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PERCEPTUAL AND CONCEPTUAL STRUCTURES IN THEA MUSGRAVE'S *GREEN*

by

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PERCEPTUAL AND CONCEPTUAL STRUCTURES IN THEA MUSGRAVE'S *GREEN*
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University of Nebraska, 2022

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Green, a string ensemble piece by Thea Musgrave, traces the interaction between two contrasting musical ideas. The opening of the piece presents the first idea: a lyrical section, titled the “Arioso,” that highlights the importance of the pitch class E within the idea. This Arioso is interrupted by the second discordant idea, which initially presents as a low F tremolo—one half-step away from E, creating dissonance. Throughout the first half of the work, these ideas interact. The discordant idea begins to develop melodically, while the Arioso theme progressively is modified and later disappears entirely. The second half of the work further explores the melodies developed from the more discordant ideas, completely omitting the Arioso theme.

In addition to this interplay between ideas there is a framework based upon the use of octatonic collections and modified octatonic collections. Using octatonic scales to create structure is also seen in another string ensemble work by Musgrave, *Largo in Homage to B.A.C.H.*, where each section is based on an octatonic scale. In *Green*, the use of the octatonic scale OCT02 with the addition of the pitch-class E and the octatonic scale OCT01 with the addition of the pitch-class F become important collections throughout the piece. These collections inform the structural framework of the piece. The use of these collections interact with the section boundaries within the first half of the piece, often creating collection-based elisions between sections where the textural contrast between the sections does not create a perceived elision. These collections also inform the way that Musgrave uses stratification within the piece. Commonly stratification is a predominantly textural—and therefore easily perceived—

technique. While there are instances of textural stratification, Musgrave also creates collection-based stratification with the use of multiple collections simultaneously. This collection-based stratification is a more conceptual application of the technique.

The use of octatonic and octatonic-adjacent collections informs the narrative arc, giving further insights into the underlying structure of the piece. The perceived interplay between the two “opposing forces” is reflected within a full analysis of the form and the use of stratification in the work.

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CHAPTER 1

INTRODUCTION

Thea Musgrave (b. 1928) is a Scottish composer who currently resides in New York. She began her studies at the University of Edinburgh before continuing her studies at the Conservatoire in Paris under Nadia Boulanger. Throughout her career of over 65 years, she has composed more than 150 pieces including operas, large scale choral works, orchestral works, concertos, chamber works for many instrument combinations, and electronic works. Most existing research on her works focuses on her concertos, choral works, operas, and works for solo wind instruments.¹ Very little exists on her string ensemble works, and there is virtually no research on her works composed in the twenty-first century.

Green was composed by Thea Musgrave in 2008 for the Scottish Ensemble, a twelve-piece string ensemble consisting of seven violins, two violas, two cellos, and a bass. It was adapted by Martyn Brabbins in 2014 for a thirty-piece string ensemble. In the program notes for this piece, Musgrave states that this “work is about conflict – expressed here by the clash of opposing musical forces.”² The opening theme, referred to as the “arioso,” is one of these forces and is centered around E. The second force is the introduction of the pitch-class F, a half-step away from E. Musgrave states that the dissonance between these two notes provides the driving conflict for this piece. In the program note, she refers to the arioso as being based in the “harmonic field of E.”³

¹ A selection of research includes “Theme and Drama in Thea Musgrave’s Early Music” by Koo Mijung, “A Study of the Choral Works by Thea Musgrave and a Conductor’s Analysis of the *Five Ages of Man* and *Rorate Coeli*” by Gail Louise Hendricks Mottola, “An Examination of the Song Cycles of Thea Musgrave” by Dana Roppolo Rice, “Thea Musgrave’s Clarinet Concerto” by Anthony Payne, “The Dramatic Aspects of Thea Musgrave’s Narcissus for Solo Flute and Digital Delay (1987) by Diane Boyd, and “Thea Musgrave’s Opera *Mary, Queen of Scots*” by Deborah Freedman.

² Thea Musgrave, “Programme Note,” in *Green*, (London: Novello, 2008), i.

³ Musgrave, i.

In interviews, Musgrave has spoken of learning composer Donald Francis Tovey's concept of "long-term harmonic planning" through his letters and writings preserved by his assistant, Mary Grierson after his death.⁴ This concept has shaped her compositions, as she explains that she creates plans for her compositions by looking at the larger form of a piece to determine how she "range[s] that journey, how long each part of the journey is, [and] what events happen on that journey."⁵ This discussion of long-range planning and construction of a "journey" through a piece suggests a deeper structural component to her compositions. Additionally, Musgrave's own program note for another string orchestra piece—*Largo in Homage to B.A.C.H.*—mentions that the piece is "rigorously organized" and is almost entirely built upon octatonic scales.⁶ In the *Largo*, the choice of octatonic scale used in each section is determined by the specific pitch-classes within the "BACH" motif. Thus, the choice of scale is directly tied to the larger structure of the piece that Musgrave is creating. This composer's note gives some further insight into some of the ways in which Musgrave may engage in this "long-term harmonic planning." This study will show how *Green's* harmonic structure is "rigorously organized" within a predominantly octatonic framework.

The octatonic scale is a collection of eight pitch classes separated by alternating half- and whole-steps. There are three different octatonic scales, denoted in this work as OCT01, OCT02, and OCT12. In this labelling system zero indicates the pitch class C, "one" indicates the pitch class a half-step above C, and "two" indicates the pitch-class two half-steps above C. Thus, OCT01 refers to the octatonic scale that contains the pitch classes C and C#/D♭, OCT02 refers

⁴ Thea Musgrave, "Thea Musgrave: Where The Practicality Comes In," interview by Frank J. Oteri, *NewMusicBox* (December 1, 2017), <https://newmusicusa.org/nmbx/thea-musgrave-where-the-practicality-comes-in/>, accessed September 28, 2022.

⁵ Thea Musgrave, "Discovery and Drama: Thea Musgrave at 90," interview by Danny Riley, *BachTrack*, (April 12, 2018), <https://bachtrack.com/interview-thea-musgrave-stockholm-april-2018>, accessed November 11, 2022.

⁶ Thea Musgrave, "Composer's Note," in *Largo in Homage to B.A.C.H.*, (London: Novello, 2013), i.

to the octatonic scale that contains the pitch classes C and D, and OCT12 refers to the octatonic scale that contains the pitch classes C \sharp /D \flat and D, as shown in Figure 1-1. Any two octatonic scales together will encompass all twelve chromatic pitch classes within the octave and will share four common pitch classes. Multiple types of chords can be created out of various pitch classes within an octatonic scale. Some, like half- and fully-diminished seventh chords and dominant seventh chords, can allude to more conventional harmonic gestures within a piece. The presence of these conventional chords means that it is easy for an incredibly organized harmonic structure to elude a listener. However, underneath the perceptible conflict between the E-focused Arioso and the intruding F, *Green* exists within a rigorously structured framework of octatonic scales in both the vertical and horizontal planes.

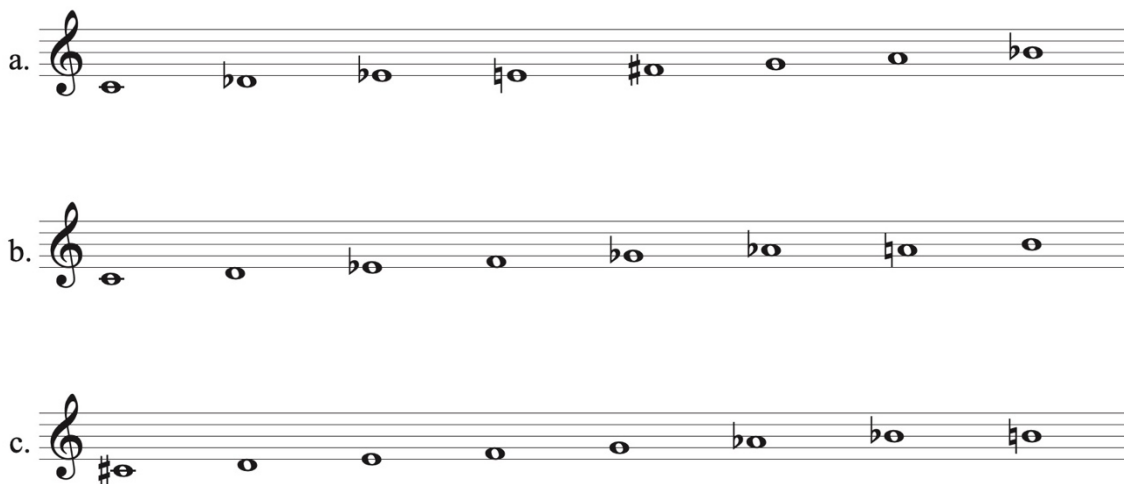


Figure 1-1. The three octatonic scales: OCT01 (a), OCT02 (b), and OCT12 (c).

Figure 2-2. OCT02 with the addition of E and G (solid noteheads). Solid circles indicate notes found frequently in the Arioso theme, while dashed circles indicate notes found occasionally in the Arioso theme. Figure 1-3. The three octatonic scales: OCT01 (a), OCT02 (b), and OCT12 (c).

In the next two chapters, I will provide an analysis of *Green*, primarily tracing the way that octatonic collections are used throughout the work. The fourth chapter will move away from the octatonic content of the piece to focus on a formal analysis. The sectional boundaries of this piece

are created through textural contrasts, and do not necessarily correspond to shifts between different octatonic collections. The final chapter will both highlight instances where the formal analysis does correspond with shifts between octatonic collections and explore the use of stratification within the work. Stratification is the use of simultaneous contrasting textures, registers, or rhythms to create distinct layers within a work. This term was coined by Edward T. Cone in his analysis of works by Stravinsky, who frequently layered contrasting textures and rhythms within his compositions.⁷ The use of stratification in this piece occurs both through the simultaneous use of multiple octatonic collections as well as through the layering of contrasting textural or registral components within a section. This study explores the interplay of form and stratification—both structural aspects of the work—with the octatonic collections that are used throughout the piece.

⁷ Edward T. Cone, “Stravinsky: The Progress of a Method,” *Perspectives of New Music*, 1, no. 1 (Autumn, 1962): 19. <https://doi.org/10.2307/832176>

CHAPTER 2

OCTATONIC ANALYSIS OF THE FIRST ZONE

Formally, *Green* can be broken into two overarching zones: the first—Z1—in mm. 1-179 and the second—Z2—in mm. 180-329. These zones are seamlessly connected but have vastly different forms, which will be explored in more detail in the fourth chapter. Zone 1 can be broken into nine sections and Z2 can be broken into five sections. Zone 1 begins with a melodic section that Musgrave refers to as the “Arioso.” The first theme of the Arioso reappears throughout Z1 in sections that are juxtaposed with sections that introduce the pitch class F as a dissonant “intruding force.” The Arioso does not appear within Z2. Instead, Z2 further develops the material derived from the non-Arioso sections of Z1 to maintain a sense of continuity through the piece while changing the role of the non-Arioso sections from an “intruding force” to the primary material in the second half of the work.

The Arioso

Green opens with a polyphonic melody that centers E as the most saliently emphasized pitch class. Other pitch content within the melody is heard in relief to E. This pitch center is established immediately within the first measure of the piece: E6 and E5 are sustained in the first violin and cello, before being joined by D5, G#4, and E4 from the second violin, viola, and bass. When the second violin begin the melody, E is still sustained in the cello, bass, and solo violin.

At first glance, a pervasive presence of octatonic scales is not immediately obvious in the opening of the piece. While the first two measures—a sustained E5, joined by E6, D5, E4, and G#4 by the end of m. 2—do adhere to notes found in the octatonic scale OCT12, the first melodic figure, found in the second violin in mm. 3-6, is not strictly octatonic. Figure 2 displays

the collection of notes predominantly used in this section: C, D, E, F, G \sharp , A, and B. Excluding E, these notes all belong to OCT02. This collection is used again in the first violin's similar line in mm. 6-11, albeit with the addition of an E \flat in m. 9 which serves as a brief neighbor tone to D6. The first iteration of the theme unfolds in the first eleven measures, ending with a cadence on E. The theme is not canonic, however it upholds many characteristics of a canonic work such that it aurally evokes the sense of a true canon. Musgrave primarily achieves this effect through overlapping two melodic lines with similar contours in the first and second violins.

Excluding E \flat momentarily, the collection of notes in this melodic opening can be labeled in a few different ways: E Phrygian with a raised $\hat{3}$, the “white-key collection” with a substitution of G \sharp in place of G \natural , or OCT02 with the addition of E. Because OCT02 with the addition of E will also account for E \flat and reflects the collection of notes found in mm. 1-2, this description is the most apt for the analysis that follows (Figure 2-1). In addition to its importance within the opening of *Green*, this collection reappears frequently throughout the piece. It is often presented in contrast to another parallel collection: OCT01 with the addition of the pitch class F. These two collections, which will be labeled as 02+E and 01+F respectively, both have crucial structural roles throughout the composition. These roles differ significantly: 02+E oftentimes appears when the pitch class E is the pitch center of a section. In these sections, the pitch class E is not a perceptual outlier despite conceptually serving as an outlier to OCT02. In contrast, 01+F appears throughout the work in instances where F is both the perceptual and conceptual outlier, oftentimes only featured within a dissonant low tremolo F in the bass line against a more consonant presentation of pitch classes belonging solely to OCT01 in higher registers. Occasionally, the 02+E and 01+F collections add a second outlier to the collection a minor third

above the primary outlier—G and A \flat respectively. Despite moving further away from the original octatonic scales used, the fact that these additional outliers are rarely present and both maintain the same relationship to the primary outlier can serve to uphold the primarily octatonic model.

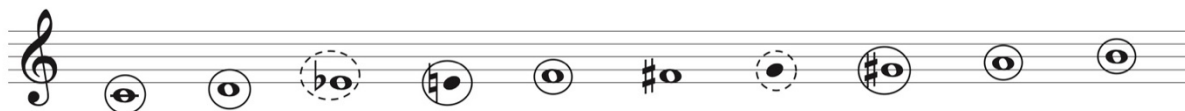


Figure 2-1. OCT02 with the addition of E and G (solid noteheads). Solid circles indicate notes found frequently in the *Arioso* theme, while dashed circles indicate notes found occasionally in the *Arioso* theme.

