32</sup> His analysis describes elaborated (or transformed) tonicizations of E minor and A minor on the way to the D-major harmony at the top of the form. E minor arises through the only unambiguous dominant harmony in the composition, B7#9.<sup>33</sup> It is preceded by Cmin7/F in mm.

<sup>30</sup> The T<sub>2</sub> harmonic sequence is exact between mm. 7–14 and 15–22 (Fmaj7-Dmaj7 then Ebmaj7-Cmaj7). A melodic sequence obtains between mm. 7–12 and 15–20, but not between mm. 13–14 and 21–22.

<sup>31</sup> For further discussion regarding prolongation and association, see [Straus \(1987, 6–8\)](#).

<sup>32</sup> This expands the more conventional and restricted view of turnarounds discussed in note 1.

<sup>33</sup> One of the most compelling details in Strunk's voice-leading graphs—undiscussed in his commentary—involves the composing out of the upper structure of the B7/#9 harmony in the melody from m. 19 to m. 27. Examples 6a and 6b show a beamed connection between D<sub>5</sub> and C#<sub>4</sub> (through D<sub>5</sub>-B<sub>4</sub>-G<sub>4</sub>-Eb<sub>4</sub>-C#<sub>4</sub>). Thus the melodic structure over these measures, during the change of harmony, arpeggiates the ultimate B7/#9 harmony. (No doubt Strunk indicated C#<sub>4</sub> to more accurately reflect the raised ninth

Dmaj7			Bmaj7			A♭maj7			Fmaj7												
D	F♯	A	C♯	E	G♯	B	D♯	F♯	A♯/B♭	D♭	F	A♭	C	E♭	G	B♭	D	F	A	C	E
C♯min7						B♭min7						Gmin7									

EXAMPLE 1.1. “Litha,” descending m3 organization on dual interval cycle, mm. 1–7 (Dmaj7–C♯min7–Bmaj7–B♭min7–A♭maj7–Gmin7–Fmaj7)

23–26, a chord more commonly indicated as F9sus, indicating a chord with suspended fourth above the bass.

This sus chord type appears twice more during the final subsection: as Fmin7/B♭ at mm. 39–46 (leading to A minor) and as B♭min7/E♭ at mm. 55–62 (leading to D major). For all three instances Strunk introduces a new operation and label to account for its tonal function. It substitutes for a more conventional dominant but relates to it through two levels of transformation. The first is that of tritone substitution, so that the roots of the three chords (F, B♭, and E♭) move down by half-step to their destinations (E, A, and D) rather than down by fifth. The second step transforms dominant chords into sus chords, so that the third of the chord is replaced by the less goal-directed fourth above the bass. Strunk uses the label II7/V' to address these two transformations. (With Cmin7/F, for example, V' accounts for the tritone substitution in the bass—F substitutes for B—while the II7 considers the upper structure Cmin7 harmony as a ii chord in relation to F as substitute V.) I would propose instead the label V'sus as a simpler and clearer designation. Regardless, Strunk's interpretation shows how these harmonies provide a postbop transformation of more conventional dominant harmonies.

Since these dominant substitute harmonies impel motion from E minor to A minor and the return to D major at the top of the form, the resultant expanded turnaround occupies more than half the composition, encompassing Subsections C and D. This calls into question the relationship between cyclic transpositional designs, heard during Subsections A and B, and the more conventional tonal designs just described in Subsections C and D. However, there seems to be a deliberately hybrid approach that unfolds in “Litha.” The cyclic processes of Subsections A and B, as I have characterized them, need not return to the originating (m. 1) harmony. Subsections C and D—although cyclic in that the overall bass motion progresses E, A, to D—nevertheless operate more conventionally.<sup>34</sup>

I suspect that Strunk would have felt uncomfortable describing “Litha” as hybrid. In fact, in his extended analysis, he brings together examples of compositions with linear intervallic patterns that operate both within conventionally tonal contexts (i.e., they link framing harmonies that function in evidently tonal ways) and ones that operate independently of framing tonal contexts. Those examples (his Examples 8a–d) and a consideration of Cohn's discussion of the coexistence of diatonic

above the bass B. In musical notation, jazz composers often notate the raised ninth as flatted tenth.)

<sup>34</sup> For the use of interval cycles in both tonal and non-tonal contexts, see Headlam (1996, 15–17).

vs. hexatonic principles lead Strunk to this conclusion: “By bringing together Examples 8 and 9, I intend to suggest that there is a continuum between the simple diatonic nonfunctional linear intervallic patterns and the tonally ambiguous twelve-tone chromatic progressions involving the transposition operation and other operations to be discussed: they all have the role of connecting tonally functional moments, and they all operate under their own nonfunctional logic.”

Strunk's comment places the ambiguous chromatic elements in service of the functionally tonal ones, all in support of a global tonic. His use of the word “connecting” may be replaced by stronger verbs such as “embellishing,” “elaborating,” or “prolonging.” The description embeds the chromatic elements into an underlying tonal structure. His position here, then, is one that is unequivocally hierarchical: a pyramid that ranks constituent elements as subordinate to the highest element.<sup>35</sup>

But I would argue that the implications of Cohn's work (and others' such as Proctor, Satyendra, and McCreless) lead not to hierarchy, but to heterarchy.<sup>36</sup> Tonal and transformational approaches (or other distinctions such as diatonic/chromatic tonality, architectural/transformational, dual syntax) provide dual and distinct organizational methods, ones that interact fluidly with varying degrees of autonomy and cooperation.<sup>37</sup> In particular, Strunk's Example 8c (a descending sequence of Maj7 chords moving down by whole step) does not connect tonally functional moments. The descending M3 sequence in his Example 8d

<sup>35</sup> Compare McCreless on the compositions of Haydn, Mozart, Beethoven, and Chopin, who “did everything in their power to clarify and justify their chromatic adventures. Not only did they bring all their gestural and rhetorical resources into play to dramatize chromatic events and give the listener time to absorb them, but they also appropriated line and motive in the service of rendering chromaticism—however daring—coherent and comprehensible” (1996, 99).

<sup>36</sup> W. S. McCulloch coined the term “heterarchy” in 1945 to describe particular neural brain functions. It has since been coopted by domains as diverse as computer programming, artificial intelligence, sociology, anthropology, archaeology, political theory, corporate management, and—more recently—media studies (particularly the role of social media in response to dominant political hierarchies). According to some theorists, heterarchy does not stand apart from hierarchy, but heterarchy is the general case that includes hierarchy as a special case. For a general overview of heterarchy, see Crumley (2005).

<sup>37</sup> Writing about Liszt, Satyendra typically assigns primary/secondary status to diatonic or chromatic elements based upon context: “It is the tension between the contextually-based logic produced through a regular series of transformations and the system-based logic produced through tonal habits of hearing that creates the ambiguities that are characteristic of nineteenth-century tonality. The transformational and architectural systems evoke different expectations, sometimes in agreement, sometimes disagreement” (1992, 43).

more clearly links two instances of CMaj7, but does so through whole-step motion in the bass and hexatonic motion (Ab–G–E–D#–C–B) in the melody. Like Examples 8a and 8b, 8c and d are sequential, linear, and create linear intervallic patterns. Yet Examples 8c and 8d, which “operate under their own nonfunctional logic,” erode (rather than uphold) evident tonal hierarchies.<sup>38</sup>

Degrees of autonomy and cooperation differ from one context to another. In my analysis of “Windows,” locally functional harmonic progressions establish the four cyclic stages. In the case of “Litha,” the chromatic cyclic elements of Subsections A and B give way to the more conventionally tonal progressions of Subsections C and D. Here, perhaps, the term “progressive” is more apt than “hybrid,” since it recognizes the composition as a series of stages. Not only is there a shift in the cyclic-to-tonal orientation but also of meter/tempo/feel (between mm. 1–30 and 31–62). In addition, the composition progresses by changes in harmonic rhythm (one-measure harmonic rhythm mm. 1–7, four-measure mm. 7–30, eight-measure mm. 31–62) to the extent that the eight-measure harmonies of mm. 31–62 correspond to the slow-moving harmony of 1960s compositions typically described by the term “modal” jazz. These progressive stages (cyclic/tonal, meter/tempo/feel, and harmonic rhythm) again show the potential attraction of single-section compositions for postbop composers, since those stages occupy a scale broader than that available with song forms.

