Chapter Four

Charles Ives's *Three Quarter-Tone Pieces*

Charles Ives's *Three Quarter-Tone Pieces* give us a good sense of how his music might sound if he had composed more microtonal pieces. Composed for the relatively unfamiliar quarter-tone pitch universe, these short piano pieces employ many of the compositional techniques that one would expect to find in a conventional Ives composition. In *The Music of Charles Ives*, Philip Lambert identifies a number of techniques that generally characterize Ives's music, including wedge-like contrapuntal structures, symmetrical sets, palindromes, aggregates composed of whole-tone collections, and interval cycles.[1] Not only does Ives use these techniques in the *Three Quarter-Tone Pieces*, but he also uses other compositional strategies, characteristic of his style, such as quotation, allusion to common-practice tonality, and even elements of humour. In this chapter, I show how Ives lends his unique voice to the medium of quarter-tone pitches, by demonstrating how the techniques commonly associated with his music are present in *Three Quarter-Tone Pieces*.

[1] Philip Lambert, *The Music of Charles Ives* (New Haven and London: Yale University Press, 1997).

It appears that Ives thought of his *Three Quarter-Tone Pieces* as mere experiments in quarter-tone composition. He describes the third piece as "little beside[s] a study in quarter-tone harmony," and the first two pieces as merely "studies in melodic and rhythmic quarter-tone possibilities."[2] And it seems clear from Ives's writings on music that he did not hold these pieces in particularly high regard, cautioning that they were "not definitely completed works of art. They were simply studies within the limited means we had with which to study quarter tones."[3] Yet it seems likely that Ives was being uncharacteristically modest; these quarter-tone pieces stand up well under analytic scrutiny, revealing many interesting and subtle relationships. In this chapter, I examine these pieces from the perspective of Ives's own writings and then explore the specific stylistic features that characterize Ives's style more generally.

Ives gives his father, George Ives, credit for inspiring his experimental impulse.[4] Ives tells a story about a childhood memory of his father, standing outside in the pouring rain, listening to the sound of nearby church bells,

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[2] Charles Ives, *Charles E. Ives: Memos,* John Kirkpatrick, ed. (New York: W. W. Norton & Company, Inc., 1972), 110-11.
[3] Ibid., 111.
[4] Maynard Solomon, "Charles Ives: Some Questions of Veracity," *Journal of the American Musicological Society* 40/3 (1987). Charles Ives is known for constructing the legend of George Ives in his writings, in which he gives credit to his father for many of his own innovations. Solomon presents a skeptical view of Charles's veneration of his father.

and running back and forth, indoors and outdoors, trying but failing to find the sound of the harmonics produced by the bells in a chord on the piano. "I've heard a chord I've never heard before," he is reported to have said. "It comes over and over but I can't seem to catch it."[5] Not long after this incident, George Ives apparently began experimenting with quarter tones—his inability to reproduce the sound of the bells may have left him with a sense that there were sounds "missing" from the piano. The most unusual of George Ives's experiments took the form of a musical device made with 24 violin strings, on which he "would pick out quarter-tone tunes and try to get the family to sing them."[6] Ives credits his father with asking the question, "If the whole tones can be divided equally, why not half tones?"[7]

The *Three Quarter-Tone Pieces* were composed for a concert in 1925 that showcased a specially-constructed quarter-tone piano with two keyboards developed by Hans Barth. Ives composed the first two movements, *Largo* and *Allegro*, specifically for this concert, although in the second movement, he recycles material from earlier works, such as *Ragtime Pieces* (1900-11) and *The*

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[5] Charles E. Ives, "Some Quarter-Tone Impressions," *Ives: Essays Before a Sonata and Other Writings,* ed. Howard Boatwright (New York: W. W. Norton & Company, Inc., 1961), 111.

[6] Ibid., 110. Ives wryly observes that his father gave up his attempts to get his family to sing quarter-tone melodies "except as a means of punishment."

[7] David Eiseman, "George Ives as Theorist: Some Unpublished Documents," *Perspectives of New Music* 14/1 (1975), 146.

See'r (1913).[8] The third movement, *Chorale,* is a reworking of a quarter-tone chorale for string orchestra that he composed in 1914.[9] One concert announcement promised a performance of the full set of three pieces, but according to the concert programme, the first piece was not played at the concert.[10] Even though the programme indicates that the two remaining pieces were performed on the Barth piano, Ives's intentions for how the *Chorale* was to be performed remains unclear. In one instance, he writes that the *Chorale* was written for "two pianos tuned together, one a quarter[-tone] sharp."[11] In "Some Quarter-Tone Impressions," Ives contradicts himself when he writes that the *Chorale* was "intended for a [single] quarter-tone piano, two keyboards, and one player."[12]

Whether or not Ives intended the *Three Quarter-Tone Pieces* to be performed on a single quarter-tone piano, the published score is laid out as though for piano duet, with the *piano primo* tuned one quarter-tone sharp and the *piano secondo* tuned at standard pitch.[13] Throughout this chapter, I use the terms

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[8] Ives, *Memos*, 163-5.
[9] Kirkpatrick, 163-5.
[10] Ibid., 110.
[11] Ibid.
[12] Ives, "Some 'Quarter-Tone' Impressions," 119.
[13] Piano technicians who are concerned about the extra tension placed on the sharpened piano may leave the *primo* at standard pitch and tune the *secondo* a quarter-tone flat. Such an alternate tuning scheme changes the absolute pitch in performance, but leaves the pitch relationships between the two pianos intact.

primo and *secondo* to refer to the two chromatic fields; as I have labelled them, the twelve-note chromatic field of the *primo* sounds one quarter tone higher than the twelve-note chromatic field of the *secondo* regardless of the absolute pitch of the two pianos. In his own writings, Ives consistently refers to the higher-pitched keyboard as the 'quarter keyboard.'

Because the *Chorale* is laid out on two grand staves, it can be difficult to see voice-leading in the score, particularly when a given voice is shared between *primo* and *secondo*. In my musical examples, I renotate Ives's music, reducing the music to fit a single grand staff. In order to remain faithful to Ives's conception of the pitch space, the pitches of the *primo* are treated as being raised one quarter tone (with the pitches of the *secondo* left as written). Thus the flats, naturals, and sharps of the *primo* are transcribed as quarter flats (𝄳), quarter sharps (𝄲), and three-quarter sharps (𝄰), unless there is a compelling musical reason to substitute enharmonic equivalents.

Ives's "Some 'Quarter-Tone' Impressions"

Although Charles Ives was a prolific writer on topics in philosophy, aesthetics, and politics, he rarely wrote about his own compositional procedures. One of the only manuscripts in which Ives identifies specific

harmonic structures is his monograph "Some 'Quarter-Tone' Impressions," written for the *Franco-American Music Society Bulletin* and published in March 1925.[14] The monograph is short—roughly a dozen pages—and contains numerous digressions into philosophical and perceptual issues. In spite of its brevity and relative lack of detail, it is a useful document because Ives here proposes specific sonorities that he uses as the basis for quarter-tone harmony.