The addition of a pitch to the octatonic collection is not an intuitive labeling of a collection of notes: an octatonic scale with an outlier is not a common concept, and perceptually E is not the outlier in the opening passage—to the contrary, it is the definitive pitch center. However, considering E as an outlier in OCT02 can center this pitch class through contrast. When one considers that E and F are predominantly found as outliers in conjunction with their presence in the program note the use of the collections 02+E and 01+F instead of OCT12, which contains both notes, appears intentional.

In m. 12, the sustained opening notes appear again, to present a new, varied iteration of the passage. This theme again employs the quasi-canonic relationship between the first and second violins, with the second violin beginning their theme first, remaining in the 02+E collection until m. 21, where the collection changes. In m. 21, the violins and viola are solidly in OCT01, as they emphasize C, B \flat , and G. The cello outlines a pizzicato arpeggio beginning on E (Figure 2-2). This pitch content could be described in various ways: an E $^{\circ}7$ arpeggio with an added 9, notes belonging to OCT12, or notes that belong to OCT01 with the addition of F. In the following measure, all the notes belong to OCT01+F, with the addition of an A \flat . This is the first time that 01+F appears in the piece. To further establish the collection 01+F, the viola

continues the pizzicato from the cello by outlining C, E, G, B \flat , and D \flat : all notes that belong to OCT01 (Figure 2-3). This pizzicato motif frequently occurs throughout the work and serves to outline which octatonic collection is being used at the time. By changing the collection from 02+E to 01+F, Musgrave marks the beginning of the transition to the second theme of the Arioso.



Figure 2-2: The "Pizzicato Motif" outlining OCT12 in the cello, m. 21.



Figure 2-3: The "Pizzicato Motif" outlining OCT01 in the viola, m. 22.

In mm. 23-24, the first theme of the Arioso elides with the second theme on an E major chord. The first violin continues in 01+F in m. 23 before transitioning to 02+E in an ascending line in m. 24, where it will remain for the first phrase of the B section. In m. 24 the second violin and viola counter the first violin with descending lines in OCT12.

The second theme starts similarly to the opening of the piece with a sustained E in the first violin in m. 25. This sustained E serves to provide connection between both themes of the Arioso while maintaining E as the pitch center. The second theme immediately has more motion underpinning the sustained notes than the first theme, with the viola presenting the pizzicato motif outlining OCT12 which is then mirrored by the cellos in m. 26. The melody continues in 02+E, with E melodically centered. By m. 27, G \sharp is added into the collection. The appearance of the pizzicato motif in the second violin in mm. 30 and 33 solidifies 02+E. The texture in this

section is much richer than that of the primary theme. Instead of presenting distinct quasi-canonic lines the violins, viola, and cello overlap—often within the same register—so that it is challenging to trace exactly which voice is presenting the melody at any given point. The viola and cello frequently hand off fragments to each other, as do the first and second violins. The bass either matches the register of the cello for close harmonies or support instances of the pizzicato motif in the second violin and viola. The melodic lines feature both upper and lower neighbor notes, often a half-step apart. This neighbor note figuration frequently returns throughout the work, often extended into a repeated gesture (Figure 2-4). The almost-constant eighth notes and neighbor motif suddenly drop away in m. 36, where the viola outlines OCT01 in the pizzicato motif beginning on E3, supported by a sustained F# and A# in the violins and joined by the bass five notes in. The viola repeats the pizzicato motif again in m. 38, this time beginning on Eb3, joined by the bass for the last four notes. The second violin is the first to re-enter OCT02 in m. 39, joined by the first violin and viola in the pickups to m. 40, and supported by the cello

The image shows a musical score for four instruments: Violin I, Violin II, Viola, and Cello, covering measures 34, 35, and 36. The key signature has one sharp (F#) and the time signature is 3/8. In measure 34, Violin I and II play eighth notes with neighbor notes. Viola plays a pizzicato motif. Cello plays a sustained bass line. In measure 35, the motifs continue. In measure 36, the motifs drop away, and the instruments play sustained notes.

Figure 2-4. The "Neighbor Motif" in multiple voices, m. 35.

outlining 02+E. The shift away from 02+E in mm. 36-38 begins the final phrase of the Arioso.

Beginning in m. 41 the harmonies become ambiguous. It is possible to identify the bass' line as outlining notes that belong to OCT01, this time in the form of an F#7 chord in mm. 43 and 45 and in the form of a B7 chord in m. 44. The rapidly descending eighth notes in the other voices in m. 42 all more closely adhere to the notes of the E minor scale than to any octatonic scale. The sustained notes in m. 43 also belong to an F#7 chord, and all the voices come to rest on notes outlining a B7 chord at some point in mm. 44-46. This is briefly resolved at an E minor chord in the downbeat of m. 47. This is the only place in the whole work where functional harmony can be traced: in E minor this passage could be labeled V7/V resolving to V7 resolving to i. In all other iterations of this theme, Musgrave employs relationships between octatonic scales and harmonies that can be utilized within a scale. Here, the step away from the octatonic to be supplanted with "functional harmony" happens in the measure before Musgrave takes a significant step away from any semblance of lyricism or functional harmony beginning with the first introduction of F as a dissonant force in m. 48. The step away from 02+E, the collection that dominates the *Arioso* up through m. 35, occurs near a section boundary. The second section, which begins in m. 48, begins in 01+F. By shifting to OCT01 in m. 36, Musgrave creates a conceptual elision: OCT01 appears before the section boundary. This elision is not reflected on the perceptual level. The juxtaposition of functional harmony in mm. 41-47 and the extremely dissonant second section beginning in m. 48 creates a firm section boundary without an elision.

Introduction of the "Intrusive Force" and the Return to the *Arioso*

In the second section (mm. 48-56) the bass and cello introduce a low tremolo F natural, which will provide a dissonant foil to E's prominence. While its salience is unavoidable—for over a measure this F is the only sounding note—the violins entering with Es in multiple octaves in

measure 49 strongly reassert the original center, albeit with this added dissonant undercurrent. When analyzing the entire ensemble, the collection used in mm. 48-52 is 01+F. Musgrave marks this F as an outlier by keeping the violins in OCT01, playing E, D#, F#, A, and G against the sole F in the bass. However, F does not remain an outlier for long as the violins shift to the OCT12 scale—outlined first with a sixteenth-note sextuplet in the first violin—that allows both E and F to coexist within the scale being used. This sixteenth-note motif (Figure 2-5) has similarities to the pizzicato motif, as both provide a clear outline of the collection being used through an ascending pattern. In this instance, Musgrave highlights the half-step relationship between E and F melodically, not harmonically. By using OCT12, both E and F belong to the scale and coexist with less overt dissonance than in previous collections.



Figure 2-5. The "Sixteenth-Note Motif" outlining 02+E in the first violin, m. 54.

OCT12 shares four common tones with OCT02 (D, F, G#, and B). In mm. 57-60, these notes are present alongside E, which is again present in three octaves: E4, E5, and E6. This collection seems to point to OCT12, as these five notes are present in OCT12. Despite this, melodically the entrances at m. 57 mirror the opening, which was determined to be instead 02+E. The addition of C in mm. 59-60 further supports this reading, as C is found in 02+E, but not in OCT12. By emphasizing the common tones between OCT12 and OCT02, Musgrave creates a “common tone transition” between these two collections, bridging the space between the second section and the return of the Arioso theme in the third section.

The return to the sustained notes centered on E in m. 57 lead into the Arioso theme again for the third section of Z1 in mm. 57-67. Like the original Arioso theme, this section uses 02+E. The violins present almost an exact replica of their opening phrase, this time with the

addition of a line of quarter-notes and half-notes in the viola that reinforces the collection used by the violins. This *Arioso* section ends with a cadence point in m. 67, marked by silence in the upper strings while the bass and cello enter with a low tremolo F, similar to the sectional boundary in measures 47 and 48.

Development of the Sixteenth-Note Motif

At m. 68, Musgrave begins the fourth section of Z1 (mm. 68-88) with 02+E, but continues the pedal F in the cello and bass in contrast against the upper voices, which still center E. The solo violin begins with a clear outline of 02+E in sixteenth note sextuplets. The first of these sextuplets end with an eighth-note E5 which is immediately echoed in the second violin, establishing E as the continued pitch center from the previous *Arioso* section. While F does belong in the OCT02 collection, perceptually it continues to function as an outlier. The low tremolo creating dissonances with the higher-register melodies is reminiscent of mm. 48-55, where the collection being used—01+F—meant that F served as both the perceptual and the conceptual outlier.

The next phrase of this section, beginning in m. 72, shifts from focusing on the sixteenth-note motif to a lyrical line reminiscent of the *Arioso* in the violins. The melody in this section remains in 02+E, which further reinforces the similarity with the *Arioso* theme. However, this differs from the *Arioso* through the simultaneous use of two collections: 02+E in the melody is superimposed onto a descending stepwise line in the viola and cello that outlines OCT01 in mm. 77-79. This simultaneous use of two different collections is a brief instance of conceptual stratification. Perceptually, both lines work together to maintain E as the pitch center of this phrase.

The conceptual stratification disappears as the viola returns to 02+E to outline the pizzicato motif in measures 79-80. When the cello and bass return in measure 80 they both enter on F. In m. 80 the violins enter with the sixteenth-note motif using the same notes as the pizzicato motif. This motif gets passed back and forth between the first and second violins in mm. 80-83. The first three iterations of the motif (mm. 81-82) outline 02+E, while the next three (mm. 82-83) outline OCT02. In mm. 82-3 02+E is maintained through an E5 in the viola and an E2 in the cello. While the final iteration of the sixteenth note motif does begin on E5 in m. 83, it ends on a D# in m. 84, which then does not resolve up to E, but instead reaches over to settle on an F# in m. 85.

Measures 85-88 primarily use OCT02 within the violins and viola, though 02+E returns in m. 89. This OCT02 is outlined by the pizzicato motif in the second violin and viola with entrances beginning on C, B, and D obfuscating a clear pitch center. However, E is not completely absent at this point. Musgrave employs stratification again, giving the cello and bass sustained tremolos in 01+F, focused primarily on E and F. The presence of D \flat and B \flat in this passage aid in distinguishing this line from the OCT02 collection used in the upper voices. In m. 89, the upper voices begin a motif reminiscent of the beginning, pointing to the return of 02+E in the melodic motive, which begins in earnest in m. 92.

Significant Changes to the Arioso Theme

The iteration of the Arioso theme in the fifth section (mm. 89-105) broadens out and introduces the pizzicato motif more quickly than the previous repetitions. Again, the overarching collection within this section is 02+E. The low F in the bass remains, fading to nothing at the end of m. 92 as the violins begin their overlapping melodies. In this iteration of the Arioso the viola

joins the second violin in m. 93, playing the same line a third lower through m. 95 before moving to the pizzicato motif outlining OCT02 in m. 96. The cello sustains harmonics that support the violins in 02+E in mm. 92-94. The bass enters with similar harmonics in m. 94, continuing through m. 97. The violins begin a repeat of the primary theme in m. 100, this time an octave lower. This iteration is again punctuated by the pizzicato motif first in the cello outlining OCT02, then in the viola outlining 02+E in mm. 103-104. The bass enters in m. 104 with a low tremolo F reappearing for the first time since m. 92. The violins do not continue with their Arioso melody after m. 105. Instead, the first violin indirectly ascends from G#5 to Eb6 with an iteration of the neighbor motif between C5 and D5 that is fragmented in the next section while the second violins step from B4 to D5 and back down. This is the third section where the Arioso theme appears, and it is the first time that there is a significant change from the original Arioso. This section occurs at the midpoint of Z1 and marks the shift away from the unadulterated Arioso theme into the more obfuscated iterations that will appear in the rest of Z1 before it disappears outright in Z2.

The Neighbor Motif Melody and Stratification

There is perceptual elision between the fifth and sixth sections. The low F tremolo that begins each of the non-Arioso sections occurs in m. 104, underneath the end of the Arioso theme. Unlike in the previous conceptual elision between the first and second sections, the melody of the fifth section remains in 02+E through m. 105 before it shifts to OCT01 in m. 106 for the beginning of the sixth section. The bass shifts from 02+E to OCT12 m. 105, introducing the use of multiple simultaneous octatonic collections which occurs throughout the sixth section. This

collection-based conceptual stratification exists in conjunction with textural—or perceptual—stratification.

The sixth section (mm. 106-131) begins with the violins fragmenting and repeating the neighbor motif in mm. 106-111, expanding the motif beyond a frequent melodic gesture to generate the entire passage (Figure 2-6). This passage is in OCT01—marking a switch from 02+E, the collection used in the previous section—and primarily uses the pairs E \flat -F \flat , B \flat -A, B \flat -C, and D \flat -C. The collection is supported with sustained tremolos on C, E \flat , D \flat , and F \flat first in the cello and later in the viola. In the next two measures, the collection-based stratification disappears as the bass also reflects OCT01 with alternating Cs and D \flat s in mm. 107-108. In m. 110, The bass and lower divisi of the cello split off from the OCT01 and enter 02+E, with the cello playing alternating A and G-sharp in m. 110 and a sustained A in m. 111. The bass plays a sustained F in m. 110, and alternating E and F in m. 111. At this point stratification is both perceptual and conceptual, with the low descending tremolo line providing a textural contrast to the melody in the violins.

The image shows a musical score for Violin I and Violin II, measures 106-111. The key signature has two flats (B-flat and E-flat), and the time signature is 3/4. Violin I starts in measure 106 with a quarter note G4, followed by a quarter rest, then a quarter note F4, and a quarter note E4. In measure 107, it plays a quarter note D4, followed by a quarter note C4, and a quarter note B3. In measure 108, it plays a quarter note A3, followed by a quarter note G3, and a quarter note F3. In measure 109, it plays a quarter note E3, followed by a quarter note D3, and a quarter note C3. In measure 110, it plays a quarter note B2, followed by a quarter note A2, and a quarter note G2. In measure 111, it plays a quarter note F2, followed by a quarter note E2, and a quarter note D2. Violin II is silent in measures 106-108. In measure 109, it plays a quarter note G3, followed by a quarter note F3, and a quarter note E3. In measure 110, it plays a quarter note D3, followed by a quarter note C3, and a quarter note B2. In measure 111, it plays a quarter note A2, followed by a quarter note G2, and a quarter note F2. Dynamics for Violin I are pp (measures 106-107), p (measure 108), pp (measure 109), mf (measure 110), and pp (measure 111). Dynamics for Violin II are pp < p (measures 109-110) and pp (measure 111).