For “Windows” and “Litha,” the common strategy involves opening with cyclic procedures before an intervening turnaround links to the m. 1 harmony. To compare with song form compositions of tonal jazz, Corea’s single-section compositions omit the regular and tonally regulating eight-measure cadences of those song forms. My interest is not in dismissing Strunk’s acknowledgement of the opening harmony as tonic but rather to call into question whether that tonic arises unequivocally through tonal forces (Strunk’s position, made clear through Schenkerian graphs and layered analysis). But neither does it arise rhetorically in an absence of those tonal forces (i.e., the chord is tonic solely because it appears at the onset of the form) since turnaround progressions effect tonal motion back to the opening harmony.

My intention is not to litigate the primacy of tonal vs. rhetorical tonics, but this question is an important methodological one that reappears regularly for postbop jazz. It also remains a methodological question for many chromatic practices of nineteenth-century tonality, which also offer a continuum of

relations between dual syntaxes and suggest a heterarchical, rather than strictly hierarchical, view of musical organization.<sup>39</sup>

## PART II. SCHEMATA AND HARMONIC GRAMMARS: “SONG OF THE WIND” AND “INNER SPACE”

### “SONG OF THE WIND”

If tonal and transformational approaches differ in their analytical methods and explanatory aims, there is nevertheless something intuitively attractive about Strunk’s idea of a continuum within his Examples 8a–d. All are sequential, linear, and create linear intervallic patterns; they differ in that his Examples 8c and d form chromatic, rather than diatonic or tonal, sequences. A continuum implies a difference of degree, not of kind. But it also raises a conundrum: how many differences in degree must obtain before resulting in a difference of kind? A stick of wood painted to shade gradually from black to grey may differ evidently when comparing end to end, but at proximate locations color distinctions may not be so evident.

One way of smoothing out methodological differences between tonal and transformational approaches is through schemata, which afford an evolutionary perspective that need not ally stringently with either approach.<sup>40</sup> This perspective may align more comfortably with habits of some jazz composers, at least those concerned more with flexible interactions of musical materials than with strict categorical distinctions. Thus an  $ic_4$  schema that appears once in the bridge to Jerome Kern’s “Smoke Gets in Your Eyes” (a modulation to  $bVI$ ) appears compounded within the bridge to Richard Rodgers’s “Have You Met Miss Jones” (tonicizing  $Bb$ ,  $Gb$ , and  $D$ ), then dominates John Coltrane’s “Giant Steps,” which is given over entirely to symmetries of  $ic_4$  cycles (through fleeting tonicizations of  $B$ ,  $G$ , and  $Eb$ ). Schemata provide a modular compositional perspective, one that also can track how certain patterns mutate or transform across different compositions.

In this section I regard two additional Chick Corea compositions, “Song of the Wind” and “Inner Space.” Strunk did not address them in his essay. I consider how they rely on particular schemata. Both use an  $ic_4$  schema, and my intent is to show how a strictly sequential design is transformed in the harmonic dimension by allowing for particular substitution strategies, creating a second-order harmonic grammar. Further, I show how “Inner Space” is comprised entirely of four schemata, most of which also rely on substitution strategies.

<sup>38</sup> McClellan (1996, 102) argues that divergent modes of listening may affect priority of diatonic vs. chromatic on different levels. In discussing an equal division chromatic sequence in Schubert’s Fourth Symphony, he raises the possibility of both a diatonically based deep middleground, or “we could adopt a different vantage point: we could say that with such sequences we approach a situation in which the controlling perceptual space through which the music—or at least some of it—moves is the chromatic space of twelve diatonic keys, not the diatonic space of a single governing key.” Alternatives to hierarchies in some tonal contexts appear in Cohn and Dempster (1992) and Fink (1999).

<sup>39</sup> Rings (2011, 35–40) distinguishes between the analytical goals of tonal (Schenkerian) and transformational models.

<sup>40</sup> Meyer (1973, 27) describes schemata as “mental representations of patterns as governed by the grammar conventions of a specific style”; for Gjerdingen (2007, 11), a schema is an abstracted prototype or well-learned exemplar; and for Byros (2012, 280), a “mentally abstracted prototype of a statistical regularity in a particular musical style which forms the basis for apprehending future phenomena.” I use the term “schemata” in this article to refer to patterns in either the harmonic or melodic dimension (or both), including particular transpositional patterns. I also use the term more broadly when referring to a turnaround schema.

(a)

EXAMPLE 12(A). *Lead sheet to “Song of the Wind” By Chick Corea Copyright © 1970 LITHA MUSIC CO. Copyright Renewed. This arrangement Copyright © 2014 LITHA MUSIC CO. All Rights Administered by UNIVERSAL MUSIC CORP. All Rights Reserved. Used by Permission. Reprinted by Permission of Hal Leonard Corporation.*

(b)

EXAMPLE 12(B). *ic<sub>4</sub> melodic pathways in “Song of the Wind,” mm. 25–36*

In the wake of Coltrane’s 1959 composition “Giant Steps,” the  $ic_4$  pathway became a powerful schema for postbop composers, both with and without tonicizing intermediaries. In an earlier article I examined the legacy of “Giant Steps” and  $ic_4$  sequences in four later compositions by Wayne Shorter, Bill Evans, and Herbie Hancock.<sup>41</sup> In Hancock’s “Dolphin Dance,” the schema appears overtly (and elaborated) in the first seventeen measures of the melody, while constrained by particular substitution strategies and transformed by the harmonic progression.

A similar process occurs in the final twelve measures of Corea’s “Song of the Wind.”<sup>42</sup> Example 12(a) contains a lead

sheet; Example 12(b) includes its melody and harmony at mm. 25–36.<sup>43</sup> The  $ic_4$  schema begins at m. 25 operates as a melodic sequence that begins with B then G. Subsequently downbeat pitches that correspond to a change in harmony initially move through the  $ic_4$  cycle of G, Eb, B, and G. We may hear the melody in terms of nested cycles, with foreground  $ic_5$  cycles moving

sheet (Eu 217729, 17 November 1970) and is extremely indebted to Dobbins’s meticulous transcription. Duke (1996) discusses Corea’s 1971 version; Lynch (2012, 34–35) discusses mm. 29–36.