Ives rejects the neutral triad as sounding too much like a consonant triad with its third out of tune, judging that the neutral triad offers only a "weak compromise" between major and minor and is therefore not suitable for quarter-tone composition; the chords that Ives prefers to use are made up of at least four distinct pitch-classes.[15]

In "Some 'Quarter-Tone' Impressions," Ives identifies one chord as his "primary" sonority;[16] this chord, which opens the "Chorale," can be represented in pitch-class notation as {0.0 3.5 7.0 10.5}, a chord with successive intervals of <3.5 3.5 3.5 1.5>. The "normal form" of this set would be {10.5 0.0 3.5 7.0}, but I prefer the form which clearly shows that pc 0.0 functions as a root. Ives does not attribute roots to his quarter-tone

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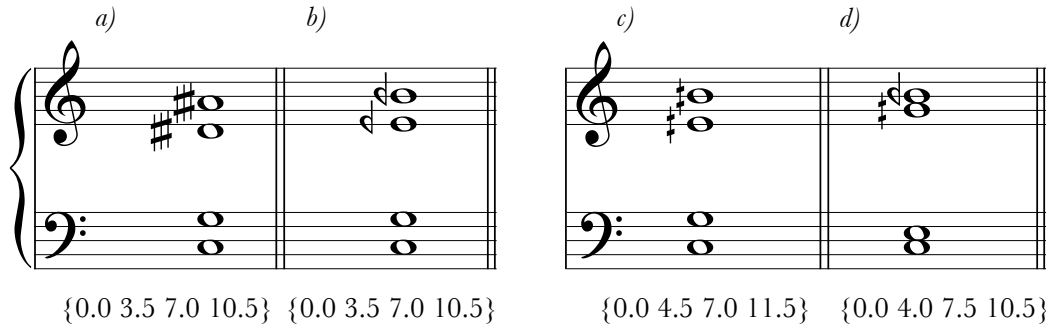
[14] Ives, *Essays Before a Sonata and Other Writings,* 106.
[15] Ibid.
[16] Ibid, 112.

chords. It is, however, useful to consider root-successions among these chords (see Example 4.7 below); I define the root as the lowest sounding pitch when the chord is arranged in the configuration presented by Ives. I refer to this "primary" chord as the *A-chord*. When viewed as a pitch-class set, the A-chord is inversionally symmetrical; it can be seen both as a stack of neutral thirds and as a pair of interlocking perfect fifths: {0.0 7.0} and {3.5 10.5}. The A-chord also has the property that the successive pitches (counting up from the root) alternate between notes taken from the *secondo* and notes taken from the *primo*.



Example 4.1: a) A-chord; b) A-chord respelled; c) and d) rejected candidates for primary sonorities

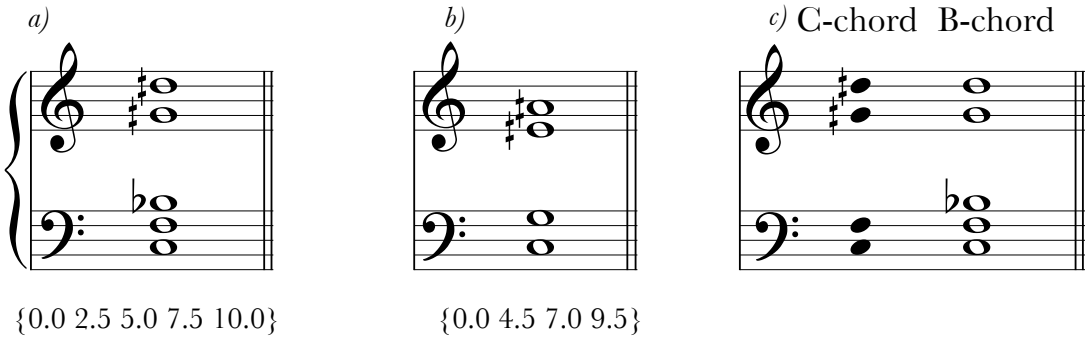
Ives's preferred voicing of the A-chord is as shown in Example 4.1a with the two distinct perfect fifths that constitute the A-chord kept registrally separated—a configuration that is inversionally symmetrical in pitch space as well as pitch-class space. Ives's quarter-tone harmonic writing typically features a separation of register, such that the notes from one piano

(normally the *secondo*) are kept below middle C while the notes from the other are kept above; rarely are the notes from the two pianos allowed to overlap or 'mix' in close registral proximity. This separation may derive from Ives's conception of the "Chorale" as a work to be performed by a single player at a quarter-tone piano with two keyboards. (It would be more practical for a single player to play with one hand on the conventional keyboard and the other hand on the quarter keyboard, since the stretches required when mixing pitches between two keyboards would be impossible to execute.)

Ives's spelling of the A-chord is curiously inconsistent—he names its pitches in turn as C, G, a raised D♯, and a raised A♯, but he describes this chord as having "three major thirds a quarter-tone flat, with an augmented second a quarter-tone flat completing the octave."[17] It seems that Ives regarded this chord as a sort of quarter-tone seventh chord, built from successive neutral thirds with a root of C. While a literal transcription of Ives's notation would render the A-chord that opens the "Chorale" as {C, D♯, G, A♯} as in Example 4.1a, the transcription in Example 4.1b {C, E𝄳, G, B𝄳} is more consistent with the spirit of Ives's conception because the chord notated with E𝄳 and B𝄳 realizes the flattened major thirds that Ives describes. Ives considered two further chords as potential primary sonorities,

[17] Ives, *Essays Before a Sonata and Other Writings*, 112.

but subsequently rejected both of them. One of these chords, transcribed in Example 4.1c, was rejected because of the narrow interval (int 0.5) between the seventh of the chord, B♯, and the root, C♮. Ives rejects the other chord, transcribed in Example 4.1d, because the chord lacks a perfect fifth.[18]



Example 4.2: a) B-chord; b) C-chord; c) transposition of the C-chord shown as a subset of the B-chord

Ives's chosen "secondary" sonority, which I refer to as the *B-chord,* can be represented as {0.0 2.5 5.0 7.5 10.0}, a set that displays the successive intervals of <2.5 2.5 2.5 2.5 2.0>. Ives describes this secondary sonority as a series of int 2.5 stacked above a root. We can also regard the B-chord as sets of interlocking perfect fourths, {0.0 5.0 10.0} and {2.5 7.5}. Like the A-chord, the B-chord is inversionally symmetrical when considered as an abstract pitch-class set; likewise, the B-chord shares the A-chord's property

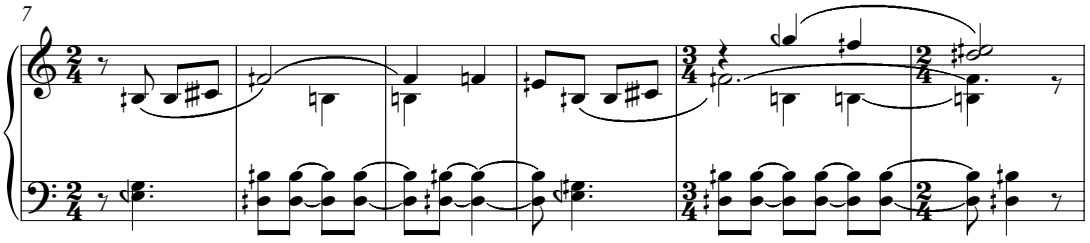
[18] Ives, *Essays Before a Sonata and Other Writings,* 113.

of successive pitches alternating between the *secondo* and *primo* twelve-tone fields. Unlike the A-chord, the B-chord does not appear symmetrically in literal pitch space; Ives's preferred voicing of the B-chord is shown in Example 4.2a.