Figure 2-6. The "Neighbor Motif" expanded into a melody. First and second violins, mm. 106-111

In m. 112, the violins move away from the neighbor motif and instead begin a descending melody that uses 01+F and A \flat and progresses in a predominantly stepwise manner. The first violin uses quarter notes and begin on A \flat 5 in m. 112, ending on A3 on the downbeat of m. 117. The second violin uses eighth notes—rhythmically augmenting the first violin's pattern—and

begins on C in m. 113, ending on A \flat 3 in m. 116. The viola section continues their sustained tremolo and accented notes pattern on C, D \flat , E \flat , and F \flat through m. 115, reinforcing OCT01 until m. 116, where they change to A \flat , D, E, and F, which reinforces 02+E. Throughout this passage, the cello and bass boast much more movement than the upper voices' lines which continues both the perceptual and conceptual stratification in the passage. The upper cello predominantly uses OCT01, the lower cello uses 02+E, and the bass mostly uses OCT02. These three lines provide a constant stream of quarter-note triplets handed off between voices, overlapping with quarter-notes and sustained half- and whole-notes in mm. 112-116.

The bass alternates between 02+E and OCT01 in mm. 119-125, while the upper and lower cello lines settle into 02+E and G and 01+F respectively. This line occurs underneath a new melodic passage introduced in the second violin in m. 118. This figure begins with an ascending leap from D \flat 4 to B \flat 4 followed by a smaller leap down to G4. The first violin imitates this entrance an octave higher four beats later, substituting A for B \flat as the highest note. Both these entrances outline OCT01, further emphasizing the conceptual stratification found in the lower strings. This is the first presentation of the three-note "leaping motif" developed into a melodic line, which will frequently appear in the second half of the piece (Figure 2-7). The leaping motif is found woven into the *Arioso* but is not expanded fully into a melody until this point. Textural stratification is preserved throughout this passage, as the cello and bass continue a rapidly moving, predominantly stepwise tremolo line underneath the longer, sweeping leaping motif gestures in the violins.

The image shows a musical score for Violin I and Violin II, measures 122-126. The score is in 2/2 time. Violin I starts with a 'poco accel.' marking. Both violins play a melodic line with dynamic markings of *mf* and *f*. A 'rit.' marking is present above the staff in measure 123. The key signature has one flat (B-flat).

Figure 2-7. The "Leaping Motif" in the first and second violins, mm. 122-126.

While there is not a section boundary until m. 132, a new phrase begins in m. 127. The cello and bass lines continue through both phrases. These lines, paired with a viola solo beginning in m. 126 create an elision between the phrases. Additionally, in m. 126 the entire ensemble converges to use OCT12 in contrast to the conceptual stratification employed in the phrase. This unison does not last long: in m. 127 Musgrave immediately steps away from the previous unison OCT12 moment to splinter the parts into three different collections. The violins center E in a quasi-obligato 02+E passage complementing a viola solo, which also uses 02+E. The first sixteenth note motif in the section uses the common notes between OCT02 and OCT12 which, when paired with the clear OCT02 in the first violin, further enforces OCT02 being used. Beneath this the cello and bass continue to use both conceptual and perceptual stratification through a low tremolo that gives a sense of unease to the melodic upper strings' melodies. The cello line is in divisi, with the lower divisi part using notes of the collection OCT01: namely C, D \flat , E \flat , and E. The upper divisi cello and bass overlay chromatic ascending runs in opposing rhythms: quarter note triplets in the bass against straight quarter notes in the cello. By m. 131 the solo, the violins, and viola section combine in an elision to the seventh section of the piece: another iteration of the Arioso spanning mm. 132-144.

Further Changes to the Arioso

The seventh section (mm. 132-144) is the fourth Arioso section, though it does not begin with the characteristic sustained E that marks the beginning of every other iteration of the Arioso thus far. Instead, a low F tremolo in the bass appears in m. 132. This tremolo further emphasizes the elision created in the upper strings, as this low F tremolo appears at the beginning of each of the non-Arioso sections in Z1. The sustained Es finally appear in m. 139, though they do not lead into a repetition of the Arioso as expected. Instead, violins descend in half- and quarter-notes from E6 and C6, contrasting with an ascending 02+E line in the viola that begins on G#4 and ends on D#5. The cello enters in m. 142 with the pizzicato motif outlining OCT+02, which is echoed by the viola in m. 143. The violins continue the trajectory established by cello and viola in m. 144, where they cut their legato descent off with an abrupt staccato three-note ascent from G#5 to B5 in the first violin and an arpeggio from B4 to F5 in the second violin followed by two beats of rest, suddenly ending this section of the piece. Despite the melodic changes made to the Arioso in this section, the collection used in this section remains 02+E.

The Sixteenth-Note Motif Revisited with Stratification

Despite the abrupt ending of the Arioso melody in the previous section, sections seven and eight (mm. 145-173) are connected through the bass line, which runs continuously in mm. 143-152, bridging the section boundary. This line undergoes a collection shift between m. 145 and m. 146, shifting from 02+E to OCT01 in a shift that is offset from the section boundary by one measure. The primary melodic line in the beginning of this section is a cello solo, which begins in m. 146 with three iterations of the sixteenth-note motif outlining OCT01, first starting on F#, then on Bb, then on G before expanding into two measures of a lyrical ascending melody.

The solo continues in mm. 151-157 in OCT01 with two iterations of the sixteenth-note motif followed by a longer lyrical melody. In m. 159 the cello solo shifts to solely the sixteenth note motif. The repetition of the sixteenth-note motif becomes a duet with a viola solo which begins in m. 157 and alternates between iterations of the sixteenth-note motif and more lyrical passages. The sixteenth-note motifs in both solos dovetail with each other throughout this section, and both solos use OCT01.

In mm. 145-151 the first and second violins, outlining OCT01, have a predominantly descending line that accompanies the cello solo. The first violin moves from E5 to D♭4 through mm. 145-151 while the second violin descends from D5 to B♭3. Additionally, the viola enters with a sustained tremolo and accent pattern also outlining OCT01 using C4, D♭4, E♭4, and F♭4.

There are three distinct lines occurring in mm. 145-151: the cello solo, the descending line in the violins, and the quarter-note triplet line in the bass. These lines are all accompanied by sustained tremolo in the viola. Each of these lines use OCT01. This is one of very few instances where textural stratification is not accompanied by collection-based stratification. While collection-based stratification frequently exists without textural stratification in this piece, the opposite is not typical.

In m. 152, the bass shifts from OCT01 to OCT02 while the first violin continues the descending line outlining 01+F and A♭. At this point, collection-based stratification joins the textural stratification previously established. The second violin picks up the tremolo from the viola an octave higher in m.155, in preparation for the viola solo beginning in m. 157. The viola section shifts from the tremolo to provide emphasis on some of the solo's more lyrical passages throughout the solo.

The introduction of the viola solo does not change the textural layers of the piece, as the viola solo joins the cello solo, the first violin and bass continue their distinct lines, and the second violin continues the tremolo accompaniment. Collection-based stratification continues through this passage until m. 169, where the entire ensemble shifts to 02+E to transition to the final Arioso section.

The final phrase of this section (mm. 169-173) is entirely in 02+E. Both collection-based and textural stratification disappears, with the violins and viola presenting a melody against an accompaniment in the cello. The bass does not play for the rest of the section. The melody is marked by a variation of the sixteenth-note motif, appearing in straight sixteenth-notes instead of in sextuplets. The variation on the sixteenth-note motif is interspersed with a fragment of the opening melody of the Arioso in m. 171. While the standard sustained E that marks the beginning of the Arioso does not appear until m. 174, the allusion to the Arioso in m. 171 in conjunction to the shift to 02+E in m. 169 provides an elision, further blurring the lines between the sections.

The Final Appearance of the Arioso

The brief entrance of the Arioso theme in m. 174 marks a drastically different presentation of the theme than what has appeared previously. While this passage is 02+E, the sustained Es that have previously marked the transition or introduction are now only found simultaneously with the second violin's melody. This melody is imitated in canon four beats later in the cello and bass, followed by the viola four beats after that, and started in the first violin four beats later (Figure 2-8). This is the first appearance of a strict canon in the work, an evolution from the quasi-canonic aspects of the Arioso that are present in the other iterations of the theme. This iteration of the Arioso ends in m. 179, closing Z1. The transition to Z2 is seamless, with an

iteration of the sixteenth-note motif appearing in the final beat of m. 179 to lead into the opening section of Z2. A low F tremolo appears in the bass in m. 178, strengthening the elision between the zones.

The musical score shows a canon in the final Arioso iteration, measures 174-178. The score is for Violin I, Violin II, Viola I, Viola II, Cello I, Cello II, and Contrabass. The key signature is two sharps (F# and C#) and the time signature is 2/2. The score shows a canon where the same sixteenth-note motif is played by different instruments in different measures. Violin I starts in m. 176, Violin II in m. 175, Viola I and II in m. 177, and Cello I, Cello II, and Contrabass in m. 178. Dynamics range from *f* (forte) to *pp* (pianissimo).

Figure 2-8. The canon in the final Arioso iteration, mm. 174-178.

The boundary between Z1 and Z2 is not an instantly recognizable point. While it is clear a section boundary exists between an iteration of the Arioso and new material in m. 180, the designation of separate “zones” is not an intuitive concept. This development only becomes clear as Z2 unfolds and the absence of the Arioso becomes evident throughout the zone, indicating a distinct change from the previous zone.

CHAPTER 3

OCTATONIC ANALYSIS OF ZONE 2

Zone 2 can be divided into five sections. The first three sections further develop material found in the non-Arioso sections of Z1. The fourth section is the climax of the piece and is incredibly densely textured. Musgrave introduces an aleatoric texture in the violins in this section, which serves to evoke a truly frenetic and high-energy climactic point. This energy immediately disappears in the fifth section, which is a slow homophonic denouement. The Arioso, which gradually became less recognizable with each iteration in Z1, is not present at all within Z2.

The Transition Away from The Sixteenth-Note Motif

The first section of Z2 (mm. 180-203) begins with the sixteenth-note motif outlining OCT02 presented by the violins in the final beat of m. 179. This leads into a sustained E decorated by a quarter-note F neighbor tone. This sixteenth-note motif followed by sustained notes spans three measures and is repeated three times after the initial iteration before moving into a variation in mm. 191-193. The presence of sustained Es in conjunction with the OCT02 sixteenth-note motif place the violins in 02+E through m. 193. The presence of the sixteenth-note motif provides continuity with Z1, as this motif was a significant part of the non-Arioso sections in Z1. The first full measure of this section, m. 180, is also indicated by a strong F tremolo in the bass, in a manner consistent with the beginning of every non-Arioso section of Z1.

The viola predominantly provides accompaniment in this section, beginning with sustained tremolos in four pitches belonging to OCT01: C4, D \flat 4, E \flat 4, and F \flat 4—in mm. 180-185. This fairly static line is broken up with long *glissandi* in between the sustained tremolo notes

in mm. 186-191, during which the viola shifts to the collection OCT12. These *glissandi* briefly place the viola line in a position of textural importance beyond accompaniment. The cello section is divided, and the lower division primarily uses half-note sustained tremolo notes, bolstering the accompaniment created in the viola section through m. 188. These voices belong to the same textural layer and similarly use the same octatonic collections: like the viola, the lower cello begins in OCT01 before shifting to OCT12 in m. 186 and remains there through m. 191.

Beneath these lines, the upper cello and bass provide a constantly-moving tremolo pattern in mm. 180-188. These voices present a different pattern of half notes and quarter-note triplets, all tremolo. Combining both voices reveals a constant stream of quarter-note triplets in this passage. Despite working together as a cohesive unit, the upper cello and bass use a different octatonic collection. The upper cello begins in 01+F and A \flat , before shifting to OCT12 in m. 186, where it remains until m. 191. Meanwhile, the bass begins the passage in OCT02, then shifts to a chromatic line in mm. 186-191. This passage is one of the few times in the entire piece that a line does not belong to an octatonic collection.

At this point in this section, the collection-based and textural strata do not correspond. Perceptually, the violins, viola and lower cello, and upper cello and bass belong to three distinct layers. However, the upper cello and bass do not share collections: the cello uses 01+F and A \flat , shifting to OCT12 while the bass begins in OCT02 before shifting to a chromatic line. In m. 192, the violins move away from the sixteenth-note motif. After five measures of sustained notes, they begin a leaping motif melody in mm. 197-190 that is reminiscent of the leaping motif melody found in mm. 118-126, in the middle of the sixth section of Z1. The first violin and second violin lines alternate iterations of the leaping motif so that it is continuously present

throughout these measures. While the first and second violins still belong in the same textural layer, the first violin shifts to OCT12 while the second violin shifts to OCT01 (Figure 3-1). This passage provides a parallel with the interactions between the upper cello and bass in the previous passage (mm. 180-188) where the two voices provided a cohesive moving line of quarter-note triplets while using two different collections.

The image shows a musical score for Violin I and Violin II, measures 197-200. The key signature is two flats (B-flat and E-flat) and the time signature is 3/4. Violin I is in OCT12 and Violin II is in OCT01. The score shows a continuous line of quarter notes with dynamic markings mf and f. The first violin part is in OCT12 and the second violin part is in OCT01. The score is written in treble clef with a 3/4 time signature. The first violin part starts in measure 197 with a quarter note G4, followed by quarter notes A4, B4, and C5. The second violin part starts in measure 197 with a quarter note G3, followed by quarter notes A3, B3, and C4. The first violin part has a dynamic marking of mf in measure 198. The second violin part has a dynamic marking of f in measure 197. The first violin part has a dynamic marking of mf in measure 199. The second violin part has a dynamic marking of f in measure 199. The first violin part has a dynamic marking of mf in measure 200. The second violin part has a dynamic marking of f in measure 200. The first violin part has a dynamic marking of mf in measure 200. The second violin part has a dynamic marking of f in measure 200. The first violin part has a dynamic marking of mf in measure 200. The second violin part has a dynamic marking of f in measure 200.

Figure 3-1. The violin line in mm. 197-200, demonstrating a continuous line using two different octatonic collections.