41 Waters (2010); for a tonal and neo-Schenkerian view of “Giant Steps,” see Martin (2012–13).

42 Corea recorded “Song of the Wind” three times, on *Sundance* (1969), *Joe Farrell Quartet* (1970), and *Piano Improvisations vol. 1* (1971). Corea (1990) contains a transcription of the third performance. My lead sheet draws from the three performances, Corea’s copyright deposit of the lead

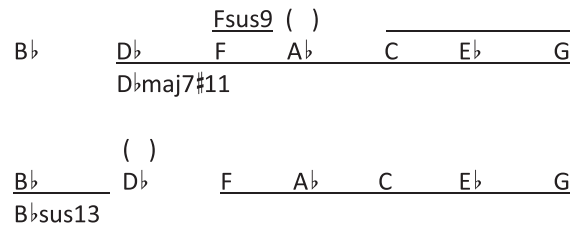
43 A comparison of the overall melodic structure of “Song of the Wind” with that of Corea’s earlier “Windows” (see Example 7) reveals some deep correspondences, despite the more advanced harmonic language of “Song of the Wind.” Like “Windows,” “Song of the Wind” involves three elaborated stepwise descents (at mm. 1–4, 9–16, and 25–36, the latter with octave displacement at m. 29), mediated by a transitional passage (mm. 5–8) and a pivot around a fixed pitch (mm. 17–24) obtained from the previous descent.

through the larger  $ic_4$  cycle on downbeats. The original cycle ceases at  $G_4$  as the melodic and harmonic rhythm decelerates.

The move to E and C for the final round of melodic sequences introduces an issue for the cyclic design, and we might hear this as initiating a different  $ic_4$  cycle. Yet another mode of hearing is through an incipient hexatonic design, which expands a single  $ic_4$  design into two. Such hexatonic designs, either through transpositional cycles or as individual harmonies, became absorbed into Corea's vocabulary toward the end of the decade (when he first recorded "Song of the Wind"). As Example 12(b) shows, the aggregate of downbeat pitches (the G-augmented triad then E and C) creates a 5-21 [01458] pentachord, consisting of five out of six pitches from the hexatonic collection. This hexatonic subset also appears vertically as the 5-21[01458] harmony heard as  $E_{min}\sharp 7/G\sharp$  heard at mm. 26–27, and we may hear the 5-21[01458] melodic design as a projected set of that 5-21[01458] harmony.<sup>44</sup>

Corea's harmonic progression in mm. 29–34 does not match the transpositional scheme of the melody, however. Rather than using a rote harmonization of equivalent harmonies moving parallel to the melody, Corea uses three different chord types: sus9 (chords 1 and 5),  $Maj7\sharp 11$  (chords 2 and 4), and sus13 (chord 3). Example 13 shows how the inclusion relations occur between these three chord types. (The example uses two  $ic_{3/4}$  cycles for visual convenience.) The  $Fsus9$  appears as gapped on the interval cycle, but its members are all included within the second chord,  $D\flat maj7\sharp 11$ . The third harmony,  $B\flat sus13$ , extends the cyclic space downward, while maintaining inclusion relations with both  $Fsus9$  and  $D\flat maj7\sharp 11$ .

Following Strunk (1979), we can define these three harmonies as forming a substitution set. Since Strunk configured his substitution sets for the grammar of tonal jazz, he identified their members by scale degree. The harmonic substitutions indicated in Example 13, like Strunk's, rely on evident common-tone and inclusion relations. Unlike Strunk's, the members need not support a global tonic or key within their postbop environment. Example 14 demonstrates this by providing three hypothetical harmonizations, using representatives of each member of the substitution set. Each hypothetical harmonization moves in parallel motion to the melody. The three lines create an array through which Corea's harmonization systematically moves, as shown by the harmonies in bold. By avoiding a mechanical harmonization, Corea's progression accesses multiple chord types, ones in a substitution relation with any of the other parallel harmonizations. If the parallel harmonization ( $ic_4$ -related progression) heard in mm. 8–15 of Coltrane's "Giant Steps" (or formed by any individual hypothetical line in Example 14) provides a first-order grammatical sequence for  $ic_4$  melodic cycles, the substitution set then



EXAMPLE 13. *Dual interval cycle and inclusion between sus9, maj7#11, sus13*

provides a second-order grammar, which Corea's composition activates in a determined succession.

Corea's harmonization, shown in the bottom row, places the  $Amaj7\sharp 11$  in second inversion. This reveals a potential contrapuntal motivation for his overall progression, since the bass is limited to parsimonious  $ic_1$  or  $ic_2$  adjacencies. The bass motion ( $F-E-D-D\flat-D-E$ ) creates a stepwise octatonic subset in counterpoint with the  $ic_4$  melodic motion. The final harmony ( $Abmaj7\sharp 5/E$ ) departs from the array of hypothetical possibilities. That harmony may be understood as a variant of an E-dominant harmony (with extensions of  $\sharp 9$  and  $b13$ ). Its strength as a dominant is diluted since the chordal seventh (D) is not part of the chord, and this highlights a postbop strategy (also seen in "Litha") of transforming dominant-type harmonies in order to suppress evident tonal cues.

That dominant-type harmony of  $Abmaj7\sharp 5/E$  (the last harmony of the form), along with the preceding  $D_{min}9$ , provides a turnaround that may be heard as a conventional  $iv-V$  turnaround in A. Yet rather than adhering to those tonal implications by linking to an A-major or -minor harmony at the top of the form, the form begins instead with  $F\sharp$  minor. One way to interpret this harmonic move is as a deceptive cadence, with the stepwise bass of  $D-E-F\sharp$  heard as  $iv-V-vi$ . Another interpretation, perhaps more pertinent for Corea, is through a relative substitution technique:  $F\sharp$  minor substitutes for an implied A major and forms the rhetorical (i.e., m. 1) tonic.<sup>45</sup>

In "Song of the Wind" the  $ic_4$  schema is vestigial, taking place in the melody. The schema is expanded: a complete  $ic_4$  cycle then moves to another incomplete cycle, inviting a hexatonic interpretation. But if the transpositional cycles in the melody are overt, the harmonic progressions transform  $ic_4$ -based cycles by passing through members of their substitution set. The schema is thus heard as familiar in the melodic dimension, but defamiliarized in the harmonic dimension. From the standpoint of musical texture, this viewpoint inverts the bottom-up approaches of Strunk's layered analyses (which are indifferent to melody) and suggests a second-order harmonic grammar dependent upon and derived from the melodic cycles.

<sup>44</sup> Wilson (1992, 23) describes a projected set as "the emphasized simultaneous statement of a particular pc set, followed or preceded by the emphasized separated statement of each of its members in turn." For Wilson, projected sets do not require pitch or pitch-class recurrence (but merely vertical or horizontal statements of the same abstract pc set).

<sup>45</sup> Since both D minor and the E-dominant harmony imply A minor rather than A major, the pathway may also be described through two Neo-Riemannian transformations, P (implied A minor to A major) and R (A major to  $F\sharp$  minor).