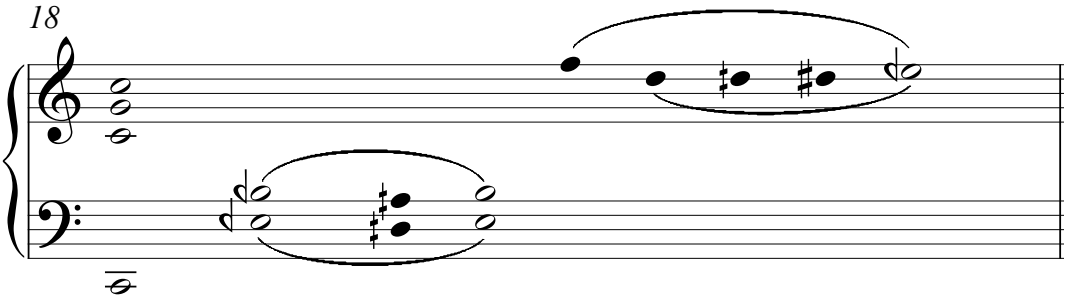
Scholars have often identified the A-chord and B-chord in the "Chorale," but typically say little else about either the chords or the piece. There are, in fact, more than two important chord types in the "Chorale."[19] Ives identifies a third sonority as a "nine-five-five" chord; Howard Boatwright has suggested that this might be some kind of C–D–A–E chord (with successive intervals of a ninth, a fifth, and another fifth).[20] It seems more likely that Ives conceived of this chord as comprising intervals of nine quarter tones, five quarter tones, and five quarter tones; this translates to intervals of <4.5 2.5 2.5> with ic 2.5 "left over" to complete the octave. I refer to this chord, shown in Example 4.2b, as the *C-chord.* The fact that the C-chord can be found in the opening measures of the *Chorale* in the form of the intervals <4.5 2.5 2.5 2.5> stacked up from the lowest voice supports my interpretation

[19] H. Wiley Hitchcock, *Ives* (London: Oxford University Press), 49–50. Hitchcock identifies the two chords as they appear in two short excerpts from the score but does not elaborate on other musical features of the *Chorale*. This type of commentary is typical of the CD liner notes one finds included with recordings of *Three Quarter-Tone Pieces*.
[20] Howard Boatwright, ed. *Essays Before a Sonata and Other Writings,* 115.

that Ives's "nine-five-five" chord is indeed this C-chord.[21] Like the A- and B-chords, the C-chord represents an inversionally symmetrical pitch-class set, having the same type of "alternation" feature seen in the previous chords. As I show in Example 4.2c, the C-chord is a four-note subset of the five-note B-chord. Ives appears not to exploit this subset relationship in the "Chorale."



Example 4.3: Mvt. I, *Largo,* mm. 7–12



Example 4.4: Mvt. I, *Largo,* sketch of mm. 18–28

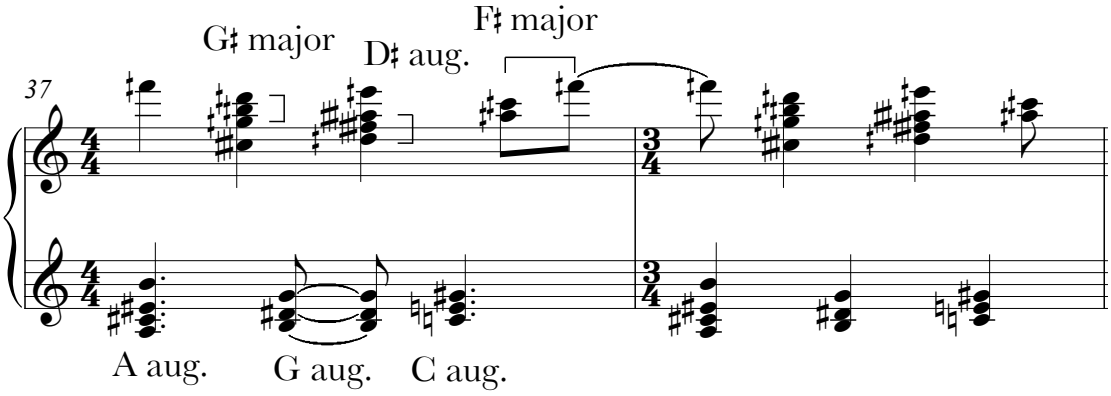
[21] A C-chord containing the same pitch classes as the chord in Example 4.2b appears in m.4, beat 2 of the "Chorale." See Example 4.8 below.

Ives concludes his "Impressions" with descriptions of each of the *Three Quarter-Tone Piano Pieces*, although these descriptions seem vague and at times somewhat misleading. Concerning the first movement, "Largo," Ives writes that it is "primarily diatonic, using quarter tones as passing notes or suspensions and quarter-tone chords as extensions or variants, though the middle section is of quarter-tone chord extensions."[22] The phrase "primarily diatonic" is puzzling, since the movement is not in any particular key and does not appear to make use of diatonic sets or scales in any obvious way; moreover, the pitch material seems equally complex and seemingly unstructured as in many of Ives's compositions. Ives does appear to use quarter tones as non-chord tones—passing tones and neighbour notes—in passages such as the one in Example 4.3; here, for example, the F𝄲 in m. 9 sounds like a quarter-tone passing tone between F♯ and E♯. This passage also displays an unusual perceptual phenomenon—the repeated B𝄲's look as though they are inflections of the chord-tone B♯; however, the slow tempo of the "Largo" makes the introduction of the B𝄲 against the B♯ sound more like a change of tone colour rather than a change of pitch. (This perception of changing tone colour can likely be attributed to two factors: (1) int 0.5 is smaller than a semitone, and (2) if the "Largo" is performed with the piano

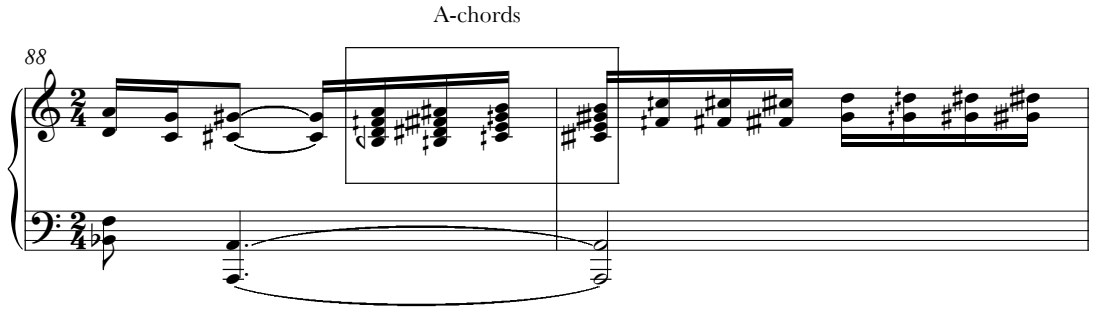
[22] Ives, *Essays Before a Sonata and Other Writings*, 119.

duet configuration described above, B𝄮 and B𝄯 will be produced by two different pianos.) Ives's statement suggests that non-chord tones are used merely to embellish "diatonic" harmonies, and yet there are clear examples of non-chord tones decorating quarter-tone harmonies as well; the passage that extends from m. 18 to m. 28 represents an extended elaboration of the A-chord, with neighbour notes and passing tones embellishing the E𝄲 and B𝄲 (Example 4.4).[23] Ives's characterization of the middle section of the "Largo" as being composed of "quarter-tone extensions" leaves unanswered the question of what, exactly, is being extended. More precisely, the middle section is composed of polychords (primarily augmented and major triads) with additional non-chord tones providing extra dissonance. Example 4.5 shows a representative passage with the triads in m. 37 marked.