The separation of textural and collection-based layers is also present in the other instruments in mm. 192-200. The viola section remains divided, and the lower voice remains in OCT01. The upper voice shifts to OCT12. The upper cello joins this textural layer and joins the upper viola line in OCT12. The upper cello, upper cello, and first violin all use OCT12 in this passage. In m. 193 the lower cello and bass begin a melody that expands upon the neighbor motif. These voices are almost entirely in unison, and both use OCT01, joining the second violin in the use of that collection.

The final measures of this section, mm. 201-203, witness the entire ensemble—apart from the lower cello and bass—play long sustained notes. These long notes all use the collection OCT01. The lower cello and bass use 01+F but only use F sparingly, predominantly joining the rest of the ensemble in OCT01 for the end of the section. The lower cello and bass connect the first and second sections with a descending line beginning in m. 200 that leads to a low tremolo F in m. 204 to begin the second section.

Revisiting the Neighbor Note Melody

The second section of Z2 (mm. 204-232) begins with a low tremolo F in the bass, the same way that non-Arioso sections began in Z1. Melodically the section begins by revisiting the expanded neighbor motif passage of mm. 106-111, the beginning of the sixth section of Z1. This passage is revisited in a similar manner to the original iteration: the first and second violins alternate measures of this melody, descending from G6 in m. 204 to E5 in m. 213. A repetition of this passage begins in m. 217, beginning again on G6 but this time extending over fifteen measures to descend to A3 in m. 230. The two iterations of the passage are separated through a long *glissando* in the violins punctuated by a descending quarter-note triplet line in the cello and bass.

This section is predominantly homophonic, which is reflected in the predominant use of OCT01 as well. The first passage in the violins (mm. 204-213) is accompanied with long sustained notes from the rest of the ensemble. With the exception of the bass, the ensemble uses OCT01 throughout the section. In mm. 204-216 the bass uses 01+F in mm. 204-205 and 210-211, with the addition of A♭ in m. 216. The F in the bass line is introduced as a low tremolo, maintaining an additional common thread from the non-Arioso sections in Z1. In the second passage (mm. 217-232), the texture changes slightly to include a line in the lower cello and bass primarily consisting of descending quarter-note triplets. This line does not include F or A♭ and is instead entirely in OCT01. This brings the entire ensemble into OCT01 for the remainder of the section.

In mm. 231-232, the violins and upper cello have longer sustained notes followed by two quarter rests, marking the end of the section with a point of stasis. In a line similar to the transition between the first and second sections, the lower cello and bass continue their

descending quarter-note triplets. This line provides a link to the third section of Z2, as this descending line leads to a low tremolo F in m. 233 (Figure 3-2).

Figure 3-2. The lower cello and bass line providing a link between the second and third sections of Z2, mm. 231-233.

The Viola and Cello Solos

The third section of Z2 (mm. 233-271) continues to develop concepts from Z1. This is not done directly in this section, as it had been in the previous section, but is instead shown through instrumentation. A viola solo and a cello solo are the focus of this section, reflecting the solos in the eighth section of Z1. Unlike in Z1, these solos do not focus on the sixteenth-note motif. Like the previous section, this section is homophonic and does not utilize collection-based stratification.

The viola solo begins in m. 233 with one measure of the neighbor note motif melody that was the focus of the previous section. This solo develops into a more lyrical line, carrying through to m. 257, and is predominantly in OCT01.

The accompaniment found in the previous section is divided into three textural layers in this section: the violins, the viola section and cello, and the bass. The violins are divided into four voices to consistently form sustained tremolo tetrachords belonging to OCT01 punctuated by long *glissandi* between tetrachords. The viola section and cello also remain predominantly in OCT01 with long sustained notes. These notes are not tremolo and are not separated by *glissandi*, which texturally separates this line from the violin line. The bass uses 01+F in this section,

though it can predominantly be reflected as OCT01; F is only present in a few distinct measures: m. 233, m. 236, and m. 249 in a low tremolo.

In m. 240, the viola section and cello increase the rhythmic density of their line, introducing half- and quarter-notes in place of the previously sustained whole notes. This rhythmic density further increases and the sections split in m. 251: the lower cello joins the bass, and the upper cello remains with the viola section. These two lines interact to provide a constant moving line leading up to m. 256, at which point the cello solo begins. While the texture of the section remains largely homophonic, the change in this line does provide slight contrast to the tremolo accompaniment found in the violins.

The cello solo that begins in m. 256 overlaps with the end of the viola solo, which joins the viola section in accompaniment in m. 258. This solo serves as a continuation of the lyrical melody that began in the viola solo. Beneath this solo, the viola section joins the violins in *glissandi* which accent the violins' sustained notes in mm. 257-263 while the cello section and bass continue to develop their line to become a countermelody to the cello solo until the end of the section.

The upper strings begin the transition to the next section in m. 264, shifting to long sustained notes that are not separated by *glissandi*. This line progresses until m. 270, when the second violin and viola play a dotted half-note followed by two half-notes in m. 271. This point of stasis in the upper strings again marks the end of a section, while the cello and bass continues with a descending quarter-note line that will end on a low F tremolo to begin the fourth section.

While this section almost entirely uses OCT01, there are a few measures that do not adhere to this collection. These collection shifts occur simultaneously within the entire ensemble so the ensemble remains in the same collection throughout, creating a sense of collectional unity in addition to the homophonic texture. In mm. 241-242 the ensemble shifts entirely to 02+ E

and G, before returning to OCT01 in m. 243 (Figure 3-3). A similar shift to 02+E and G occurs in m. 246, and again in the final measure of the section.

The image shows a musical score for three violin parts: Violin I (top), Violin I (middle), and Violin II (bottom). The score is in 2/2 time and features a key signature of one flat. It is divided into two sections by a dashed vertical line. The first section, labeled 'OCT01 div.', covers measures 239 to 242. The second section, labeled '02+E and G', covers measures 241 to 243. Dynamics include *p*, *sfz*, *pp*, and *fp*. Glissando markings (*gliss.*) are present in measures 239, 240, and 242. The shift to 02+E and G is indicated by a vertical line and a dashed box.

Figure 3-3. The first and second violins demonstrating the shift from OCT01 to 02+E and G in mm. 239-243.

The Aleatoric Climax

The fourth section of Z2 is the climax of the piece. It begins with a low tremolo F in the bass beneath the second true canon in the work, found two beats apart between the first and second violins. This canon begins in OCT01, with each voice outlining the OCT01 scale ascending an augmented 11th through quarter notes and eighth notes. This is accompanied by tremolo sustained notes in the rest of the ensemble. The viola and cello are divided, and all outline OCT01. The bass alone maintains the low F tremolo. The tremolo places the entire ensemble into the collection 01+F due to one voice: without the presence of the bass, OCT01 is clearly established in these two measures.

The canon continues with the addition of F in mm. 274-275, emphasized as the highest note of the leaping motif in the first violin, before settling on high sustained notes in OCT01 in m. 276. Underneath the sustained notes, the lower cello and bass move away from the octatonic

collection in a descending chromatic collection of quarter-note triplets. The triplets lead into a low F tremolo in m. 277 for a repeat of the first phrase of the canon.

The presence of a true canon in this opening phrase is significant. There is only one other appearance of a true canon, in mm. 174-178, which marked the final iteration of the *Arioso* and the end of Z1. Here, by beginning the section in this manner, Musgrave draws attention to the ensemble working as a full cohesive force through canon and accompaniment. This cohesion will provide a stark contrast to the frenetic energy that follows, where Musgrave separates the group into twelve voices.

After two iterations of the OCT01 scale followed by the leaping motif, the violins' scalar ascent continues in canon in m. 282, now in rhythmic diminution. The rapidly ascending notes become sixteenth notes while the longer notes are now quarter-note- and eighth-note triplets. The lower cello and bass again present a descending quarter-note triplet line, but adhere to 01+F. This is the first presence of the textural stratification that will follow in the section: the descending 01+F line is now directly juxtaposed with the violins' ascending canon.

In m. 287, the canon ends as the first and second violins begin the OCT01 scalar ascent at the same time a minor 3rd apart—the first violin starts on B \flat 3 and the second violin starts on G3. In the next measure they splinter into seven parts for an aleatoric pattern (Figure 3-4), all in OCT01. Each pattern is six notes long, starts on varying pitches, and all have different contours. The instructions read “Play as fast as possible *detaché*, NOT necessarily all together. Repeat pattern as necessary. Quick, jagged rhythms.”⁸ While each voice only plays five or six notes of OCT01, every pitch of OCT01 except for C is present in this measure. The next two measures (mm. 289-290) imitate the previous two, though the scalar ascent begins on C \sharp 4 in the first violin

⁸ Thea Musgrave, *Green* (London: Novello, 2008), 20.

and B \flat 3 in the second violin. The aleatoric patterns in m. 290 include C and omit B \flat . Measures 291-292 also repeat the pattern, with m. 291 starting on E4 and C \sharp 4 in the first and second violins respectively. The aleatoric pattern in m. 292 extends through m. 293 and omits F \sharp .



Figure 3-4. An example of the aleatoric pattern shown in the top voice of the first violin, m. 288.

The violin layer is firmly established in OCT01 for the remainder of the section. Beginning in m. 287 the bass and lower cello remain in 01+F in a primarily descending line alternating between quarter-note triplets, straight quarter notes, and long sustained notes with *glissandi* down to eighth notes. This descending line is a distinct layer in the section as it provides a direct contrast—both contour-wise and register-wise with the violins' line. It also directly contrasts the contour of the viola and upper cello line, which is the middle layer of the section.

The viola and upper cello do not consistently use an octatonic collection after m. 287. While there are instances of OCT01, they also use a chromatic gesture of ascending quarter-note triplets in mm. 287, 291, and 293. The viola section is split in two voices, with the top voice using double stops, and the upper cello line also employing double stops, creating five potential pitches in this layer. While these chromatic ascents do not belong to any octatonic collection, they are spaced apart so that a different octatonic collection is created in each note of the quarter-note triplets (Figure 3-5). With each note of the triplets the collection shifts, passing through each octatonic collection including 01+F and 02+E. In between the chromatic triplets of mm. 287 and

291, the viola and upper cello punctuate the violins' scalar motif with short ascending *glissandi* in OCT01 in mm. 288-289.

The image shows a musical score for three instruments: Viola A, Viola B, and Cello. The score is in 2/2 time and consists of two measures, 287 and 288. In measure 287, each instrument plays a triplet of notes, marked with a '3' and a slur. The dynamic is mezzo-forte (mf). In measure 288, the dynamics change to fortissimo (ffz). The Viola A and Viola B parts end with a quarter rest, while the Cello part ends with a quarter note. The key signature has one sharp (F#).

Figure 3-5. Ascending chromatic triplets in the viola and cello lines, m. 287.

While each layer switches between a few different motifs, they do not move synchronously. The first instance of aleatoric music in m. 288 is presented largely in silence in the lower two layers. The second instance in m. 290 is underscored by ascending *glissandi* in the cellos and tremolo descending quarter-note triplets in the bass, and the third in m. 292 is underscored by the descending tremolo triplets without the ascending *glissandi* and is accompanied by the chromatic ascending quarter-note triplets in the violas and upper cellos in m. 293.

These three layers continue through to m. 298, albeit with a marked texture change. The violins alternate a staccato eighth-note iteration of the leaping motif with the aleatoric pattern in mm. 294-298. The iterations of the leaping motif in mm. 295 and 297 are followed by three ascending stepwise eighth notes. The intervals between the first and second violins are no longer a constant minor third, and instead use major thirds, minor thirds, perfect fourths and tritones. All the notes of this layer belong to OCT01, and the aleatoric sections in mm. 294 and 296 omit F# and A respectively.

While the upper layer boasts a distinct change of motif between mm. 287-293 and mm. 294-297, the lower two layers maintain similar textural elements between both sections. The middle layer of viola and the upper cello shifts from the chromatic quarter-note triplets to a primarily textural layer consisting of ascending *glissandi* between quarter-notes in rhythmic unison. While the viola continues to outline OCT01, the upper cello makes a subtle shift to OCT12 in m. 294. Many of the notes that the cello uses are common tones between OCT12 and OCT01, but a B-natural in m. 295 indicates that OCT12 is the collection used. This shift is the first indication of the manner of collection-based stratification that will follow in the final section. The last two measures of this section (mm. 298-299) culminate with long sustained notes in the violins and viola, while the lower cello and bass continue in their primarily descending line, still in OCT01, which leads into a low F tremolo for the beginning of the final section in m. 300.

The Denouement

The final section of the piece (mm. 300-329) begins with a low F tremolo in the bass. This section uses soloists juxtaposed against long, sustained notes in the remaining voices, largely moving in unison. There is no textural stratification in this homophonic section, but there is a great deal of collection-based stratification. The ensemble remains in twelve distinct voices. The bass uses 01+F (Figure 3-6), while the other eleven voices use either OCT01 or OCT12. These lines include three soloists—one each in the first violin, second violin, and viola—that have more rhythmic freedom and move between OCT01, OCT12, and OCT02 throughout the section. Collections can be identified in two ways in this section. Each voice uses a distinct collection throughout the section. Due to common tones between collections, an octatonic or octatonic-adjacent collection is formed in each measure as well.



Figure 3-6. The bass, outlining 01+F. This gesture reappears throughout this section.

Measures 320-321 mark the end of the penultimate phrase with an abrupt shift from the purely octatonic collections through the introduction of E \flat and A into OCT12 in the second violins. These two notes are a tritone apart and create two five-note chromatic clusters spanning from C \sharp to F and from G to B, with E \flat and A in the center of their respective clusters. This increased chromaticism only lasts for these two measures as the ensemble shifts to 01+F in m. 322 for the final phrase of the piece which is introduced by the final occurrence of the leaping motif, rhythmically augmented, in the solo violin and solo viola. This shift away from an octatonic collection corresponds with the end of a phrase, which happens frequently throughout the work.

The final phrase progresses from 01+F in m. 322 to OCT12 in m. 323, which then shifts to OCT01 in mm. 324-5. The bass slides down to a tremolo F1 in m. 326, changing the ensemble into 01+F for the final four measures of the piece. In the penultimate measure, m. 328, the solo second violin adds a sustained D5 to the 01+F collection. While this is not a common outlier in this piece, the D5 serves to mirror the opening of the piece, as D is the first pitch that is introduced after the Es in m. 1. This mirror continues in the final measure, where every voice except for the first violin solo drop out and a solo, sustained E5 fades to *niente* to close the piece.