Melody	G	E $\flat$	B	G	E	C
Hypothetical 1 (sus9)	<b>Fsus9</b>	D $\flat$ sus9	Asus9	Fsus9	<b>Dsus9</b>	
Hypothetical 2 (Maj7#11)	D $\flat$ maj7#11	<b>Amaj7#11</b>	Fmaj7#11	<b>D<math>\flat</math>maj7#11</b>	B $\flat$ maj7#11	
Hypothetical 3 (sus13)	B $\flat$ sus13	G $\flat$ sus13	<b>Dsus13</b>	B $\flat$ sus13	Gsus13	
Corea's	Fsus9	Amaj#11/E	Dsus13	D $\flat$ maj7#11	Dsus9	A $\flat$ maj7#5/E

EXAMPLE 14. *Hypothetical and Corea's harmonization for mm. 29–36 of "Song of the Wind"*

"INNER SPACE"

The last composition to be examined is "Inner Space," which combines four distinct schemata. It is a thirty-measure single-section composition with an eight-measure introduction. As shown by Example 15(a) (a lead sheet to "Inner Space"), it consists of an introduction (I) and four subsections, indicated as A, B, C, and D. The introduction reappears in abbreviated fashion in Subsection C (mm. 15–18). In both the introduction and Subsection C, the melody carries the  $ic_4$  schema while the harmonic progression transforms it.<sup>46</sup>

The eight-measure introduction elaborates the cyclic design in the melody. Appearing every two measures are the melodic pitches D $\sharp$ –B–G–D $\sharp$ , indicated as 1, 2, 3, and 4 in Example 15(a) (During the introduction's final two measures, the harmonic and melodic progression both move to an  $ic_1$  cycle). The same cyclic stages reappear in abbreviated fashion in Subsection C (mm. 15–18). There the melodic elaborations of the  $ic_4$  cycle are pentatonic subsets 4–22[0247] and 4–23[0257]. Example 15(b) isolates the  $ic_4$  pathway taken by the melody (including its continuation along an  $ic_1$  cycle).

The harmonic progression does not take that same systematic pathway. It uses the same type of harmony (Maj7#11), but the melodic pitches alternately form two different intervals with the bass, #11 (chords 1 and 3) and M7 (chords 2 and 4). As above, we may understand these two harmonies as a substitution set, here created by  $ic_5$ -related maj7#11 harmonies. The substitution in this case—the " $ic_5$  swap"—is constrained by the relationship to melody, preserving either #11 or M7 with the bass. Example 16 shows this relationship on an  $ic_{3/4}$  dual interval cycle. The relationship is overlapping but not directly adjacent.<sup>47</sup> Corea's specific melodic constraint (D $\sharp$ ) appears in bold. The example indicates chord 1 (Amaj7#11) and its substitute (Emaj7#11), as well as chord 4 (Emaj7#11) and its substitute (Amaj7#11).

As with "Song of the Wind," we can understand the progression as using a second-order grammar in lieu of a systematic harmonization moving in parallel motion to the  $ic_4$  melody. Example 17 provides two hypothetical progressions, using

representatives of each member of the substitution set, with each moving in parallel motion to the melody. Corea's progression toggles back and forth between the two lines, as shown by the harmonies in bold. Relative to Corea's progression, the first hypothetical progression swaps out the first and third chord, and the second swaps out the second and fourth.

The progression avoids the mechanical harmonization provided by either hypothetical version. Corea's resultant bass motion (A–C–D $\flat$ –E) instead creates incomplete motion along an  $ic_{3/1}$  dual-interval cycle, which yields the hexatonic collection when completed in that voice. (Completion of that collection in "Inner Space" would require three more bass moves, F–A $\flat$ –A, and therefore would require a second melodic statement of the melodic  $ic_4$  cycle.) Corea's progression, shown in Example 17, maintains consistent contrary motion between melody and bass.<sup>48</sup>

Three additional schemata complete "Inner Space," each with the melody and accompaniment creating a 5 + 5 + 6 quarter-note metric grouping in conflict with the  $\frac{4}{4}$  meter. Subsection A (mm. 1–8) is systematic in the melodic, rather than harmonic, dimension. Subsection A relies on a collectional schema, harmonized (as the  $ic_4$  schema) in a one-to-one fashion, appearing in the piano voice throughout, and in the horns (mm. 7–8). Measures 1–4 adumbrate the (F $\sharp$  major or D $\sharp$  minor) pentatonic collection<sup>49</sup> as 3–7[025]. (The piano part is consistently voiced in parallel fifths, thus the B-major/G $\sharp$ -minor pentatonic collection appears beneath the F $\sharp$ -major/D $\sharp$ -minor collection.) The varied repetition beginning at m. 5 completes the collection with the change of harmony moving into m. 9.

In one sense, Subsection A's harmonic design works independently of the melodic design.<sup>50</sup> Yet, as with the  $ic_4$  schemas described above, Corea's harmonies involve a substitution set. Here the set augments the  $ic_5$  swap of the Introduction and Subsection C (discussed above) by including a minor-ninth harmony. Example 18 shows a representative set as overlapping

48 This is one of two such contrary motion harmonic possibilities with the melodic design of D $\sharp$ –B–G–D $\sharp$  and this substitution set. The other begins with  $ic_1$  of the  $ic_{1/3}$  cycle in the bass: Emaj7/#11–Fmaj7/#11–A $\flat$ maj7/#11–Amaj7/#11.

49 For more on major and minor pentatonic, see Benward and White (1993, 16–17).

50 The  $ic_4$  schema, as it appears in mm. 8–15 of Coltrane's "Giant Steps," moves systematically in both the melodic and harmonic domains. Pentatonic melodies harmonized in parallel fashion are heard in rock music, discussed by Biamonte (2010, 16–17), but less so in jazz practice. For Coltrane's use of pentatonic collections in improvisation, see Porter (1998, 151–52, 233–37).

46 Lynch (2012, 33–34) discusses mm. 1–8.

47 In jazz practice, M7 substitutions whose roots are a fifth apart are more easily considered when the "lower harmony" is specifically maj7/#11, and the upper harmony is merely M7. Thus Fmaj7/#11 includes Cmaj7: such inclusion relations frequently provide pedagogical shortcuts. Other " $ic_5$  swap" relations occur via Neo-Riemannian function theory: for example, A minor and E minor are both viable functional substitutes for a hypothetical C-major tonic.

(a)  
(8-bar Introduction)

1. Amaj7#11 2. Cmaj7#11

3. D♭maj7#11 4. Emaj7#11 E♭maj7#11 Dmaj7#11

Subsection A  
(Piano)

1 C#min9 Dmaj7#11 C#min9 Cmaj7#11 Amaj7#11

(Horns, piano repeats mm. 1–3) (Piano and Horns)

5 C#min9 Dmaj7#11 C#min9 Cmaj7#11 Amaj7#11 E♭

Subsection B  
(Horns)

9 Emaj7#11 G♭<sup>6</sup> Emaj7#11 E♭ E<sup>6</sup> E♭<sup>6</sup> (No chord)

Subsection C

15 1. Amaj7#11 2. Cmaj7#11 3. D♭maj7#11 4. Emaj7#11 E♭maj7#11 Dmaj7#11

Subsection D  
(Piano)

19 E triad/F E♭min7

(Horns)

27 Dmaj7#11

EXAMPLE 15(A). *Inner Space* By Chick Corea Copyright © 1973 UNIVERSAL MUSIC CORP. Copyright Renewed. This arrangement Copyright © 2014 UNIVERSAL MUSIC CORP. All Rights Reserved. Used by Permission. Reprinted by permission of Hal Leonard Corporation.

adjacencies on the  $ic_{3/4}$  cycle. The result is a substitution set of leading-tone (Amaj7#11–C#min9), relative (C#min9–Emaj7), and  $ic_5$  swap (Amaj7#11–Emaj7) relations. The example also includes Corea's melodic constraint (shown as D# in bold) that restricts the melodic interval above the bass to #11, ninth, or M7.

As above, the set allows a second-order progression that substitutes for a first-order parallel harmonic design. Example 19 indicates the melodic pitch, the three hypothetical harmonizations, and Corea's harmonization for mm. 1–4 and 5–8.

Again, the three hypothetical harmonizations may be read as an array through which Corea's progression proceeds, as shown

(b) 1. 2. 3. 4.