[23] Interestingly, the B𝄲 stops sounding long before m. 28, so that the passage ends not with Ives's A-chord, but with a neutral triad—a triad that Ives claims to have preferred not to use.



Example 4.5: Mvt. I, *Largo,* mm. 37–38



Example 4.6: Mvt. II, *Allegro,* mm. 88-9

Ives describes the second movement, "Allegro," as "mostly made of rhythms contrasted or 'split' between the two pianos."[24] In the second movement, Ives treats the *primo* and *secondo* pianos antiphonally—a musical idea appears first on one keyboard and then it is repeated a quarter tone higher or lower on the other. He adds that, "From a pure quarter-tone

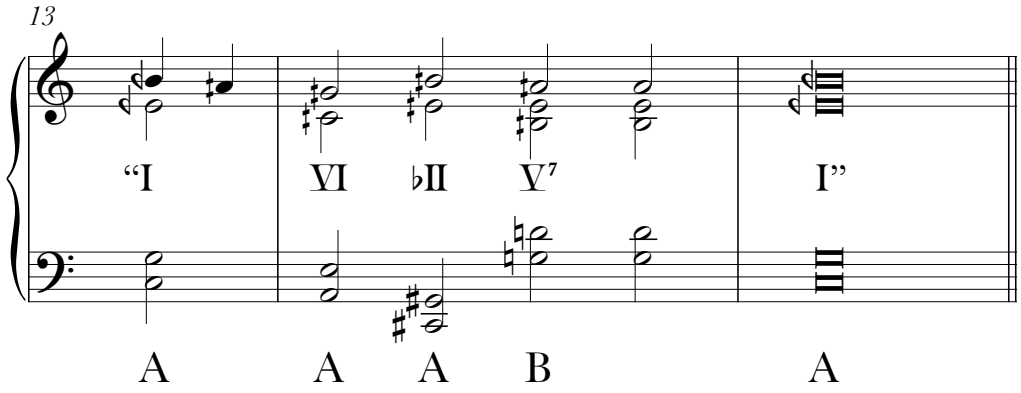
[24] Ives, *Essays Before a Sonata and Other Writings,* 119.

harmonic standpoint it doesn't amount to much."[25] Ives's assessment most likely derives from the movement's antiphonal texture since the two quarter-tone keyboards rarely sound together. There is some quarter-tone harmony in the second movement, such as the series of A-chords in mm. 88-9 (Example 4.6) and the march-like passage containing A- and B-chords discussed in more detail below (Example 4.13).

Taxonomy of Ives's Quarter-Tone Chords

In the "Chorale," Ives demonstrates his techniques for structuring quarter-tone harmony in their most complex form. In contrast to the first two movements, the third movement exhibits a greater variety and number of quarter-tone chords, along with a more subtle use of voice-leading and bass lines. By looking at the "Chorale" in its entirety, we can observe a number of significant compositional features. For much of the movement, Ives keeps the two quarter-tone fields registrally separate, scoring the notes of the *primo* above middle C and the notes of the *secondo* below. With few exceptions, Ives's A- and B- chords tend to be in root position.

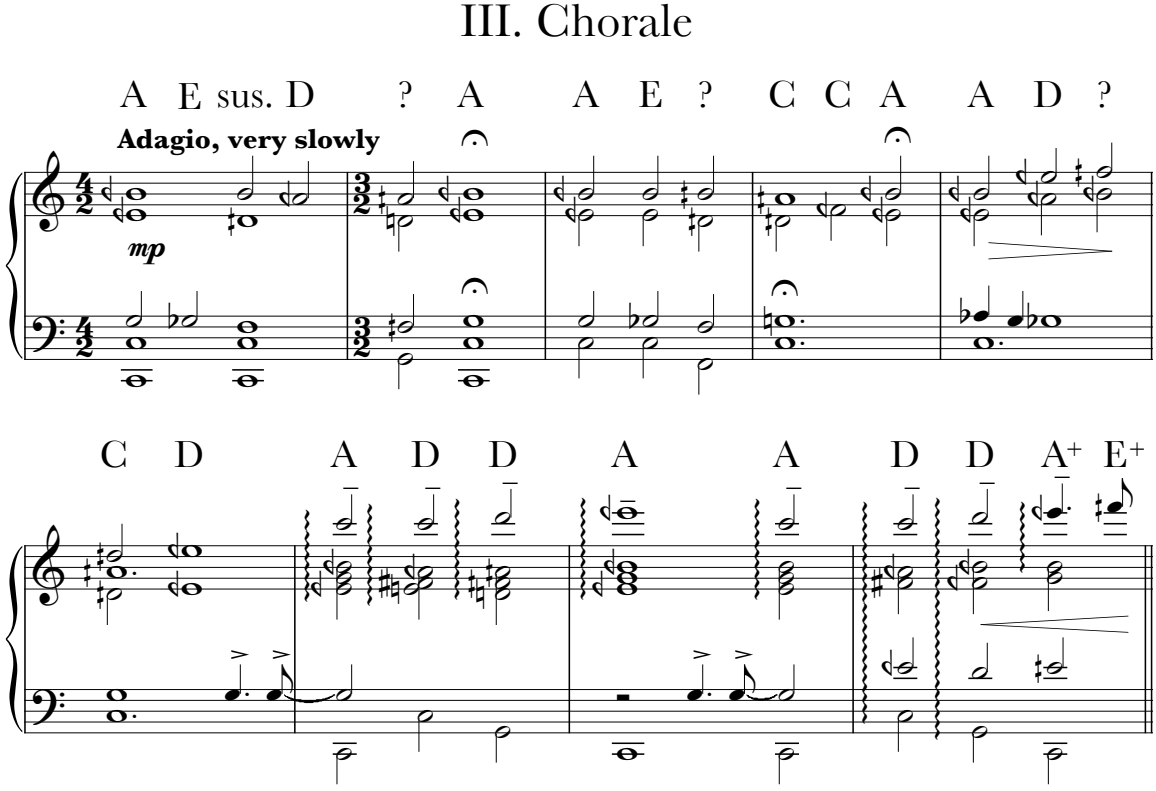
[25] Ibid.