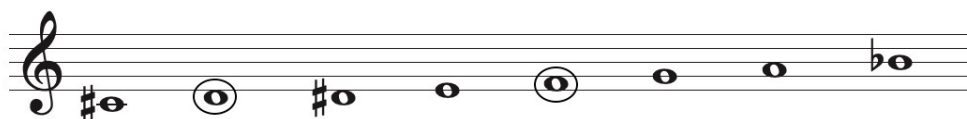


Figure 3-7. The pitch classes found in the final chord of the piece. Circled notes indicate pitch classes that do not belong to OCT01.

The octatonic and octatonic-adjacent collections that pervade this work subtly influence the narrative arc that Musgrave creates. The “opposing forces” in Z1 often use different collections, though the shifts between these collections can sometimes imply an imperceptible elision. The use of textural and collection-based stratification also serves to reinforce the contrast between “opposing forces.” The Arioso in Z1 does not use stratification at all, creating a sense of unity within the passage. When stratification appears, it is initially in the non-Arioso sections of Z1, growing in intensity as the zone progresses. In Z2, the climactic section of the zone takes stratification to its strongest point, with the ensemble broken into twelve voices and three distinct layers. The denouement continues the stratification into three layers but shifts from a perceptual textural stratification to a conceptual, collection-based stratification. The next chapter will provide a more thorough formal analysis of both zones, and the following chapter will examine the interactions of the octatonic collections with the structural aspects of the work.

CHAPTER 4

FORMAL ANALYSIS

As described in the previous two chapters, almost every note in *Green* is related in some way to a predominantly octatonic collection. This octatonic organization does not, however, dictate every aspect of the piece: the form of *Green* is not directly impacted by the octatonic structure. In a formal analysis of *Green*, the strongest determining factors of sectional boundaries are motivic and textural changes between sections. Only some sectional boundaries correspond with changes in collection; other boundaries are drawn despite little or no change in collection. At every sectional boundary the shift is predominantly perceived through the motivic and textural changes regardless of any corresponding changes in collection; the many common tones shared by the octatonic collections ensure subtle shifts between collections. *Green* can be broken into two overarching zones: the first—Z1—in mm. 1-179 and the second—Z2—in mm. 180-329. These zones are seamlessly connected with a smooth transition between the two but are differentiated through the different formal labels that can be ascribed to each zone (Figure 4-1).

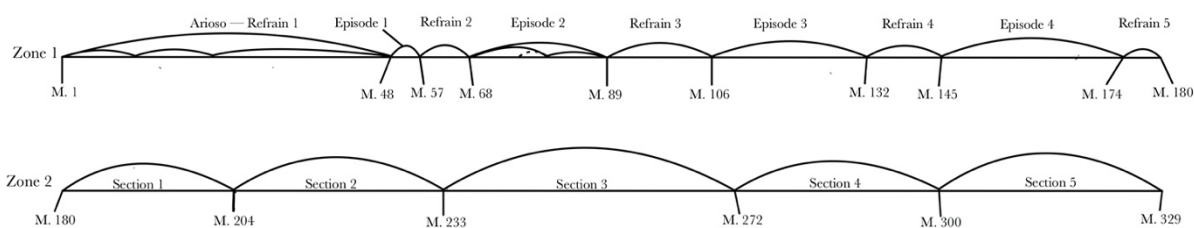


Figure 4-1. Formal diagram of Z1 (top) and Z2 (bottom).

Zone 1

In interviews⁹ and in her program note, Musgrave states that the opening Arioso of *Green* is often interrupted by the low F in the bass. She then describes the way that the Arioso returns, first in a reaction of surprise, then “one of irritation, then anger.”¹⁰ This alternating push and pull is especially prevalent in the first zone of the piece, which can be loosely mapped out as a nine-part rondo spanning mm. 1-179, with the Arioso serving as the “refrain,” and the instances of the F “intrusions” serving as the “episodes” (Figure 4-2).

The initial presentation of the Arioso is 47 measures long and can be further broken down into three parts: two repetitions of the primary theme in mm. 1-24 and further development of those ideas in a second section spanning mm. 25-47. The eleven-measure primary theme is the only section that reappears in the “refrains” of the rondo. In a classical rondo mm. 25-47 would be labeled as the B section, with the primary theme immediately following. As m. 48 is not a return to the primary theme but instead is the first instance of an F “intrusion,” rondo form may not appear to be a completely accurate descriptor. However, there are distinct textural and scalar similarities between the primary theme and mm. 25-47, while there are stark textural contrasts between the other potential “episodes” and the primary theme. The similarities between the primary theme and mm. 25-47 make it possible to group mm. 1-47 together, with the latter half expanding on themes introduced in the primary theme. By establishing the Arioso in this manner, the reoccurrence of the primary theme throughout this zone is given weight beyond a repeated eleven-measure melody.

⁹ The Scottish Ensemble, “Thea Musgrave’s new commission, *Green*, in rehearsal with Scottish Ensemble,” January 8, 2009, YouTube Video, 7:10, <https://youtu.be/LJmOUhOhz7A>. Accessed September 28, 2022.

¹⁰ Thea Musgrave, “Programme Note,” in *Green*, i.

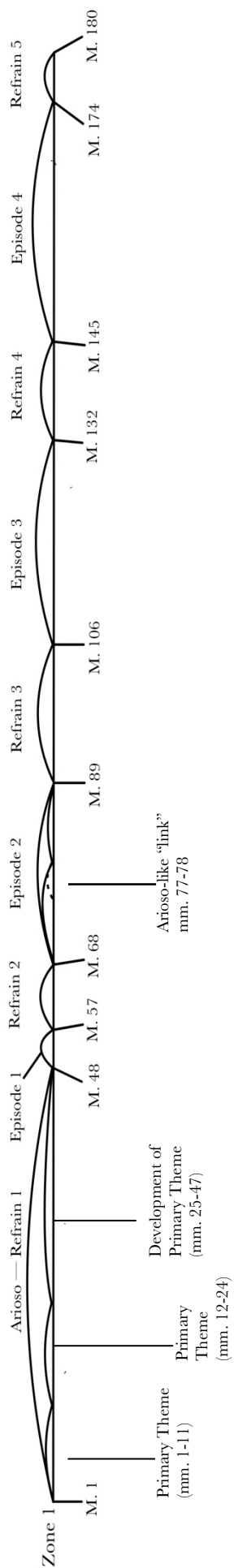


Figure 4-4. Formal Diagram of Z1, outlining a loose rondo form.

The sections in Z1 are not proportional, nor are they consistent throughout the zone. The opening Arioso is 47 measures long and can be further broken down into three parts: two repetitions of the primary theme in mm. 1-24, and further development of those ideas in mm. 25-47. In contrast the first episode is only nine measures long—less than one-fifth the length of the Arioso, and two measures shorter than one iteration of the primary theme. The relative lengths of episodes in comparison to Arioso statements gradually shift through the rondo, with the episodes expanding until the final episode is 29 measures long: the second-longest section of the zone. Excepting the first and last refrains, the refrains do not change as much in length as they do in texture throughout the zone.

Musgrave primarily uses varied textural effects to create contrast between sections. As described in Chapter 1, the opening Arioso hints at a canon, and the frequent overlapping contrapuntal melodies and occurrence of the neighbor motif would not be out of place in a Bachian contrapuntal form, like an invention or a fugue. The first episode, in mm. 48-56, provides a stark contrast to the contrapuntal texture of the Arioso. This episode boasts an incredibly sparse texture—the full ensemble of the Arioso is replaced by the first violin and bass—and a deviation from the previous contrapuntal style. This episode uses sustained notes interrupted by a solitary moving line in the solo violin in mm. 53-56, which outlines OCT12 through the sixteenth note motif. This motif is present throughout future episodes and the second zone of the piece, which unites the two sections.

The second episode is introduced in a less abrupt manner than the first. While the low F in the cellos and basses marking this music as an episode is still a sudden and dissonant entrance in m. 67, it does not cut off an ascending line and instead takes over from sustained notes in the violins and viola. This episode immediately has more rhythmic activity than the first episode,

with a violin solo based on the sixteenth-note motif. All the voices of the ensemble are present in this episode. Through the increased rhythmic activity and denser texture, this episode has a more complex texture than the first episode which allows it to serve as a distinct section of musical development rather than merely a sparse contrast to the *Arioso*. This episode is divided into two sub-sections, in mm. 68-79 and mm. 80-88. The first sub-section ends with a melody reminiscent of the *Arioso*, including a quotation from the first violins' melody in mm. 22-23 in mm. 77-78. This is not a large enough section of the *Arioso* to necessarily qualify as a refrain, especially as it does not incorporate the high sustained E or the other aspects of the primary theme. The second sub-section of this episode again incorporates the sixteenth note motif in the violins above the low F in the cellos and basses.

The third episode has a distinctly different character than the refrain, but the transition between these sections is much less abrupt than the transitions to previous episodes. Here, the low F enters two measures before the episode, and it begins with a melody that expands upon the *Arioso*'s characteristic neighbor motif. The first and second violins also engage in a call-and-response gesture based on the leaping motif, which is akin to the contrapuntal nature of the *Arioso*. This call-and-response utilizes space to connect the contrapuntal concepts of the *Arioso* to the sparse nature of the episodes. This episode is further differentiated from the refrain in m. 126 with the entrance of a viola solo that initially centers the sixteenth-note motif before expanding into new melodic material. This solo shifts the focus from the call-and-response gesture to the sixteenth-note motif.

The fourth episode alludes to the entrance of the first episode, with low tremolos in the cellos and basses interrupting an ascending line in the violins. The violins also allude to their line in the first episode, beginning with longer sustained notes separated by rests. This line occurs simultaneously with a cello solo that imitates the viola solo of the third episode by starting with

the sixteenth-note motif and expanding with new melodic material upon that. Unlike the solo in the third episode, this cello solo uses the sixteenth-note motif throughout. A viola solo, again beginning with the sixteenth-note motif, enters in m. 157 to begin a call-and-response gesture with the cello. While the viola solo again does not stick with the sixteenth-note motif throughout, this interplay with the cello hints at the tutti call-and-response sixteenth-note motif that will mark the end of the episode.

A direct comparison of the refrains throughout this zone shows how the refrain becomes distorted throughout the zone. While the second and third refrains bear similarities to the first iteration of the theme, the fourth and fifth refrains are drastically altered. The second refrain (mm. 57-67) is the most like the first refrain, both texturally and note-wise. The third refrain (mm. 89-105) is also similar from a textural standpoint, but the addition of the pizzicato motif in m. 96 and mm. 103-104 in the viola marks an unraveling of the *Arioso*. Measure 96 marks the first time that the pizzicato motif occurs in the middle of the *Arioso* primary theme: the pizzicato motif's earlier occurrence in the primary theme is in mm. 21-22, just before the secondary theme begins in m. 25. The pizzicato motif in mm. 103-104 reflects its familiar usage as a transition figure.

The fourth refrain (mm. 132-144) does not begin with the characteristic sustained E in the violins. Instead, the second violin's melody overlaps with the end of the viola solo to create a subtle, obfuscated entrance. When the first violin's distinctive sustained E finally appears in m. 139, the refrain is half over. For the first time in the piece, these sustained notes do not develop into the full theme, as the next episode begins abruptly in m. 145.

The fifth refrain (mm. 174-179) marks the end of the first zone and leads into the second zone. This refrain begins with the characteristic sustained high E, and has four measures of a true, three-voice canon based on the secondary line in the primary theme. This refrain is truncated—only six measures long—and bears the least resemblance to the primary Arioso theme. The clear presence of a melody found in the Arioso asserts its status as a “refrain” while the stark contrast to the previous refrains indicates its significance as the final refrain of this zone.

The image shows two musical excerpts for Violin I. Excerpt a (mm. 53-57) is marked 'pochiss. accel.' and 'p nervoso'. The solo violin part (labeled 'solo') plays a sixteenth-note motif starting in measure 53, with a tempo marking of quarter note = c. 48. The other violins ('altri') play sustained notes. Excerpt b (mm. 68-73) is marked 'agitato'. The solo violin part (labeled 'solo') plays the same sixteenth-note motif starting in measure 68, with a dynamic marking of 'mf'. The other violins ('altri') play sustained notes.

Figure 4-7. a. The first instance of the Sixteenth-Note Motif in mm. 53-56, marking the end of the first episode.
b. The beginning of the second episode, opening with the Sixteenth-Note Motif in mm. 68-73.

While the episodes in any rondo provide direction and development of the piece, Musgrave goes one step further and connects the episodes through shared motivic ideas, creating a cohesive melodic arc within the episodes that stands independent from the refrains. This connection is so strong that, if one were to remove the refrains and make minor transitional adjustments, these episodes could stand together as a piece with significant thematic development. While this connection includes the low F “intrusion,” there are several more connections beyond this. The first episode ends with the introduction of the sixteenth-note motif, which is the basis for the beginning of the second episode, reflected in Figure 4-3. The third episode begins by fragmenting the Arioso theme, and a viola solo in the second half of the

episode predominantly uses the sixteenth-note motif. While the fragmented Arioso theme does not directly feature in the second episode, the two sixteenth-note motif sections in the second episode are connected by a five-measure passage reminiscent of the Arioso theme. The third and fourth episodes both fragment the Arioso theme above a lower string solo: in the third episode a viola solo fades into the refrain, and a cello solo begins in the beginning of the fourth episode, as seen in Figure 4-4. Both solos utilize the sixteenth-note motif. The cello solo is very quickly within the register that it shares with the viola, further connecting the two sections through registral continuity. The opening violin notes in the fourth episode also bear some resemblance to violin notes of the first episode, which further connects the episodes as a cohesive unit (Figure 4-5).

Figure 4-8 consists of two musical staves, labeled 'a.' and 'b.', showing the opening of solos in different episodes. Staff 'a.' is for Viola, starting at measure 125. It begins with a 'solo' marking and a 'dramatic!' instruction. The music starts with a low F (F2) and a sixteenth-note motif. Dynamics include *f*, *ff*, and *f*. Staff 'b.' is for Cello, starting at measure 146. It begins with a 'solo' marking and an 'en dehors' instruction. The music starts with a low F (F2) and a sixteenth-note motif. Dynamics include *mf*, *f*, and *f*. Both staves show a clear connection to the sixteenth-note motif discussed in the text.

Figure 4-8. a. The opening of the viola solo in the third episode (mm. 125-130) compared with b., the opening of the cello solo in the fourth episode (mm. 146-150).