Amaj7#11 Cmaj7#11 Dbmaj7#11 Emaj7#11 (Ebmaj7#11) (Dmaj7#11)

EXAMPLE 15(B). *ic4 melodic pathway in “Inner Space” (introduction and mm.15–18)*

Amaj7#11

A C# E G# B D# F# A#

Emaj7# 11

EXAMPLE 16. *Dual interval cycle and inclusion between maj7#11*

by the harmonies in bold. At mm. 1–4 and 5–8, the progression begins centrally (melody is ninth, D#), moves upward (melody is seventh, C#), returns to the central position, and moves downward (melody is #11<sup>th</sup>, F#). The technique for harmonizing the fifth pitch between mm. 1–4 and 5–8 varies, with parallel harmonic motion matching the melodic F#–D# (Cmaj7#11–Amaj7#11, m. 4) and a return to the upper position for G# (Cmaj7#11–Amaj7, m. 8). The example reveals that the result in all cases, with the exception of the parallel harmonic motion linking F# to D# (m. 4), is contrary motion between voices, maintaining the shortest potential distance in the bass voice.<sup>51</sup>

Subsection B (mm. 9–14) begins with the completion of the pentatonic collection, and Corea’s harmonization of the melodic Bb breaks out of the substitution set heard during the previous subsection. The schema of this subsection is harmonic, supporting bass motion that departs from and returns to Eb through E and Gb. I will refer to this schema as Phrygian, with the term describing ascending semitone, tone root motion and its return that follows the opening harmony (rather than strict adherence to the pitches of the Phrygian mode). This schema is one that Corea developed in a number of subsequent compositions, either with the bass motion consistently housing major-mode harmonies or with the initial harmony minor and the subsequent harmonies major.<sup>52</sup>

Subsection D is the last subsection of the composition. It forms a varied turnaround, similar to those heard in “Windows”

<sup>51</sup> This parallel motion between harmony and melody (Cmaj7/#11 to Amaj7/#11, F#–D#) thwarts the contrary motion procedures elsewhere in the excerpt. Perhaps the intent was to postpone harmonic return (to C#min<sup>9</sup>) until the beginning of the next four-measure phrase.

<sup>52</sup> “La Fiesta,” for example, uses all major-mode harmonies for the three-chord vamp and makes overt the Flamenco origins of this Phrygian schema. In contrast, “What Was” uses a minor-mode harmony for the initial chord. “Inner Space” is closer to “La Fiesta” since all three harmonies are major mode. However, “Inner Space” the piano right hand maintains a P5 pedal point of Eb/Bb for all three chords, forming root/fifth with the Eb harmony, M7/#11 with the E harmony, and sixth/third with the Gb harmony. This makes less evident any overt ties to clichés of Flamenco guitar.

and “Litha.” In “Inner Space,” the turnaround occupies twelve measures (mm. 19–30) and consists of three harmonies, Emaj/F, Ebmin7, to Dmaj7#11, which then link to C#min9 at the top of the form. Corea’s progression replaces a more conventional turnaround of V7/ii–ii–V7. His central Ebmin7 acts as a ii chord, with the flanking first and third harmonies as substitutes. The first harmony, Emaj/F 4-18(0147), is a subset of the octatonic collection, and completes it if stated through a completed T<sub>3</sub> cycle. In 1960s practice, that cycle corresponds to a network of ic<sub>3</sub>-related dominant harmonies. That is, the cycle Emaj/F–Gmaj/Ab–Bbmaj/B–Dbmaj/D completes the OCT<sub>1,2</sub> collection and accesses four potential dominant harmonies (Bb7–Db7–E7–G7), with extensions derived from the parent octatonic collection. Emaj/F thus stands in a substitute relationship with Bb7, with extensions that include b7, b9, and #11. In a characteristic postbop maneuver, however, it omits the chordal third and avoids the descending fifth bass (or descending half-step) motion characteristic of dominant-type harmonies. It therefore leads, in a qualified manner, to Ebmin7, the ii harmony, voiced in open fourths in the piano right hand.

The third chord of the turnaround, Dmaj7#11, operates as a dominant substitute. We may understand two levels of transformations with a more conventional V7 harmony (Ab7). First, the D bass is in a tritone relationship with Ab7. Second, it houses a major-seventh, rather than dominant-seventh, chord. The harmony thus suppresses the active leading tone (C), replacing it with C#.<sup>53</sup>

Corea’s three-chord progression, therefore, alters a more conventional turnaround of V7/ii–ii–V. An alternative technique would place a pedal point V in the bass beneath that three-chord progression. In “Inner Space,” the dominant appears as a pedal point (Ab) during these twelve measures, not in the bass, but in the upper voice of the piano. The technique appears also in the turnaround to “Windows,” and in both compositions the melodic pedal point of  $\hat{5}$  provides a subtle tonal cue during the transformed turnaround.

“Inner Space” progresses by moving through four schemata that activate the introduction and four subsections. The ic<sub>4</sub> (Introduction and Subsection C) and pentatonic schemata (Subsection A) appear melodically, with the harmonic schemata altered by substitution techniques. The Phrygian (Subsection B) and turnaround (Subsection D) schemata are harmonic, with the turnaround schema subject to grammatical substitutions. Those substitutions transform underlying schemata. They help describe progressions beyond terms such as “ambiguous” and call into

<sup>53</sup> In that sense, it resembles Vsus7, which similarly omits the leading tone.



Melody	D#	B	G	D#
Hypothetical 1 (M7 <sup>th</sup> with melody)	Emaj7#11	<b>Cmaj7#11</b>	A♭maj7#11	<b>Emaj7#11</b>
Hypothetical 2 (#11 <sup>th</sup> with melody)	<b>Amaj7#11</b>	Fmaj7#11	<b>D♭maj7#11</b>	Amaj7#11
Corea's	Amaj7#11	Cmaj7#11	D♭maj7#11	Emaj7#11

EXAMPLE 17. *Hypothetical and Corea's harmonization for introduction and mm. 15–18 of "Inner Space"*

<u>Amaj7#11</u>
<u>C#min9</u>
<u>Emaj7</u>
A C# E G# B D# F# A#

EXAMPLE 18. *Dual interval cycle and inclusion between maj7#11, m9, and maj7*

question their view as “non-functional.” The ways in which Corea adopts and transforms these schemata effect one of the most remarkable aspects of his postbop compositions: they maintain a sense of inevitability, but avoid predictability and cliché.

### PART III. STRUNK AND SUBSTITUTION SETS

The substitution principles described above provide the focus of this final section, which considers those principles in light of an early work of Strunk's. In his 1979 article, “The Harmony of Early Bebop: A Layered Approach,” he provided a powerful view of tonal jazz (focused specifically on the repertory of bebop musicians) that fused Schenkerian precepts with practical jazz harmonic training that he learned at the Berklee College of Music and as an active jazz musician.<sup>54</sup> It proposed—for harmony alone—a series of operations that moved, through elaborations, from background tonic to foreground harmonic progressions. One of the article's strongest accomplishments was the idea of substitution sets, which showed particular equivalencies between harmonies. Set membership, as he described it, obtained through inclusion relations that preserved significant underlying voice-leading paths. He provided five distinct substitution sets, all within a tonal jazz context. The five sets and their members appear in Example 20.