Example 4.7: Mvt. III, *Chorale,* mm. 13-5

Strong evidence suggests that the chorale is "in C": the piece both opens and closes with a root position A-chord with the pitch C♮ in the bass, and there is a recurring cadential figure, harmonized in a way that strongly suggests a functional tonal progression, that comes to a close on C♮. Ives arranges the B-chord so that it functions as a dominant, in opposition to the A-chord's tonic. The first occurrence of this cadential figure appears in m. 13 (see Example 4.7) and demonstrates this typical dominant/tonic opposition. In this passage, we see a series of A-chords interrupted by a single B-chord at the end of measure 14. If we look at the bass of the chords beginning in m. 13, we see the string of pitches C♮, A♮, C♯, G♮, C♮. If we substitute D♭ for C♯, this string can be interpreted as $\hat{1}$–$\hat{6}$–$\flat\hat{2}$–$\hat{5}$–$\hat{1}$ in the key of C, a chromatic bass line that (in a conventional tonal context) could

support the functional progression **I**–*vi*–♭**II**–**V**–**I**. Not only does the lone B-chord occupy the place of the dominant in this progression, it appears in an inversion that puts the pitch G in the bass. The actual root of this B-chord is B♯, a pitch that could be seen as a close leading-tone to C. Ives here appears to be playing an elaborate game with the relationships between his quarter-tone chords and the compositional norms of common-practice functional harmony.

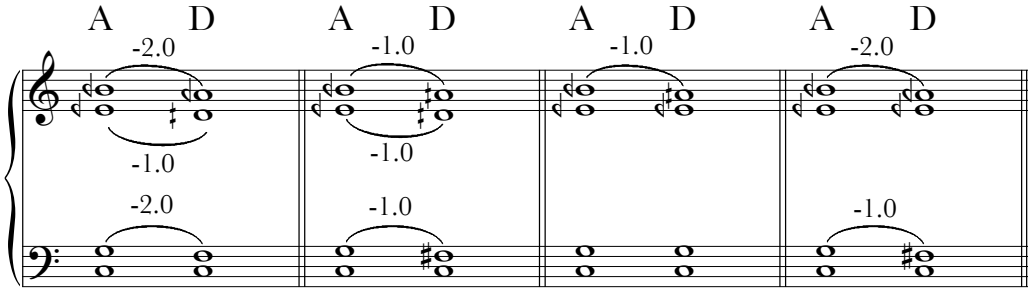


Example 4.8: Mvt. III, *Chorale*, mm. 1–9

Example 4.8 shows the first nine measures of the chorale, renotated so that the music fits on a single grand staff. In addition to reducing the notation to a single staff, I have chosen enharmonic equivalents such that each A-chord is spelled to resemble a traditional seventh chord, that is, spelled as a "stack" of thirds. Scored in this fashion, Example 4.8 allows us to see some striking features. From the opening until m. 7, the two quarter-tone fields are registrally separated; with the sole exception of the first chord of m. 2, the *primo* notes are confined to the treble clef, while the *secondo* notes are confined to the bass clef. The voice-leading profile of the first four measures is typical of chorales: a disjunct bass supports relatively smooth upper voices—the soprano, alto, and tenor voices all move by intervals of no more than ic 2.0. The pitches of the bass line fall into familiar patterns: C–G–C followed by C–F–C—typical tonal bass lines suggesting I–V–I and I–IV–I in the key of C. Each phrase begins and ends with an A-chord with a root of 0.0, reinforcing not only the role of C as a sort of "tonic," but also the role of the A-chord as a primary sonority.

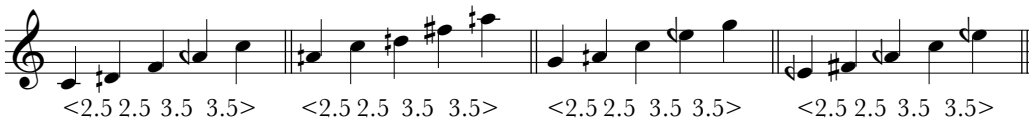
In Example 4.8, I have marked the chord types above each chord. There are a number of A-chords, all in root position, and all with roots of C♮. There are also C-chords; in m. 4, the moving alto voice transforms a root position C-chord with a root of C♮ into an inverted C-chord with a root of

A♮. The chord that I have identified as a D-chord is not a chord described by Ives; this chord arises from the voice-leading. The D-chord has an interval structure of <2.5 2.5 3.5 3.5> and can be represented by {0.0 3.5 6.0 9.5}. Example 4.9 shows four ways that the root-position A-chord {0.0 3.5 7.0 10.5} can be transformed into a D-chord. If pc 0.0 is held as a common tone, there are four distinct D-chords that can be reached by way of voice-leading of no more than int 2.0 (one whole step) in each voice. In Example 4.9a, the slurs show the moving voices, and the numbers show the interval traversed by each moving voice; Example 4.9b arranges the D-chords of Example 4.9a in "root position" to make clearer each D-chord's intervallic structure. There are other transformations leading to other D-chords that can be reached from this one A-chord, depending on which notes are held as common tones and which notes are moved.[26]



Example 4.9a: Transforming the A-chord into D-chords

[26] The voice-leading and transformational interactions among Ives's chords would likely make an interesting future study. In Chapter 6, I apply a neo-Riemannian transformational approach to a quarter-tone tetrachord used by Ivan Wyschnegradsky.



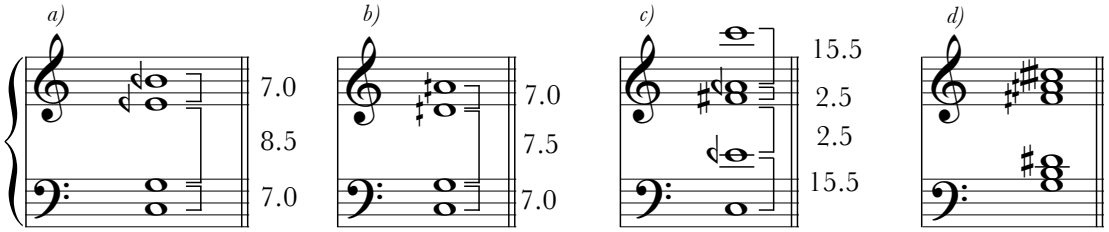
Example 4.9b: The D-chords of example 4.9a rearranged in "root position"

I have further identified an *E-chord* that, like the D-chord, first arises as a result of voice-leading. The G♭ in the first measure is a chromatic passing tone between the G♮ in the A-chord and the F♮ in the following D-chord. This passing tone creates an incidental sonority of {0.0 3.5 6.0 10.5}, a chord with successive intervals of <3.5 2.5 4.5 1.5>. The E-chord is not inversionally symmetrical, and has the property that each successive interval is unique. As well, the E-chord shares the alternating property of the other chords. The Chord marked A^{+} is a superset of the A-chord; likewise the incidental sonority caused by the motion of the soprano in m. 9 is a superset of the E-chord, which I have marked E^{+}.

There are four chords in Example 4.8 that fit none of these five chord types: in m. 1, beat 3, the chord that arises from the suspension (marked 'sus.') has an interval structure of <2.5 2.5 5.5 1.5>; in m. 2, the chord on the first beat has an interval structure of <2.5 4.5 3.5 1.5>; in m. 3, beat 3,

there is a 3-note chord with an interval structure of <2.5 6.5 3.0>; in m. 5, beat 3, there is a chord with an interval structure of <5.5 0.5 4.5 1.5>. The four-note chords all share the alternation property; apparently Ives was interested in chords that in an abstract sense mix the two quarter-tone fields.