As the zone progresses, the episodes collectively become less of an “intrusive force” and develop their own melodic and motivic material, particularly the low F and the sixteenth-note motif. The low F is present throughout each episode, but it is omnipresent only in the first and second episodes. In the third and fourth episodes, the low F serves to mark the beginning of the episode, then appears sporadically throughout the rest of the episode. Conversely, the sixteenth-note motif appears first at the end of the first episode and quickly becomes a driving force for the following three episodes. This motif is often presented through a solo. The use of this motif in the second episode serves to establish it as an important concept without much development beyond that, while the solos in the third and fourth episodes treat it as a starting point to expand into

more melodic ideas. The sixteenth-note motif outlines the prominent collection used in the section, while also providing a connection among the episodes that is clearly audible to the listener.

The image shows two musical excerpts, labeled 'a' and 'b'. Excerpt 'a' is for Violin I and Violin II, covering measures 48 to 54. It features a 'solo' part for Violin I and an 'altri' part for Violin II. The music is in 3/4 time and includes dynamic markings such as *pp* and *p*. Excerpt 'b' shows the opening notes for Violin I and Violin II in measures 146, 147, and 148, with a dynamic marking of *p*.

Figure 4-9. a. The violins' first notes of the first episode, mm. 48-54, in comparison with b., the violins' opening notes of the fourth episode, mm. 146-148.

As the episodes develop melodically, the transitions between sections become less sharply articulated. For example, the low F of the third episode begins in the final measure of the refrain, and parts of the refrain can be heard in the last few measures of the fourth episode. These transitions are much less dramatic than those between the earlier sections. The melodic development and elisions work together to push the two opposing musical forces into increasingly closer proximity throughout the zone, shifting which force serves as the “intruder.”

Zone 2

The second zone (mm. 180-329) can be broken into five discrete sections (Figure 4-6), each of which is closed by a moment of stasis that is highlighted by sustained notes and rests. Consecutive sections have sharp contrasts in the level of rhythmic activity within each section. In

contrast to Z1, the Arioso theme is not present in Z2, but parallels exist between the episodes in Z1 and the sections of Z2. The disappearance of the Arioso further develops the shifting roles of the Arioso and the episodes that pervaded Z1. By removing the Arioso completely, the material in the episodes of Z1 that reappears in Z2 cannot “intrude upon” the Arioso. Each section begins with the low F tremolo in the bass creating a large-scale parallel with the way in which each of the episodes in Z1 opened. By expanding upon the material found in the episodes of the first zone without interspersing the Arioso theme, the direction and connectivity of the episodes is clear. The first two sections of Z2 also heavily draw upon material found in the episodes of Z1. The third and fourth sections further develop these ideas, while the final section unifies the ensemble in the piece’s denouement.

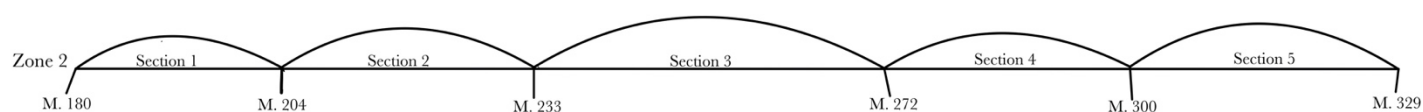


Figure 4-10. The formal diagram for Z2, outlining five sections.

The first section—mm. 180-203—serves as a bridge between the first and second zones of the piece, beginning with alternating the sixteenth-note motif with longer sustained notes. This leads into a call-and-response passage based upon the leaping motif, shifting focus from the sixteenth-note motif to the leaping motif. The ordering of the motifs reverses the order of the passage in the third episode of the first zone, where the leaping motif is followed by the viola solo which re-centers the sixteenth-note motif. From a rhythmic perspective, this section begins with quicker, more intricate rhythms and shifts to longer sustained notes with more space in between notes.

The second section of Z2, mm. 204-232, pairs the opening low tremolo F with fragmentation of the neighbor motif which immediately injects more movement into the section. This fragmentation of the neighbor motif additionally is a continuation of the imitation of Z1’s

third episode. This fragmented neighbor motif occurs in the beginning of the third episode, meaning that this section continues the previous section's trajectory through the motifs of the third episode (Figure 4-7).

	Fragmented Neighbor Motif	Leaping Motif	Sixteenth-Note Motif	
Zone 1: Episode 3 →	mm. 106-117	mm. 118-125	mm. 126-131	
	mm. 204-232	mm. 193-203	mm. 180-192	Zone 2: Sections 1 and 2 ←

Figure 4-13. Tracing motifs in Z1 Episode 3 and Z2 Sections 1 and 2.

While the third section—mm. 233-271—continues to expand upon the fragmented neighbor motif, the combination of the distinct change from the violin sections' melody to a solo viola and the low F tremolo beginning in m. 233 marks the section boundary. This solo soon departs from the neighbor motif, expanding upon the material, before being joined by the cello section in a similar melody in m. 256. This melodic material is not a new reflection of previous sections of the piece, but the combination of solo viola and solo cello hearkens back to the fourth episode in the first zone. Again, this combination is re-ordered from its iteration in Z1, where the cello entered before the viola.

The climactic fourth section of the Z2 begins in m. 272 with the second true canon of the piece. This strong entrance immediately indicates that the section will be dramatic. The same indication exists in the case of the first true canon, which occurs in the final refrain of Z1. As the section progresses and the canon fades, an homage to the sixteenth-note motif comes into focus. This is not an exact iteration of the motif, but it is a clear resemblance that unites the fourth section with the previous material. This call-back to the sixteenth-note motif occurs while Musgrave adds new, starkly different material in the form of frenetic aleatoric textures. By alternating between the sixteenth-note homage and the aleatoric motif, Musgrave pushes the

piece towards a dramatic conclusion while maintaining a strong connection to what came before. This section builds, with the aleatoric sections lengthening, through to an ascending line of eighth notes that abruptly stops in a manner reminiscent of the end of the first and fourth refrains of Z1. The sudden silence and return to sustained, slow notes marks the end of this section and the beginning of the final section with a striking texture change.

The final section of the piece showcases the neighbor motif and leaping motif in a variety of solos above long sustained notes which are sometimes joined by the pizzicato motif. Gradually, the entire ensemble moves to long sustained notes to close the piece, reminiscent of the opening notes of the Arioso. The sixteenth-note motif is not present in this closing section. By again revisiting the themes of the work and the opening chord, Musgrave brings connects the beginning and the end of the piece without necessitating an overt recapitulation.

In Z2 Musgrave alludes to motifs that originated in the first zone's episodes. These allusions extend beyond melodic material, as parallels can also be drawn between instrumentation choice and the order in which material is presented throughout Z2, as seen in Figure 4-8. As the piece progresses, these allusions become less overt. The first two sections of Z2 reference melodic material of Z1's third episode in the reverse order of their initial presentation. The third section of Z2 references the instrumentation of the fourth episode of Z1 with solo viola and cello presenting the melody, again in the reverse order of the initial voicing combination. An additional reference can be found in compositional technique between the beginning of the fourth section of Z2 and the final refrain in Z1, the two instances of true canon in the work. This

canon is the least direct reference—there is not a direct line between melodic material or distinct instrument choice.

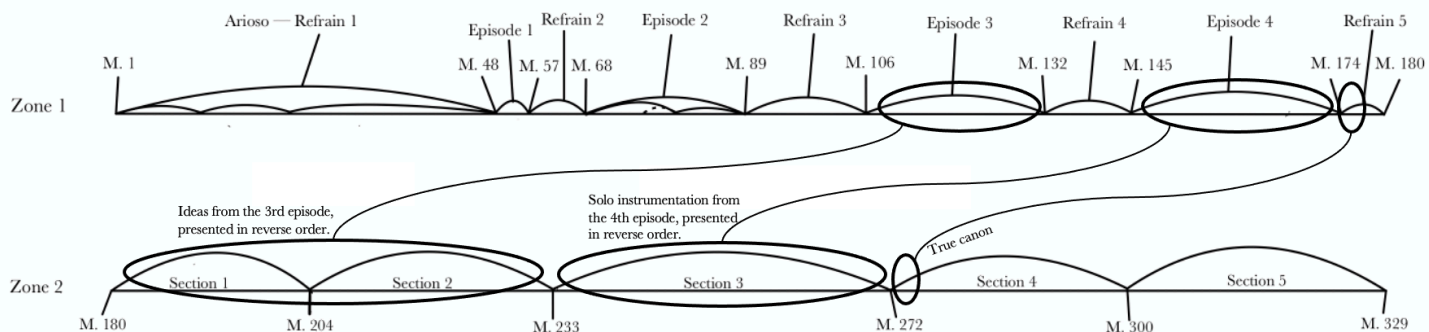


Figure 4-14. Location of motifs, instrumentation, and techniques found in both $Z1$ and $Z2$.

The Arioso, conversely, is not directly referenced in Z2. The fifth section has the strongest reference in the zone, yet even this does not reference the melody and instead quotes the high, sustained notes that mark the beginning of the Arioso. The last two measures of the entire piece imitate the first two measures of the piece, in reverse order and with the addition of a low F in the basses. While the high sustained E that begins the Arioso is distinctive, it is not the primary focus of the theme. In the program note for the piece, Musgrave states that the forces change roles: the Arioso becomes the intrusive force through the end of the work. Omitting references to the Arioso in Z2 on its own would achieve this effect, but it is further strengthened by the development of the episodic material as a cohesive, uninterrupted idea throughout the zone.

CHAPTER 5

INTERACTIONS OF COLLECTION AND FORM

Octatonic Collections in Relation to Form in Zone 1

While motivic development plays a much larger role in the formal structuring of the piece than the octatonic collections do the octatonic collections used in the piece do have a connection to the form, particularly in Z1. In Z1, different sections tend to shift to use different collections. In instances where a collection remains the same between sections, the treatment of the collection differs. Much of the octatonic collections' impact on the structure of the piece concerns the simultaneous use of collections in collection-based stratification, but some correlation with the sections of Z1 exists as well. The formal correlations are found in Z1, where each refrain uses 02+E and the episodes are marked by movement between different collections. Figure 5-1 illustrates the correspondences between collections and form in Z1; the following paragraphs explore these correspondences in detail.

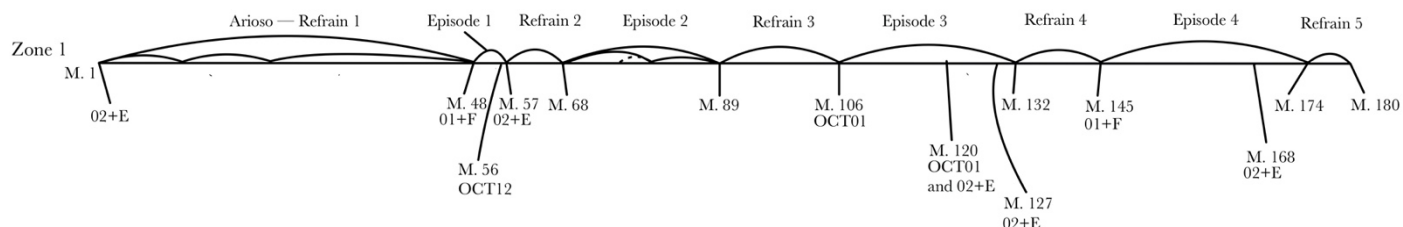


Figure 5-1. The collections used in Z1 as they correspond to the form.

The first episode begins in 01+F, however, the F is only present in the bass, as the violins' line uses pitches that solely belong to OCT01. By setting the basses' low F in contrast to the violins' line, Musgrave uses F as both a perceptual and conceptual outlier. In the second half of the episode, the collection shifts when two iterations of the sixteenth-note motif outline OCT12 in mm. 54 and 56. In m. 55, however, the solo violin plays a C, which does not fit in OCT12 above the section violins playing E and F, which would fit in OCT12. Paring the sixteenth-note

motif with the C creates the collection 02+E instead. The transition to the simultaneous OCT12 and 02+E serves as a transition to 02+E for the next refrain, reflected in Figure 5-2.

The musical score consists of three staves: Violin I (solo), Violin II (altri), and Contrabass. The key signature has two sharps (F# and C#). The time signature is 3/4. The tempo is marked as *c. 48*. The score is divided into measures 53, 54, 55, 56, and 57. A dashed box encloses measures 55, 56, and 57. In measure 53, Violin I plays a sixteenth-note motif labeled OCT01 with the instruction *pochiss. accel.* and *p*. Violin II plays a sustained chord labeled OCT02. Contrabass plays a low tremolo F labeled 01+F. In measure 54, Violin I continues with OCT01. Violin II continues with OCT02. Contrabass continues with 01+F. In measure 55, Violin I plays a sixteenth-note motif labeled OCT12₆ with the instruction *p nervoso*. Violin II plays a sustained chord. Contrabass continues with 01+F. In measure 56, Violin I plays a sixteenth-note motif labeled OCT12 with the instruction *p*. Violin II plays a sustained chord labeled 02+E with dynamics *pp*, *p*, and *pp*. Contrabass continues with 01+F. In measure 57, Violin I plays a sixteenth-note motif labeled OCT12 with the instruction *p*. Violin II plays a sustained chord labeled 02+E with dynamics *pp*, *p*, and *pp*. Contrabass continues with 01+F. The section ends with *a niente* in measure 57.

Figure 5-4. The simultaneous collections used in mm. 53-56.

The second episode is the only one that does not shift collections as it progresses. It remains completely in 02+E: the same collection used in the refrains. While the low tremolo F is again used as an intrusive dissonance, that is no longer reflected in the nature of the collection, where E is the conceptual outlier. In this episode, Musgrave treats the dissonances between E and F in the same way that they are treated in the previous episode where F was also the outlier conceptually. While texturally most of this section is distinctly different from the refrain, it does have a five-measure interlude that resembles the Arioso. This episode shows that there does not need to be a shift in collection between a refrain and an episode to maintain clear section boundaries.

The third episode begins in 01+F and A \flat but shifts between collections. This episode marks a brief appearance of two simultaneous collections in mm.120-121: the viola and violins outlining OCT01 juxtaposed against a stepwise ascent in 02+E in the bass and cello. In m. 127, the ensemble shifts to 02+E and G, predominantly outlined through the sixteenth-note motif in the viola solo. This collectional shift occurs before the refrain enters, serving as a conceptual elision that alludes to the actual elision between the episode and the following refrain.