Many of these substitutions are familiar ones from common-practice harmony. The first three sets may be brought into line with dominant, subdominant, and tonic functions.<sup>55</sup> These harmonies apply both in major and minor keys. Strunk used uppercase Roman numerals for all harmonies. The #II<sup>o7</sup> harmony is more typically labeled as a common-tone diminished seventh, and brings into its orbit four dominant-seventh chords formed by the chromatic lowering of any one of its

elements.<sup>56</sup> Finally, the IVm set involves “subdominant modal intensification”<sup>57</sup> and so appears only in major keys. These harmonies, along with those provided by linear operations (in the bass: neighbor, incomplete neighbor, passing; in upper voices: passing tone line and  $\frac{6}{4}$  prefix) outline, in remarkably comprehensive fashion, the landscape of harmonies in tonal jazz that work in support of a global tonic (and its interior tonicizations).

Strunk's additions to these harmonies that appear in his Corea article show some ways in which postbop composers adapted the harmonies of tonal jazz. They address harmonies that alter more conventional dominant-type chords and, thus, amend the substitutions available within the V set shown above. I have proposed an alternative name of V'sus (a sus chord built upon bII, the tritone substitution for V) for Strunk's II<sup>7</sup>/V' heard at mm. 23–26, 39–46, and 55–62 of “Litha” (see Strunk's Example 7 in the accompanying essay). It, as well as the “change to parallel triad” operation (mm. 47–54 of “Litha,” referring to the minor v, substituting for a dominant-type V chord), addresses the postbop technique of removing some of the more active chordal members of dominant-type harmonies. Additional dominant-harmony substitutions appeared in turnaround sections, such as the last chord of “Song of the Wind” (Abmaj7#5/E), and the antepenultimate and ultimate harmonies of “Inner Space,” including the octatonic E/F harmony substituting for a Bb7b9#11 (mm. 23–26), and the Dmaj7#11. The latter harmony (V' maj7), along with V'sus, appears as part of a specific V' (tritone substitution) category. They then offer two levels of substitution to V7: (1) tritone substitution, and (2) suspended fourth (in place of third) or major seventh (in place of dominant-seventh chord). Example 21 shows those dominant-type harmonies as substitutions within the V set (all transposed to appear in the example as substitutes for G7). Their use in lieu of traditional dominant-type chords indicate how postbop compositions qualified cadential motions heard in tonal jazz.

Example 21 also provides examples of the additional substitutions offered in the second half of this article. They are likewise similar to Strunk's in that they rely on inclusion relations. Corea establishes a network of two to three potential substitute harmonies that bypass a harmonization that moves in parallel motion to the melodic pathway. Corea's harmonic choices

54 Jazz harmony at Berklee has been codified but transmitted informally until the publication of Mulholland and Hojnacki (2013).

55 See Harrison (1994). McGowan (2005) treats tonal function in a tonal jazz context.

56 With this substitution set, Strunk calls attention to the relation between the symmetrical diminished-seventh harmony and the four nearly even dominant-seventh chords formed by downward displacement of one of the elements of the diminished seventh (1979, 15). For more on this relation, see Cohn (2012, 148–55).

57 This is referred to as “modal interchange” at Berklee: see Mulholland and Hohnacki (2013, 116–31).

Mm. 1-4						
Melody	D#	C#	D#	F#	D#	
Hypothetical 1 (M7 <sup>th</sup> )	Emaj7	<b>Dmaj7</b>	Emaj7	Gmaj7	Emaj7	
Hypothetical 2 (9 <sup>th</sup> )	<b>C#min9</b>	Bmin9	<b>C#min9</b>	Emin9	C#min9	
Hypothetical 3 (#11 <sup>th</sup> )	Amaj7#11	Gmaj7#11	Amaj7#11	<b>Cmaj7#11</b>	<b>Amaj7#11</b>	
Corea's Harmonization	C#m9	Dmaj7	C#min9	Cmaj7#11	Amaj7#11	
Mm. 5-8						
Melody	D#	C#	D#	F#	G#	Bb
Hypothetical 1 (M7 <sup>th</sup> )	Emaj7	<b>Dmaj7</b>	Emaj7	Gmaj7	<b>Amaj7</b>	
Hypothetical 2 (9 <sup>th</sup> )	<b>C#min9</b>	Bmin9	<b>C#min9</b>	Emin9	F#min9	
Hypothetical 3 (#11 <sup>th</sup> )	Amaj7#11	Gmaj7#11	Amaj7#11	<b>Cmaj7#11</b>	Dmaj7#11	
Corea's Harmonization	C#min9	Dmaj7	C#min9	Cmaj7#11	Amaj7#11	Eb

EXAMPLE 19. *Hypothetical and Corea's harmonization for mm. 1–8 of "Inner Space"*

V set: V7, #VII<sup>o</sup>7, #VII<sup>o</sup>7, bII<sup>o</sup>dom7 (also labeled as V'7)  
 IV set: IV, II7  
 I set: I, III7, VI7 (#IV<sup>o</sup>7)  
 #II<sup>o</sup>7 set: #II<sup>o</sup>7, #VII<sup>o</sup>dom7, II<sup>o</sup>dom7, IV<sup>o</sup>dom7, bVI<sup>o</sup>dom7  
 IVm set: IVm, II<sup>o</sup>7, bVII<sup>o</sup>dom7

EXAMPLE 20. *Strunk's substitution sets (1979, 15)*

support parsimonious bass motion ("Song of the Wind") or contrary motion between melody and bass ("Inner Space").

However, these particular substitutions differ from Strunk's because they operate in an environment that does not support an unequivocal global or local tonic. The substitutions may be considered as akin to Neo-Riemannian relations but within an expanded tertian context. The Neo-Riemannian labels of R and L apply to those harmonies that are direct adjacencies on the  $ic_{3/4}$  dual interval cycle. I have used the term "ic<sub>5</sub> swap" to describe the intervallic relation of the two M7 outer harmonies of "Inner Space" (shown as Cmaj7#11 and Fmaj7#11). Finally, the sus9 and sus13 harmonies (shown as Asus9 and Dsus13) involve a gapped harmony on the  $ic_{3/4}$  dual interval cycle (A–E–G–B and D–A–C–E–G–B). Therefore, the relation to its two substitutes are less clear. I will take the liberty of naming the relation of this sus chord to the others as an "St" ("Strunk") relation, with the label "St" followed by the distance along the  $ic_{3/4}$  interval cycle. Thus Dsus13 and Fmaj7#11 are in an St1 relation, as are Fmaj7#11 and Asus9.<sup>58</sup> The three substitution sets for Corea's "Song of the Wind" and "Inner Space" (shown at the bottom of Example 21) are limited, involving either three adjacent bass pitches along the  $ic_{3/4}$  interval cycle

("Song of the Wind," A, F, and D; "Inner Space," mm. 1–8, C, A, and F), or two bass pitches in an  $ic_5$  relation ("Inner Space," Introduction and mm. 15–22, C and F). The latter  $ic_5$  relation omits a central member along the  $ic_{3/4}$  cycle.

The substitution sets here also differ significantly from Strunk's, since they include extensions beyond the seventh. Likely as a result of his Berklee training, Strunk maintained a distinction between sevenths (as essential dissonances) and extensions of ninths, elevenths, and thirteenths (as inessential dissonances).<sup>59</sup> The previous analyses show how Corea's melodic structures rely on those upper extensions, revealing a significant distinction between tonal and postbop compositional practices. They also suggest that harmonic substitutions need not require a strictly tonal context. Further, they provided postbop composers with fertile methods to expand grammatical possibilities.