Ives's Characteristic Compositional Techniques

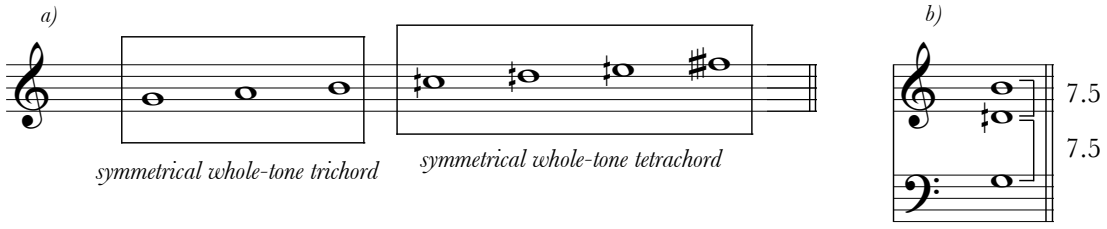


Example 4.10: a) A-chord, Mvt. III, *Chorale,* m. 1; b) C-chord, m. 3; c) D-chord, m. 9; d) Mvt. I, *Largo,* opening chord

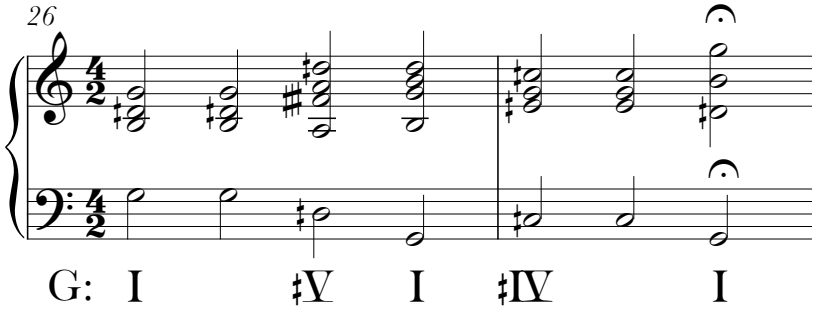
Throughout *Three Quarter-Tone Pieces,* one can find numerous realizations of the compositional techniques that characterize Ives's music. For example, symmetrical structures and palindromes play an important role in Ives's music, both on a local level and as determinants of large-scale form.[27] I show above that the A-, C-, and D-chords are all inversionally symmetrical pitch-class sets. Ives arranges the pitches of these chords in configurations that are

[27] Lambert, 65-75 *passim*.

inversionally symmetrical in pitch space so that the harmonic intervals create vertical palindromes.[28] Example 4.10 shows these chords as they appear in the "Chorale" with the intervals marked to the right of each chord. The chord shown in Example 4.10d is the chord that opens the first movement. This chord, which is described by Ives, is composed of two symmetrical augmented triads that combine to create a six-note chord; it is symmetrical both as a pitch-class set and in its arrangement in pitch space.



Example 4.11: a) scale representing the pitch content of Mvt. III, *Chorale,* mm. 16-27; b) m. 27, final chord of passage

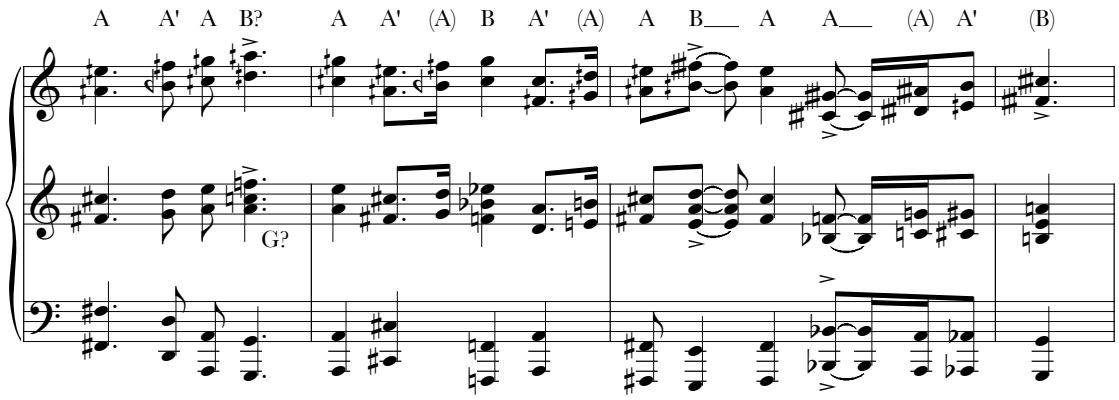


Example 4.12: *Chorale,* mm. 26–7

[28] Although the B-chord is inversionally symmetrical, Ives does not arrange the chord registrally as a palindrome.

While the chords in Example 4.10 are examples of symmetry occurring at a local level, symmetry also governs the pitch content of a section spanning several measures in the passage from m. 16 to m. 27. This passage is based on a scale that arises from a transformation of symmetrical segments of the diatonic scale. If one separates the G-major scale into the two whole-tone sets {7.0 9.0 11.0} and {0.0 2.0 4.0 6.0} and then transposes the tetrachord up by one quarter tone, the result is Ives's scale (Example 4.11a). Even though the resultant set, {7.0 9.0 11.0 0.5 2.5 4.5 6.5}, is not itself inversionally symmetrical, Ives's transformation partitions the G-major scale, itself an inversionally symmetrical set, into two smaller inversionally symmetrical sets, thus reinforcing the significant role that inversional symmetry plays within the *Chorale*. The final chord of this passage is a distorted G-major triad that occurs in m. 27. Disregarding the octave doublings of the pitch G♮, one obtains the chord in Example 4.11b, which is a symmetrical representation of the "tonic triad" derived from the scale shown Example 4.11a. In this passage, Ives plays with the tension between the quarter-tone sets and the diatonic idiom, centering this passage around the pitch G, while the piece as a whole is centered on C, thus again hinting at a dominant-tonic relationship. Ives ends the passage with a simple chord

progression that is likely to be perceived as a distorted version of I–V–I–IV–I (Example 4.12).

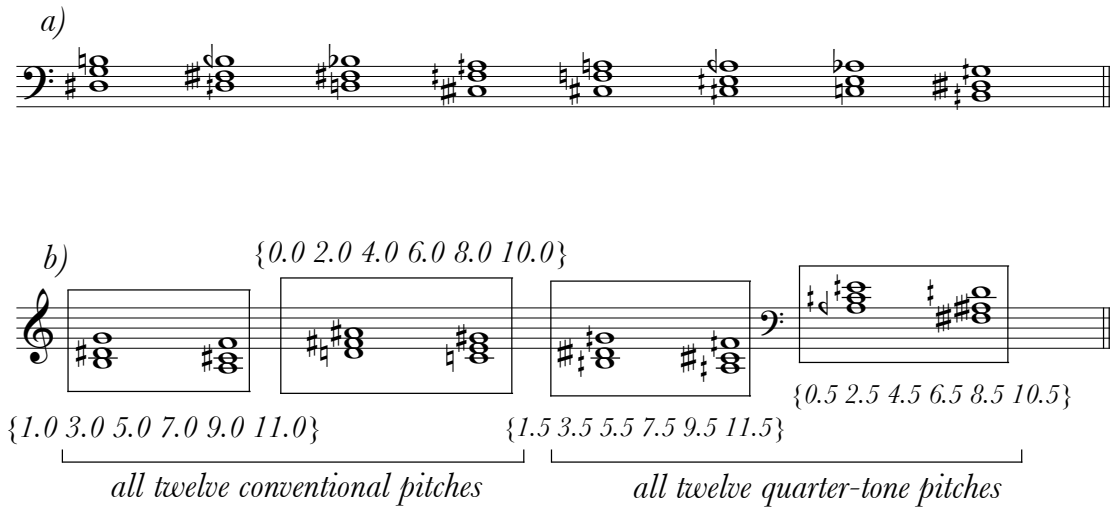


Example 4.13: *II. Allegro,* mm. 47–50

According to Lambert, Ives often uses wedge-like structures to control outer-voice counterpoint.[29] In a wedge, two voices moving in opposite directions either converge or diverge depending upon which voice ascends and which descends. The wedge formation does not play a substantial role in the *Three Quarter-Tone Piano Pieces*, although there is one striking passage made up of A- and B-chords that occurs in the *Allegro* beginning at m. 47 (see Example 4.13). The chords marked A' are second-inversion A-chords. (The final chord in m. 47 likely contains a misprint in the score; substituting G♮ for A♮ yields a root-position B-chord). Ives was concerned that quarter-tone