The final episode begins in 01+F, adding A \flat as the section progresses. In m. 168, however, the solo cello sixteenth-note motif outlines 02+E which is rapidly adopted by the rest of the ensemble, continuing with the sixteenth-note motif. This scalar elision is slowly mirrored by a melodic elision: fragments of the primary arioso theme appear in mm. 171 and 173, leading into the final refrain beginning in m. 174.

The form of *Green* is predominantly shaped by stark textural and motivic contrasts that dictate the sectional boundaries. The extended rondo form in Z1 introduces the intrusive force of the low tremolo F in the episodes, which gradually supplant the refrains in terms of motivic development. This motivic development shifts the role of the refrain away from its traditional purpose in a rondo, as it disappears fully in Z2 instead of maintaining a strong structural role. The melodic material in Z2 relates to the melodic material in the episodes of Z1, which further emphasizes the significance of these melodies over the Arioso theme. Throughout Z1 the choice of octatonic collections used in a section only slightly affects the formal structure, with the changes in collections near the ends of the first, third, and fourth episodes creating a smooth transition to 02+E before the section boundary is reached. There is not a distinct correlation of form and collection in Z2. Instead, the use of the octatonic collections in this zone focuses primarily on the interplay between simultaneously sounding collections.

Stratification in Zone 1

Stratification is the simultaneous occurrence of contrasting rhythms, textures, or registers that create distinct layers within a work. In *Green*, there are two distinct types of stratification used. The first is textural stratification, which can be perceived by the listener, and encompasses registral, rhythmic, and textural contrasts. The second type of stratification is collection-based

stratification. By simultaneously using different octatonic collections in different voices, Musgrave creates distinct collectional strata. Due to the shared common tones between octatonic collections, this type of stratification is not easily perceived, and thus will be referred to as a conceptual form of stratification. While it is frequently present, stratification is not a constant technique used in this piece. The opening *Arioso* weaves the ensemble together in a rich, texturally cohesive melody. The sudden entrance of a low F tremolo in m. 48 marks a dramatic textural and motivic change. This textural change corresponds with the first use of stratification in the piece. Through the give and take between the *Arioso* and developing episodes in Z1, stratification develops as a more frequently used technique, foreshadowing its prominence in Z2. In addition to perceptual strata, Musgrave often employs multiple octatonic collections simultaneously to create a subtle, conceptual web of stratification as well.

The use of 01+F in this piece often shows a simultaneous use of textural and collection-based stratification. The first time that this collection is used in m. 48 the only F present is in the bass, where it appears in a low sustained tremolo. This line is one of three in the section: the other two are a solo violin and the section first violins. Based on this contrast of register and texture—the violins in mm. 48-53 primarily play smooth dotted-half notes separated by long rests—this section outlines the first instance of stratification in the piece. Looking at the ensemble as a whole in mm. 48-52, the collection is 01+F. Breaking the ensemble down into distinct voices, the violins only use OCT01. The only reason for the collection to be labeled 01+F is the basses' low F (Figure 5-3). By placing the basses in the position to singlehandedly change the collection used, Musgrave introduces stratification on both the perceptual and conceptual level. This occurs frequently when 01+F is used. Conversely, the use of 02+E does not exhibit analogous

conceptual stratification. There are instances of perceptual stratification where 02+E is used, but E is not used as the outlier in these cases.

The image shows a musical score for three instruments: Violin I, Violoncello, and Contrabass. The score is in 2/2 time. Measures 47-48 show a low F tremolo in the bass and cello with dynamics *sfz ff*. Measures 49-52 show the violins using OCT01, with dynamics *pp* and *p*. The bass and cello continue with the low F tremolo, with dynamics *p* and *dim. poco a poco*.

Figure 5-7. Measures 47-52, showing the violins using OCT01 and the bass changing the overall collection to 01+F.

The second episode in Z1 (mm. 68-88) again uses the low F tremolo in the bass and cello. In this iteration it is paired with a rapidly moving line in the violins and viola focusing on the sixteenth-note motif. In this instance, the lower strings' line serves more as a dissonant accompaniment to the busy upper strings' line than it does as a distinct stratified layer. This section almost entirely uses 02+E, with one exception: mm. 86-88 in the cello and bass lines, which use 01+F. These three measures do not constitute perceptual stratification as the textural divisions remain the same despite the simultaneous appearance of 02+E and 01+F.

The third episode in Z1 (mm. 106-131) does not have a low tremolo F as a constant presence throughout the section. Instead, the cello and bass establish a more independent line that expands upon the low F tremolo. In the first phrase, the viola provides a textural layer of sustained tremolo notes, while the violins present the fragmented neighbor motif melody. Within

this perceptual stratification, the violins, viola, and upper cello use OCT01. The lower cello and bass predominately use 02+E (Figure 5-4).

	106-125	126-131
OCT01	Violin 1 Violin 2 <i>Viola</i> Upper Cello	<i>Violin 1</i> <i>Violin 2</i> Lower Cello
02+E	Lower Cello Bass	Viola (Solo)
Chromatic		Upper Cello Bass

Figure 5-8. Collection-based and textural layers in mm, 106-131. Plain text denotes the primary layer, italicized and bold text denote other layers.

The last portion of this episode becomes even more prominently stratified both perceptually and conceptually. The viola shifts from a textural tremolo line to a solo in m. 126. The cello and bass continue their moving tremolo line, while the violins continue their melody, now no longer the primary focus. The violins and lower cello continue in OCT01, while the upper cello and bass shift to a chromatic collection. The viola solo uses the sixteenth-note motif to outline 02+E. While three different collections are being used, the divisions of conceptual strata differ from the divisions of perceptual strata: the lower cello perceptually shares a layer with the upper cello and bass but uses OCT01, sharing a collection with the violins.

The fourth episode (mm. 145-173) begins with three distinct strata accompanied with a textural tremolo layer in the viola and cello sections. The focal layer is a cello solo, but the violin and bass lines are distinctive enough to be considered strata. This instrumentation is a continuation from the way in which the viola solo was treated in the previous episode. Unlike the previous episode, however, the entire ensemble begins this episode in OCT01. This is the one instance in the piece where perceptual stratification does not occur simultaneously with conceptual stratification, as seen in Figure 5-5. However, this is not a long-lasting collection: the

cello solo changes to OCT12 in m. 151, and the bass moves to OCT02 in m. 152. While the strata remain stylistically consistent throughout this section, the instrumentation of the strata changes in m. 157. A viola solo joins the cello solo in the focal layer, and the second violin becomes the textural tremolo layer. The viola section joins the viola solo for some of the sustained notes within the line, the first violin continues its distinct line, and the cello section joins the bass line. In m. 157 the bass remains in OCT02 while the rest of the ensemble returns to OCT01. The solos, viola section, and cello section stay in OCT01 through m. 168, but the violins shift between OCT12 and OCT01 in mm. 163-168 and the bass shifts between OCT01 and OCT02. In m. 169 the stratification disappears, and the entire ensemble shifts to OCT02 for the remainder of the episode. (Figure 5-5) This shift to OCT02 sets up the final refrain of Z1, which abandons the multi-collectional layers for a true canon.

	145-150	151-156	157-162	163-165	166-167	168	169-173
OCT01	Cello (Solo) Violin 1 Violin 2 <i>Viola</i> <i>Cello (Section)</i> <u>Bass</u>	Violin 1 Violin 2 <i>Viola</i> <i>Cello (Section)</i>	Violin 1 <i>Violin 2</i> Viola (Solo) Viola (Section) Cello (Solo) <u>Cello (Section)</u>	Viola (Solo) Viola (Section) Cello (Solo) <u>Cello (Section)</u> <u>Bass</u>	Violin 1 <i>Violin 2</i> Viola (Solo) Viola (Section) Cello (Solo) <u>Cello (Section)</u>	Viola (Solo) Viola (Section) Cello (Solo) <u>Cello (Section)</u>	
OCT02		<u>Bass</u>	<u>Bass</u>		<u>Bass</u>		Full Ensemble
OCT12		Cello (Solo)		Violin 1 <i>Violin 2</i>		Violin 1 <i>Violin 2</i>	

Figure 5-9. The textural and collection-based layers of the fourth episode. Plain text denotes the primary layer. Bold, italicized, and underlined text denotes other layers.

Stratification in Zone 2

The beginning of Z2 in m. 180 immediately employs stratification, simultaneously projecting OCT01, 01+F and A_b, OCT02, and 02+E in distinct layers (Figure 4). In addition to the collection-based stratification, two distinct melodic lines are used to provide textural stratification: the violins present a melody utilizing the sixteenth-note motif and the upper cello and bass feature a tremolo quarter-note triplet line. These lines are joined by the lower cello and

viola, providing sustained tremolo accompaniment that is punctuated by long *glissandi*, adding a distinct and noticeable textural element. While the viola, cello, and bass shift collections in the first phrase to eventually all land in OCT12, the first and second violins remain in 02+E. Despite the reduction of conceptual layers, the perceptual strata remain prominent throughout.

In two of the textural layers, both voices use the same collections. The first and second violins move in tandem both in melodic line and in collection, outlining 02+E with four sixteenth-note motif iterations a minor tenth apart. The viola begins in OCT01 but alternates between that and OCT12, each collection clearly established through three- and four-note clusters of sustained tremolos. The lower cello also belongs to this layer and mirrors the viola's shift between OCT01 and OCT12. Both viola and cello return to OCT01 in m. 192. The upper cello and bass layer is the exception to this correlation of collection and textural layer. In the first nine measures of this section, they both belong to the same layer, handing off tremolo quarter-note triplets in alternating measures. However, the bass begins in OCT02 before moving to a chromatic descent while the upper cello begins in 01+F and A \flat before shifting to OCT12 in m. 188. These shifts are reflected in Figure 5-6.

	180-185	186-192	193-201	202-203
OCT01	<i>Viola</i> <i>Lower Cello</i>		Violin 2 <i>Lower Viola</i> Lower Cello Bass	Violin 1 Violin 2 Viola Cello
01+F and A \flat	Upper Cello			Bass
OCT02	Bass			
02+E	Violin 1 Violin 2	Violin 1 Violin 2		
OCT12		Upper Cello <i>Lower Cello</i> <i>Viola</i>	Violin 1 <i>Upper Viola</i> <i>Upper Cello</i>	
Chromatic		Bass		

Figure 5-10. Collection-based and textural layers in mm. 180-203. Plain text denotes the primary layer. Other layers are denoted through bold and italicized text.

In the second phrase (mm. 193-203) of the section the perceptual strata shift to correspond more closely to register: the violins are the melodic upper layer, the viola and upper cello make up another—primarily textural—layer of sustained tremolos, and the lower cello and bass provide a third layer of tremolos and descending quarter-note triplets. In contrast to the first phrase of this section, the collections here do not correspond to the perceptual layers. Only two collections appear in mm. 193-199: the first violin, upper viola, and upper cello use OCT12 in mm. 193-200 while the second violin, lower viola, lower cello, and bass use OCT01. In m. 200, 01+F is added in the bass and lower cello and in m. 201 the entire ensemble shifts to OCT01. This shift corresponds with the violins, viola, and upper cello lines all playing sustained whole notes, ending the stratification of the section.

The strong stratification in the first section of Z2 does not continue through the second section (mm. 204-232), which is largely homophonic. The first violin and second violin develop the melody above sustained notes in the lower voices. This section is almost entirely in OCT01, though the addition of the low F tremolo in the bass occasionally shifts the collection to 01+F. The cohesive nature of this section is slightly tempered in m. 224, where the bass and lower cello begin a descending quarter-note triplet line which provides more textural contrast to the violin melody. This is not necessarily enough to be considered “stratification.” While the rhythm does contrast with the violin melody, the descending contour and higher register—the lower cello and bass line begins on A4—do not form a significant space between registers that could constitute perceptual stratification.

The third section of Z2 (mm. 233-271) does not use stratification. The entire ensemble begins with OCT01, apart from the bass which adds F to shift the collection to 01+F. The difference of treatment of solos in Z1 and Z2 with regards to stratification emphasizes the textural contrasts of the piece. In Z1, where stratification is not as frequently used, the use of

perceptual stratification in solo passages further distinguishes the passages as significant. In Z2, which begins with stratification, the opposite is true: the solos in this section are brought into focus through the absence of strata. In m. 257, a cello solo joins the viola solo. The accompaniment lines increase motion here and begin to separate from each other, with the cello section and bass beginning a more descending line while the violins continue with an ascending line. While these lines are not independent enough to qualify as stratification, the increase in movement points towards the stratification that will occur in the next section.

In the fourth section of Z2 (mm. 272-299) perceptual stratification intensifies as the section progresses. Though it begins with the familiar standard canonic violins above the rest of the ensemble in sustained tremolo, the lower voices' line increases in rhythmic density beginning with the bass' descending quarter-note triplet figure in mm. 275-276. By m. 280, the basses and lower cellos establish a distinct melodic line, while the violas and upper cellos primarily maintain the sustained tremolo. In m. 287, one measure before the violins begin the aleatoric gestures, the violas and upper cellos begin a distinct melodic line as well, adding an additional layer to this complex and growing texture.

By m. 287 the violins are alternating ascending sixteenth-note figures and aleatoric gestures, the viola and upper cello have an ascending line of quarter notes and quarter note triplets, and the lower cello and bass have a descending line of quarter notes and quarter note triplets. While the lower two strata use the same rhythmic values, they do not share the same rhythms. The most striking contrast between layers remains between the violins and the rest of the ensemble, but the differences between the lower two lines also distinguish them as separate layers. The score splits into twelve staves here—one instrument per part in the original ensemble's configuration—with the viola and cello lines utilizing double-stops as well. The ensemble will remain split in twelve parts for the remainder of the piece.