CODA

In his "Harmony" entry for *The New Grove Dictionary of Jazz*, Strunk addressed the development of jazz harmony during the twentieth century. He suggested a three-stage process in which the principles of tonal jazz remained in force until supplanted in the late 1950s by the newer harmonic procedures of modal jazz and then free jazz. My goal here has been to use Corea's compositions to propose an additional, postbop, stage that elided with the others. Postbop related to tonal jazz (by similarities such as repeating chorus structures and harmonic rhythm) but was nevertheless distinct because it challenged or eroded tonal hierarchies.<sup>60</sup>

58 There are similar R, L, and  $ic_5$  swap relations in Strunk's substitution sets for tonal jazz. The three harmonies within Strunk's I set (I flanked by VI and III) involve all three relations. His IV set (IV and II<sup>7</sup>) use the R relation (when in major). In his later "Harmony" article, Strunk omits the IVm set and includes its contents within the subdominant category. He further augments that subdominant category to include VI<sup>o</sup>maj<sup>7</sup> and bII<sup>o</sup>maj<sup>7</sup>, which allows an  $ic_5$  swap relation.

59 Jazz harmony at Berklee distinguishes between sevenths ("the basis of the harmony") and higher extensions ("tensions," which "may be added freely to chords to increase the amount of harmonic color without the necessity to resolve the dissonance they create"). See Mulholland and Hojnacki (2013, 3 and 20.)

60 Strunk was certainly aware of these ideas but presented them as subsets of tonal jazz. He called attention to a progressive tonality ("a piece exhibits

The image displays two staves of musical notation in bass clef. The top staff is labeled 'V set' and contains three chords: Gm, Bmaj7#5/G, and Db/D. The bottom staff is labeled 'V'' and contains two chords: Db/sus7 and Db/maj7#11. Below these are two more staves of notation. The first of these is labeled 'Song of the Wind' and contains three chords: Asus9, Fmaj7#11, and Dsus13. The second is labeled 'Inner Space' (Intro and mm. 15-22) and contains two chords: Cmaj7#11 and Fmaj7#11. The third is labeled 'Inner Space' (mm. 1-9) and contains three chords: Cmaj7#11, Am9, and Fmaj7#11. Each chord is represented by a vertical line with dots indicating the notes on the staff.

EXAMPLE 2.1. *Substitution sets through Corea's Compositions.*

It is perhaps tempting to draw analogies between a four-stage evolutionary model of jazz harmony (tonal, postbop, modal, and free jazz) and of Western European harmony, which authors from Proctor to Cohn have roughly depicted as moving in four overlapping evolutionary stages between the late eighteenth and early twentieth centuries.<sup>61</sup> Yet despite the inviting similarities, there are significant differences. For jazz the most durable exemplars of the latter three stages emerged more or less simultaneously. The touchstone for cyclic postbop structures was John Coltrane's "Giant Steps," recorded in 1959, the same year as Miles Davis's *Kind of Blue*, celebrated for providing the most potent early representatives of modal jazz. Ornette Coleman's *Free Jazz* was recorded the following year, in 1960.<sup>62</sup> Further, as the decade progressed, artists, such

two or more apparently structurally equal keys, often beginning on one and ending on another. . ."). In this case the two tonics, it would seem, are rhetorical tonics by virtue of being first or last chord. He also described an "extended tonality" ("Structural chords may remain in a single key, but the chords that connect the structural points often follow another, usually contrapuntal logic"): in this case chord progressions that do not provide overt tonal clues support those that do. Additionally, Strunk characterized the development of tonal jazz as processive: "The development of jazz harmony from early styles through the 1950s may, thus, be characterized as a general movement from simple to complex chord progressions and from a relaxed to a rapid rate of harmonic change" (Strunk 1988, 492 and 494).

61 Proctor and Cohn linked similarly the first and second Viennese schools by means of the nineteenth-century chromaticists and the Impressionists. Proctor (1978, x) expressed interest in demonstrating how "the seeds of the atonality of the Second Viennese School are contained in the tonal system of the First Viennese School," by discovering "the development of a lineage linking Schubert, Berlioz, Chopin, Wagner, Liszt, Bruckner, Wolf, Grieg, and Tchaikovsky to the Impressionist and Modern composers." Cohn (2012, 206–08) proposed a four-stage evolutionary model that covers the same ground by progressing through vocabulary: (1) triad, (2) Tristan genus, (3) scale (i.e., of the "scalar tonality" of French Impressionists and Russian composers of the late nineteenth and early twentieth centuries), and (4) pc set (of the Second Viennese School atonalists).

62 Moreover, in a four-stage view of jazz harmony papers over an array of ongoing diverse jazz practices and influences, such as blues, gospel, soul, non-Western influences, etc., Broze and Shanahan study the development

as Chick Corea, developed fluency in tonal, postbop, modal, and free jazz. Despite general and facile similarities between the four-stage model for Western European and jazz harmony, there remains much to be assessed about the diachronic and vertical progress of the former and the synchronic and lateral progress of the latter.

Strunk's contributions to the analysis of jazz harmony are profound. As his article on Corea makes evident, he rigorously developed and adapted throughout his career a range of methodologies, using them to address repertoires that remain analytically recalcitrant. If, as he stated, "the study of the expansion of tonality in jazz is one of the unfinished tasks facing jazz theorists," he remains one of the central figures in that endeavor.

#### WORKS CITED

- Benward, Bruce, and Gary White. 1993. *Music in Theory and Practice*. Vol. 1., 3rd ed. Madison: Brown and Benchmark.
- Biamonte, Nicole. 2010. "Triadic, Modal, and Pentatonic Patterns in Rock Music." *Music Theory Spectrum* 32 (2): 95–110.
- Brown, Matthew. 1993. "Tonality and Form in Debussy's *Prélude à 'L'Après-midi d'un faune'*." *Music Theory Spectrum* 15 (2): 126–43.
- Brown, Stephen C. 2003. "Dual Interval Space in Twentieth-Century Music." *Music Theory Spectrum* 25 (1): 35–58.
- Broze, Yuri, and Daniel Shanahan. 2013. "Diachronic Changes in Jazz Harmony: A Cognitive Approach." *Music Perception* 31 (1): 32–45.

of harmony in jazz compositions from 1920 to 1970. Their corpus data suggests that 1956 (not 1959) was the watershed year for the "decline in traditionally 'tonal' chord use." Relevant for Corea's postbop compositions is their observation that "the chords that traditionally represent the 'Dominant' functional category in traditional harmony (dominant seventh and diminished) both exhibit declines in usage over the studied timespan" (Broze and Shanahan 2013, 41, 36).