[29] Lambert, 53-64 *passim*.

harmony might "lessen contrapuntal feeling"[30]—the use of inversions allows Ives to address his contrapuntal concerns, creating contrary motion between bass and soprano throughout the passage, which both begins and ends with diverging wedges formed by the ascending soprano coupled with the descending bass.



Example 4.14: a) Mvt. II, *Allegro,* mm. 135-6; b) mm. 130-33

Another technique that is common in Ives's music is the combination of complementary whole-tone scales to create structures that exhaust the aggregate.[31] In the *Three Quarter-Tone Piano Pieces*, Ives builds aggregates from both augmented triads and whole-tone scales. Ives describes a chord made

[30] Ives, *Essays Before a Sonata and Other Writings,* 118.
[31] Lambert, 81.

up of "an augmented major triad in the normal scale and another based a whole tone higher or lower in the octave above (quarter keyboard)"[32]—one realization of this chord, which opens the first movement "Largo," is shown above in Example 4.10d. Example 4.14a shows a simple passage in which a single augmented triad is repeatedly transposed down by int 0.5 until the full 24-note aggregate is completed. The augmented triads in Example 4.14b are arranged symmetrically so that each pair combines to form one of the four whole-tone collections, each pair of whole tone sets combines to form one of the two 12-note aggregates, and the whole passage collectively exhausts the 24-note aggregate. In his "Impressions," Ives also considers partitioning the pitches of the 24-note aggregate into whole-tone chords, distributing them across several octaves "in a chord not especially harsh."[33] Example 4.15 presents a sketch of m. 42 of the *Allegro* in which whole-tone sets combine to form the full 24-note aggregate.

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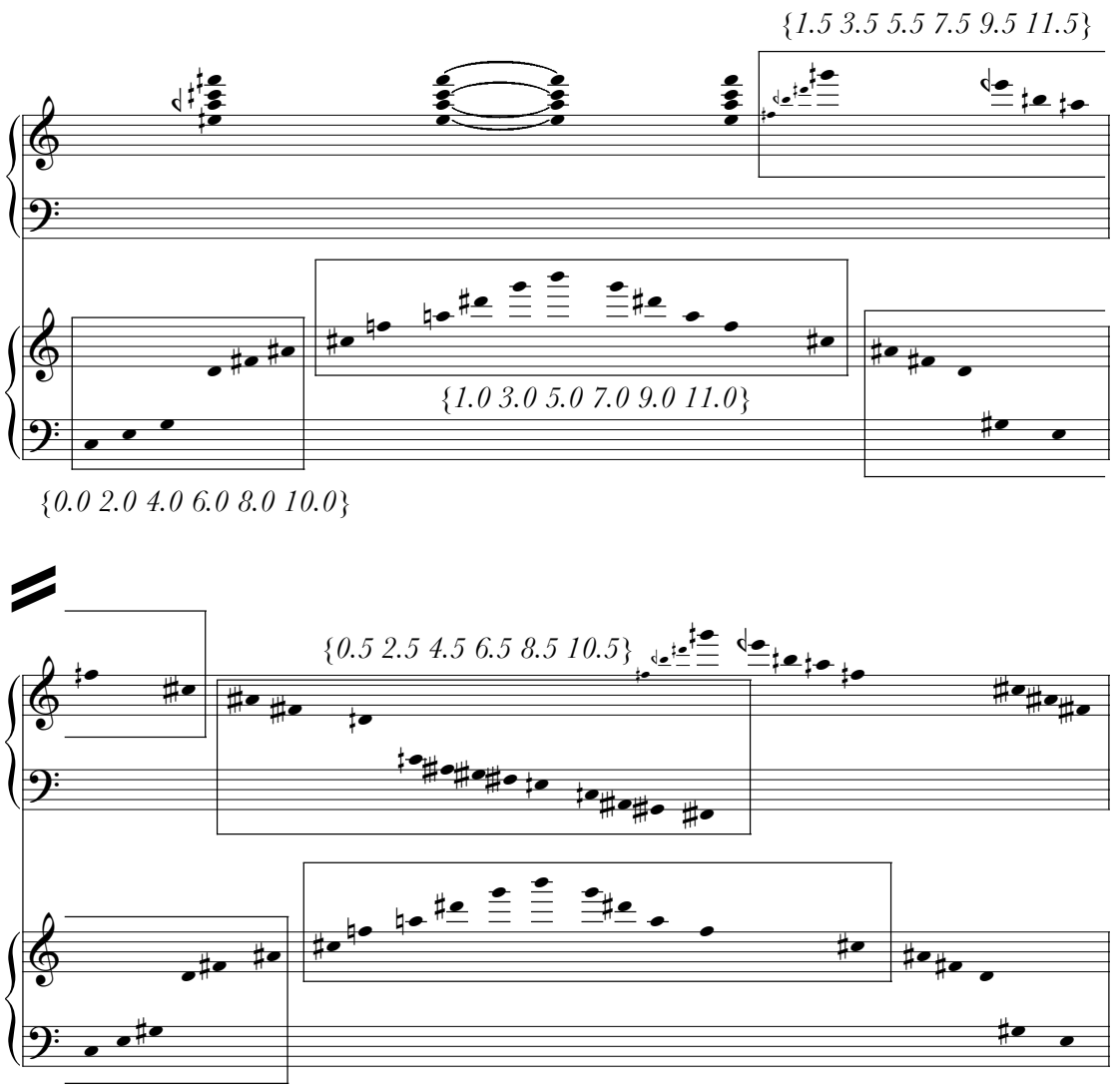
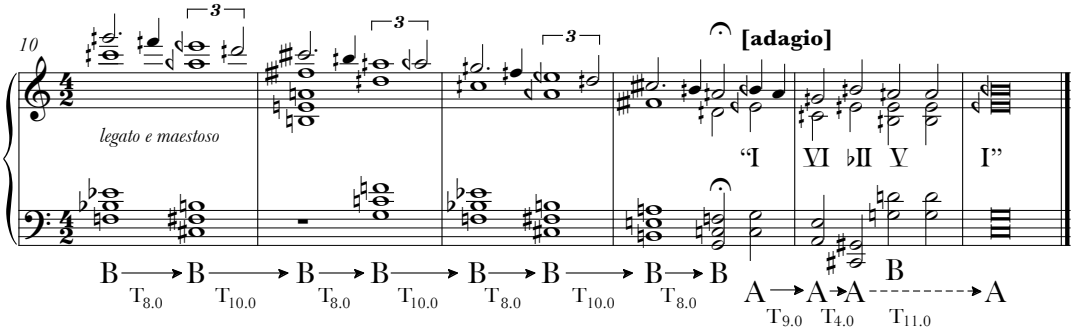
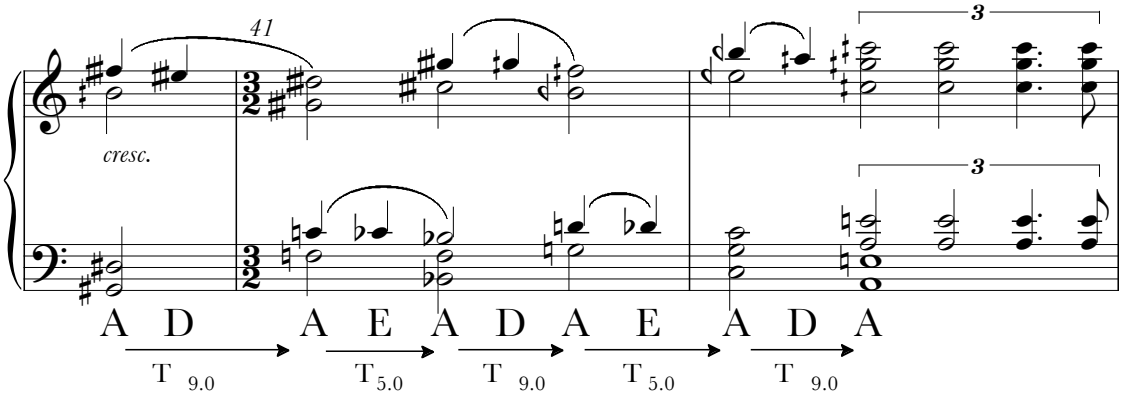
[32] Ives, *Essays Before a Sonata and Other Writings,* 116.
[33] Ibid., 117. In a footnote, Boatwright claims that by "whole-tone triads" Ives meant "augmented triads." In the passage sketched in Example 4.15, while the pitches of the *secondo* arpeggiate augmented triads, the pitches of the *primo* do not adhere strictly to this procedure.