The fourth section of Z2 begins in 01+F, and continues the increasing intensity towards a climax of rapid collectional and textural juxtapositions to culminate in the most dense stratification within the work. As is typical in this collection, it begins with the bass providing the only presentation of F in mm. 272-273, but the F then also appears in the violins in mm. 274-275. The second violins, viola, and upper cello stay in OCT01 in mm. 272-286, with the F (and subsequent A \flat) appearing in the first violin and bass. In mm. 275-276, the lower cello and bass presents a chromatic descending line, one of the few instances in the piece where an octatonic collection is not present. Above these lines, however, the rest of the ensemble remains in 01+F. In mm. 277-286, the lower cello and bass return to 01+F and A \flat below the rest of the ensemble's OCT01. Here, collection-based stratification begins appearing in the section, foreshadowing the stratification that begins in m. 287. The violins, lower cello, and bass all use OCT01 in mm. 287-299. The violas and upper cello do not maintain an octatonic collection in this section. Much of their melodic line consists of chromatic ascending quarter-note triplets. These triplets are not entirely devoid of octatonic material, however: the four voices are stacked in minor thirds, which creates a chromatic ascending progression through all three octatonic collections (Figure 5-7). By

combining both types of stratification with the frenetic nature of the climax, Musgrave brings perceptual and conceptual stratification into play to further mark the significance of this section.

The image shows a musical score for three instruments: Viola A, Viola B, and Cello. The score is in 3/2 time and consists of two measures, 287 and 288. Each instrument part features ascending chromatic triplets. Above the staves, the octatonic collections used are labeled: OCT01, OCT12, OCT02, OCT01, 02+E, OCT02, and OCT01. Dynamic markings are *mf* for measures 287 and *sfz* for measure 288. The Cello part is written in a lower register than the violas.

Figure 5-11. Ascending chromatic triplets outlining octatonic collections in the violas and cello, m. 287.

The final section of the piece (mm. 300-329) is homophonic, with the ensemble providing sustained accompaniment beneath soloists. Within the ensemble the bass stands apart slightly, playing some sustained notes tremolo in opposition to the rest of the ensemble. However, these notes are frequently paired rhythmically with the lower cello line, which connects the bass line to the ensemble despite the textural difference. Despite the homophonic texture of this section, there is conceptual stratification, which is outlined in Figure 5-8. The ensemble is split into twelve voices,¹¹ continuing the divisions of the previous section. Three voices (violin 1B, viola B, and cello B) use OCT01 throughout the section, and four voices (violin 1A, violin 1C, solo violin 2, and cello A) use OCT12 throughout the section. The solo violin 1, violin 2A, violin 2B, and viola A—which has solo sections—switch between OCT01 and OCT12 within the section. Violin 2A maintains OCT01 until m. 319, where it switches to OCT12. Violin 2B reverses this,

¹¹ These voices will be labeled in following manner: Solo Violin 1, Violins 1A, 1B, and 1C, Solo Violin 2, Violins 2A and 2B, Violas A and B, Cellos A and B, and bass.

Starting Scale	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	
Violin 1 Solo	\$\$\$\$	****	****	****	****	\$\$\$\$	****	****	****	****	****	****	****	\$\$\$\$	****	AAAA	****	****	****	\$\$\$\$	****	\$\$\$\$	****	****	****	****	\$\$\$\$	****	\$\$\$\$	\$\$\$\$	\$\$\$\$
Violin 1a	\$\$\$\$	****	****	****	****	\$\$\$\$	****	****	****	****	****	****	****	\$\$\$\$	****	AAAA	****	****	****	\$\$\$\$	****	\$\$\$\$	****	****	****	****	\$\$\$\$	****	\$\$\$\$	\$\$\$\$	\$\$\$\$
Violin 1b	\$\$\$\$	****	****	****	****	\$\$\$\$	****	****	****	****	****	****	****	\$\$\$\$	****	AAAA	****	****	****	\$\$\$\$	****	\$\$\$\$	****	****	****	****	\$\$\$\$	****	\$\$\$\$	\$\$\$\$	\$\$\$\$
Violin 1c	\$\$\$\$	****	****	****	****	\$\$\$\$	****	****	****	****	****	****	****	\$\$\$\$	****	AAAA	****	****	****	\$\$\$\$	****	\$\$\$\$	****	****	****	****	\$\$\$\$	****	\$\$\$\$	\$\$\$\$	\$\$\$\$
Violin 2 Solo	\$\$\$\$	****	****	****	****	\$\$\$\$	****	****	****	****	****	****	****	\$\$\$\$	****	AAAA	****	****	****	\$\$\$\$	****	\$\$\$\$	****	****	****	****	\$\$\$\$	****	\$\$\$\$	\$\$\$\$	\$\$\$\$
Violin 2a	\$\$\$\$	****	****	****	****	\$\$\$\$	****	****	****	****	****	****	****	\$\$\$\$	****	AAAA	****	****	****	\$\$\$\$	****	\$\$\$\$	****	****	****	****	\$\$\$\$	****	\$\$\$\$	\$\$\$\$	\$\$\$\$
Violin 2b	\$\$\$\$	****	****	****	****	\$\$\$\$	****	****	****	****	****	****	****	\$\$\$\$	****	AAAA	****	****	****	\$\$\$\$	****	\$\$\$\$	****	****	****	****	\$\$\$\$	****	\$\$\$\$	\$\$\$\$	\$\$\$\$
Viola 1*	\$\$\$\$	****	****	****	****	\$\$\$\$	****	****	****	****	****	****	****	\$\$\$\$	****	AAAA	****	****	****	\$\$\$\$	****	\$\$\$\$	****	****	****	****	\$\$\$\$	****	\$\$\$\$	\$\$\$\$	\$\$\$\$
Viola 2	\$\$\$\$	****	****	****	****	\$\$\$\$	****	****	****	****	****	****	****	\$\$\$\$	****	AAAA	****	****	****	\$\$\$\$	****	\$\$\$\$	****	****	****	****	\$\$\$\$	****	\$\$\$\$	\$\$\$\$	\$\$\$\$
Cello 1	\$\$\$\$	****	****	****	****	\$\$\$\$	****	****	****	****	****	****	****	\$\$\$\$	****	AAAA	****	****	****	\$\$\$\$	****	\$\$\$\$	****	****	****	****	\$\$\$\$	****	\$\$\$\$	\$\$\$\$	\$\$\$\$
Cello 2	\$\$\$\$	****	****	****	****	\$\$\$\$	****	****	****	****	****	****	****	\$\$\$\$	****	AAAA	****	****	****	\$\$\$\$	****	\$\$\$\$	****	****	****	****	\$\$\$\$	****	\$\$\$\$	\$\$\$\$	\$\$\$\$
Contrabass	\$\$\$\$	****	****	****	****	\$\$\$\$	****	****	****	****	****	****	****	\$\$\$\$	****	AAAA	****	****	****	\$\$\$\$	****	\$\$\$\$	****	****	****	****	\$\$\$\$	****	\$\$\$\$	\$\$\$\$	\$\$\$\$

12+Eb, A

With D:
mirroring
opening

* Viola 1 has solos in mm. 303-304, 310-311, 320-329

- Oct12 ++++
- Oct01 ****
- Oct02 AAAA
- 01+F \$\$\$\$
- No collection established.

Figure 5-12. The multiple collections used in the final section of the piece. Colors refer to collections used within a voice, while symbols refer to the collection for the measure.

beginning with OCT12 and switching to OCT01 at m. 319. The bass is the only voice that uses a different collection: 01+F. There are three collections occurring simultaneously throughout the section—a fitting culmination for a work that has explored each collection alone and in various combinations with the others. The bass enters with two consecutive notes that belong to OCT01—usually D \flat and C; occasionally B \flat and A—before sliding down to a low F, thus clearly establishing the collection. Conceptually, however, this section is not entirely stratified. Through the use of common tones between OCT01, 01+F, and OCT12, most measures within this section belong to one of these collections. The contrast of collectional cohesion within each measure in spite of the ongoing collection-based stratification further obfuscates the conceptual stratification in this section.

A few measures in this section do not adhere to these three collections: m. 315, mm. 320-321, and m. 328. Measure 315 uses OCT02, which is most clearly outlined the use of E \flat , D, and F \sharp in the solo violin 1 part. All three second violin parts and the second viola part also play notes that do not belong to their collections otherwise. However, because only one note is played in each of these measures, a competing collection is not established. In the case of the two lowest second violin parts, which both switch collections in m. 319, the notes at m. 315 belong to the collection that will be established in m. 319. Measures 320-321 most closely adhere to OCT12 with the addition of E \flat and A. These notes, a tritone apart, are found in violin 1-2 and violin 2-2. Instead of an octatonic collection with one outlier, this can be broken into two chromatic pentachords a tritone apart. Finally, m. 328—the penultimate measure—is essentially 01+F with D. This final pitch collection is reminiscent of the first chord with a D against the high E, though this iteration has an F present as well.

As is the case in many other iterations of 01+F, the bass is the sole voice that distinguishes the collection as 01+F by being the only voice with an F present. This sole use of 01+F is particularly significant in this instance, as the bass is not the only voice that uses a collection with F in it; eight other voices use OCT12 at some point in this section. This F stands out within the ensemble because of its low register and tremolo. Musgrave shows the significance of this low F by maintaining this note as a perceptual and conceptual outlier in the final section of the piece.

The overarching trend of the piece is to gradually increase the level of stratification, whether conceptual, perceptual, or both. In Z1, where the opening *Arioso* is not stratified, stratification is increasingly introduced in contrasting episodes as Z1 progresses. The shift towards stratification is observed in the treatment of solo passages in Z1 and Z2. Textural stratification in Z1 is further marked as significant by appearing in dramatic solo passages, whereas in Z2 soloistic sections are distinct through their lack of stratification. This homophonic texture is especially clear in contrast with the climactic section of the piece, which is extremely stratified. While the final section of the piece is perceptually unified underneath solos, it is one of the most conceptually stratified sections of the work. While conceptual stratification exists without perceptual stratification throughout the final section of the piece, the opposite only occurs once, in mm. 145-151. It is important to note that the different types of stratification do not necessarily directly correspond, even as they occur at the same time. The many common tones shared between octatonic collections allows for the simultaneous use of multiple collections in one perceptual layer without discord.

CONCLUSION

The narrative arc of *Green* traces the interplay of two “opposing musical forces” a half-step apart: the E-centered Arioso and the discordant “intrusive” F. These “forces” interact and change roles through the course of the piece. This narrative, as outlined in Musgrave’s program note, is further supported by form and the use of stratification within the piece. Additionally, the overarching octatonic framework of the piece informs both the form and compositional techniques employed.

This piece is divided into two large formal sections, or zones. The first zone (Z1) introduces the two “forces,” setting them in opposition to each other. As Z1 progresses, the second—originally discordant—force develops and becomes the focal theme. The second zone (Z2) further explores the development of this new focal theme before bringing the piece to an end that is reminiscent of the first few measures of the piece.

The two forces are initially presented in an alternating pattern, similar to the form of a nine-part rondo. The first part of the lyrical and contrapuntal Arioso, primarily built around the collection 02+E, returns throughout Z1 as a “refrain,” interrupted by four increasingly complex “episodes” that each begin with a low tremolo F. These “episodes” are connected through motifs and instrumentation choices, creating sections that could almost seamlessly follow one another if the “refrains” were omitted. When this development is halted again and again by the return to the opening theme, it is no longer clear which force is “intruding” upon the other.

The final two “episodes” in Z1 develop texturally as well as melodically with the use of stratification. This creates an intense contrast to the Arioso, which has a much more unified texture. This stratification is found in textural and registral contrasts, but also can be traced through the simultaneous use of multiple octatonic collections.

Within Z1, the use of varying octatonic collections corresponds to some degree with the form but is not the most important perceptual determination of formal boundaries. The most significant indicator of a new section is the dissonance created between a low tremolo F and the previous, E-focused *Arioso*. This F can belong to OCT02, OCT12, 01+F, or 02+E, and Musgrave uses each of these collections within the “episodes.” However, the transition back to 02+E for the “refrains” often creates a conceptual elision, as the shift in collection occurs before the perceptual formal shift. In the last two episodes, the shift of voices to OCT02 or 02+E corresponds to conceptual stratification. In the third episode the shift to 02+E is seen only in the viola solo—increasing stratification before the refrain, and in the fourth episode the stratification collapses as the ensemble shifts into a homophonic texture and the collection OCT02.

The initial theme that is presented in the *Arioso* does not appear in Z2. Instead, the motifs explored in Z1’s “episodes” are further developed without the interruption of the *Arioso*. There are direct quotations of thematic materials from the third episode of Z1 within the first two sections of Z2. Section three of Z2 uses the same solo instruments—viola and cello—that the fourth episode of Z1 uses, further establishing continuity. The fourth section of Z2 brings the sixteenth-note motif to an apex, turning it into a frenetic aleatoric gesture in the violins. The final, much calmer fifth section then unifies the ensemble into longer, sustained notes that bring the piece to a conclusion that alludes to the sustained D and E that open the piece.

Stratification is present within the first, fourth, and fifth sections of Z2. The texture of the second and third sections, which do not use stratification, can be described as melody and accompaniment. By using material from the third and fourth episodes of Z1—which use stratification—in the second and third sections of Z2 without stratification, Musgrave balances the two zones while giving the viola and cello solos in Z2 more space to expand upon previous motifs without competing with other layers of melody. This unified texture also provides a huge

contrast before the fourth section of Z2, which is stratified both perceptually and conceptually. Musgrave creates three thick layers within this section and overlaps them in organized chaos, culminating in OCT01 aleatoric gestures in the violins above thick stacks of chromatically ascending quarter-note triplets. While the chromatically ascending lines are not octatonic, they are presented in stacks of five notes in minor thirds. Thus, each beat of a triplet forms an octatonic collection.

The concept of the multiple simultaneous collections creating an overarching collection within the ensemble is fully realized in the final section of the piece. The ensemble moves largely in rhythmic unison underneath solos that present the final, slowed iterations of motifs developed throughout the work. This rhythmic unison does not mean that stratification is not present: conceptually, eleven of the lines outline either the OCT01 or OCT12 octatonic collection. The bass, alone, outlines 01+F until the end. Despite the differences in collection in each voice, almost every measure of the section also adheres to either OCT01, OCT12, or 01+F. Through the use of common tones, Musgrave creates a simultaneously stratified yet cohesive final section.

While the octatonic collections used in *Green* are not directly cited as structural and narrative components in the way that they are used in Musgrave's *Largo in Homage to B.A.C.H.*, they do play a role in the underlying structure of the piece. Instead of creating, as she does in the *Largo*, a "rigorously organized" system for which octatonic collection is used in a particular section, Musgrave uses the interactions between multiple octatonic collections to uphold her narrative of the shifting roles between the Arioso and the initial "intrusive force" that develop throughout the piece.

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