- Byros, Vasili. 2012. "Meyer's Anvil: Revisiting the Schema Concept." *Music Analysis* 31 (3): 273–346.
- Childs, Adrian. 1998. "Moving Beyond Neo-Riemannian Triads: Exploring a Transformational Model for Seventh Chords." *Journal of Music Theory* 42 (2): 181–94.
- Cinnamon, Howard. 1986. "Tonic Arpeggiation and Successive Equal Third Relations as Elements of Tonal Evolution in the Music of Franz Liszt." *Music Theory Spectrum* 8: 1–24.
- Cohn, Richard. 2012. *Audacious Euphony: Chromaticism and the Triad's Second Nature*. New York: Oxford University Press.
- Cohn, Richard, and Douglas Dempster. 1992. "Hierarchical Unity, Plural Unities: Toward a Reconciliation." In *Disciplining Music: Musicology and Its Canons*. Ed. Katherine Bergeron and Philip V. Bohlman. 156–81. Chicago: University of Chicago Press.
- Cope, David. 2003. "Computer Analysis of Musical Allusions." *Computer Music Journal* 27 (1): 11–28.
- Corea, Chick. 1988. *Now He Sings, Now He Sobs*. Transcribed by Bill Dobbins. Rottenburg: Advance Music.
- . 1990. *Chick Corea Piano Improvisations*. Transcribed by Bill Dobbins. Rottenburg: Advance Music.
- . 1994. *Chick Corea Collection*. Milwaukee: Hal Leonard.
- Crumley, Carole. 2005. "Remember How to Organize: Hierarchy Across Disciplines." In *Nonlinear Models for Archaeology and Anthropology*. 35–50. Aldershot: Ashgate Publishing.
- Duke, Daniel. 1996. "The Piano Improvisations of Chick Corea: An Analytical Study." DMA Thesis, Louisiana State University.
- Fink, Fobert. 1999. "Going Flat: Post-Hierarchical Music Theory and the Musical Surface." In *Rethinking Music*. Ed. Cook Nicholas and Mark Everist. 102–37. Oxford: Oxford University Press.
- Gjerdingen, Robert. 2007. *Music in the Galant Style*. New York: Oxford University Press.
- Gollin, Edward. 2007. "Multi-Aggregate Cycles and Multi-Aggregate Serial Techniques in the Music of Béla Bartók." *Music Theory Spectrum* 29 (2): 143–76.
- Harrison, Daniel. 1994. *Harmonic Function in Chromatic Music: A Renewed Dualist Theory and an Account of Its Precedents*. Chicago: University of Chicago Press.
- Headlam, David. 1996. *The Music of Alban Berg*. New Haven: Yale University Press.
- Jan, Steven. 2007. *The Memetics of Music: A Neo-Darwinian View of Musical Structure and Culture*. Aldershot: Ashgate Publishing.
- Julien, Patricia A. 2003. "The Structural Function of Harmonic Relations in Wayne Shorter's Early Compositions: 1959–1963." PhD diss., University of Maryland.
- Kernfeld, Barry. 1981. "Adderley, Coltrane, and Davis at the Twilight of Bebop: The Search for Melodic Coherence." PhD diss., Cornell University.
- Kinderman, William and Harald Krebs eds. 1996. *The Second Practice of Nineteenth-Century Tonality*. Lincoln: University of Nebraska Press.
- Kopp, David. 2002. *Chromatic Transformations in Nineteenth-Century Music*. Cambridge: Cambridge University Press.
- Krebs, Harald. 1981. "Alternatives to Monotony in Early Nineteenth-Century Music." *Journal of Music Theory* 25 (1): 1–16.
- . 1985. "The Background Level in Some Tonally Deviating Works of Franz Schubert." In *Theory Only* 8 (8): 5–18.
- Levine, Mark. 1995. *The Jazz Theory Book*. Petaluma, CA: Sher Music Co.
- Lewin, David. 2002. "Thoughts on Klumpenhouwer Networks and Perle-Lansky Cycles." *Music Theory Spectrum* 24 (2): 196–230.
- . 2005. "Some Theoretical Thoughts about Aspects of Harmony in Mahler's Symphonies." In *Music and the Aesthetics of Modernism*. Ed. Berger Karol and Anthony Newcomb. Cambridge, MA: Harvard University Press.
- Lynch, Jordan Michael. 2012. "Where Have I Known This Before: An Exploration of Harmony and Voice Leading in the Compositions of Chick Corea." Master's Thesis, Bowling Green State University.
- Martin, Henry. 1988. "Jazz Harmony: A Syntactic Background." *Annual Review of Jazz Studies* 4: 9–30.
- . 2011. "Schenker and the Tonal Jazz Repertory." *Tijdschrift voor Muziektheorie* 16 (1): 1–20.
- . 2012–13. "Expanding Jazz Tonality: The Compositions of John Coltrane." *Theory and Practice* 37–38: 185–219.
- Martins, José António. 2003. "Bartók's Polymodal Chromaticism and the Dasian System." Paper given at SMT-Madison Wisconsin.
- McCreless, Patrick. 1996. "An Evolutionary Perspective on Nineteenth-Century Semitonal Relations." In *The Second Practice of Nineteenth-Century Tonality*. Ed. Kinderman William and Harald Krebs. 87–113. Lincoln: University of Nebraska Press.
- McGowan, James. 2005. "Dynamic Consonance in Selected Piano Performances of Tonal Jazz." PhD diss., University of Rochester.
- Meyer, Leonard. 1973. *Explaining Music: Essays and Explorations*. Chicago and London: University of Chicago Press.
- Morgan, Robert. 1999. "Are There Two Tonal Practices in Nineteenth-Century Music?" Review of *The Second Practice of Nineteenth-Century Tonality*, ed. by Kinderman William and Harald Krebs. *Journal of Music Theory* 43 (1): 135–63.
- Mulholland, Joe, and Tom Hojnacki. 2013. *The Berklee Book of Jazz Harmony*. Boston, MA: Berklee Press.
- Porter, Lewis. 1998. *John Coltrane: His Life and Music*. Ann Arbor: University of Michigan Press.
- Proctor, Gregory. 1978. "Technical Bases of Nineteenth-Century Chromatic Tonality: A Study in Chromaticism." PhD diss., Princeton University.

- Rings, Steven. 2011. *Tonality and Transformation*. New York: Oxford University Press.
- Satyendra, Ramon. 1992. "Chromatic Tonality and Semitonal Relationships in Liszt's Late Style." PhD diss., University of Chicago.
- Straus, Joseph. 1987. "The Problem of Prolongation in Post-Tonal Music." *Journal of Music Theory* 31: 1–21.
- . 1990. *Remaking the Past: Musical Modernism and the Influence of the Tonal Tradition*. Cambridge, MA: Harvard University Press.
- Strunk, Steven. 1979. "The Harmony of Early Bop: A Layered Approach." *Journal of Jazz Studies* 6: 4–53.
- . 1985. "Bebop Melodic Lines: Tonal Characteristics." *Annual Review of Jazz Studies* 3: 97–120.
- . 1988. "Harmony." *The New Grove Dictionary of Jazz*. London: Macmillan: 485–96.
- . 1996. "Linear Intervallic Patterns in Jazz Repertory." *Annual Review of Jazz Studies* 8: 63–115.
- . 1999. "Chick Corea's 1984 Performance of 'Night and Day'." *Journal of Music Theory* 43 (2): 257–81.
- . 2000. "Analytical Approaches to Chick Corea's Compositions of the 1960s." Paper given at European Music Analysis Conference (Oxford, England) and West Coast Conference of Music Theory and Analysis (Eugene, Oregon).
- . 2003. "Wayne Shorter's 'Yes and No': An Analysis." *Tijdschrift voor Muziektheorie* 8: 40–56.
- . 2005. "Notes on Harmony in Wayne Shorter's Compositions, 1964–67." *Journal of Music Theory* 49 (2): 301–32.
- Waters, Keith. 2005. "Modes, Scales, Functional Harmony, and Nonfunctional Harmony in the Compositions of Herbie Hancock." *Journal of Music Theory* 49 (2): 333–57.
- . 2010. "'Giant Steps' and the ic4 Legacy." *Intégral* 24: 135–62.
- . 2011. *The Studio Recordings of the Miles Davis Quintet, 1965–68*. New York: Oxford University Press.
- Waters, Keith, and J. Kent Williams. 2010. "Modeling Diatonic, Acoustic, Hexatonic, and Octatonic Harmonies and Progressions in Two- and Three-Dimensional Pitch Spaces; or Jazz Harmony after 1960." *Music Theory Online* 16 (3).
- Wilson, Paul. 1992. *The Music of Béla Bartók*. New Haven: Yale University Press.