Example 4.15: Mvt. II, *Allegro,* mm. 42–43, complementary whole-tone sets forming aggregates



Example 4.16: Mvt. III, *Chorale*, mm. 10–5



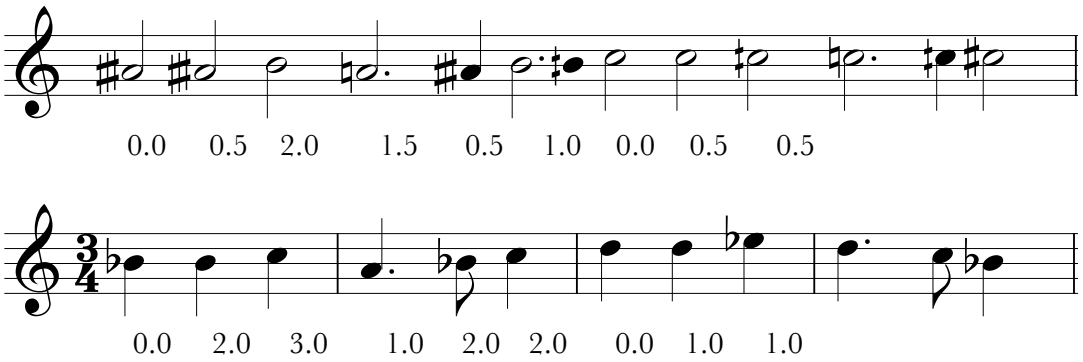
Example 4.17: Mvt. III, *Chorale*, mm. 40–2

Ives typically uses two types of interval cycles to generate pitch material: simple cycles based on the repetition of a single interval, and combination cycles based on the alternation of two different intervals.[34] The A- and B-

[34] Lambert, 160. The term "combination cycle" is derived from Cohn's idea of transpositional combination. See Richard Cohn, "Properties and Generability of Transpositionally Invariant Sets," *Journal of Music Theory* 35/1-2 (1991), 16.

chords are examples of sets generated by simple cycles; the A-chord can be generated by a cycle of int 3.5, while the B-chord can be generated by a cycle of int 2.5. The sequential passages in the "Chorale" are governed by combination cycles, in which the sequence proceeds through the alternation of two different intervals of transposition. Example 4.16 shows measures 10 through 15, a passage in which a sequence of B-chords proceeds by $T_{8.0}$ alternating with $T_{10.0}$, creating a three-note cycle of chord roots beginning and ending on G. It is interesting to place this passage in the context of the music surrounding it. The opening nine measures of the "Chorale" begin and end with A-chords with roots of C♮, while the sequence that follows begins with a root-position B-chord with F♮ in the bass and ends with a B-chord with a root of G♮. This latter chord is followed by the cadential figure shown in Example 4.7 and discussed above. Over the entire first fifteen measures, therefore, we find a passage centered on C♮, followed by a sequence starting with a bass F♮ and moving through to a bass G♮, finally reaching a cadential figure that emphasizes the root-postion A-chord with a bass C♮. Here, Ives is clearly alluding to large-scale tonal conventions: the pattern of C-F-G-C spanning the first fifteen measures can be interpreted as $\hat{1}$-$\hat{4}$-$\hat{5}$-$\hat{1}$ in the key of C. Example 4.17 shows another passage from the end of m. 40 to m. 42—a passage that is also sequential, as the A-chords are

transposed by $T_{9.0}$ and $T_{5.0}$. The voice-leading interactions are also of special interest; in each case, the voice moving in quarter notes creates D- and E- chords on the offbeats.



Example 4.18: Mvt. III, *Chorale,* melody, mm. 48-52, compared to the melody of "America"

Ives is known for quoting patriotic songs in his music, although the source material for such quotations is frequently paraphrased.[35] Throughout the "Chorale," Ives uses fragments of the song "America"; the longest quotation, shown in the upper staff of Example 4.18, comes from mm. 48-52. Ives compresses several of the intervals while preserving the melodic contour and the dotted rhythms of the original tune (shown in the second line of Example

[35] J. Peter Burkholder, "'Quotation' and Emulation: Charles Ives's Uses of his Models," *Musical Quarterly* 71/1 (1985), 2-3.

4.18 for comparison) to create a new quarter-tone melody that sounds similar to the tune he is paraphrasing.

The *Three Quarter-Tone Piano Pieces* are of special interest in the way that they "sound like Ives" even though they use an unfamiliar tuning. This chapter suggests that there are numerous musical features that these pieces share with Ives's more well-known works, supporting my initial claim that these quarter-tone pieces in fact mimic Ives's familiar compositional style. These experimental pieces present questions that deserve further exploration. Particularly important is the curious tension that Ives sets up between quarter-tone harmony on the one hand and the norms of common-practice tonal harmony on the other. When discussing quarter-tone harmony, Ives argues rhetorically, "Why tonality as such should be thrown out for good, I can't see. Why it should be always present, I can't see."[36] In Chapter Five, I look *24 Préludes dans l'échelle chromatique diatonisée à 13 sons* by Ivan Wyschnegradsky. These preludes do not use common-practice tonality, but exploit prolongations of a tonic chord to create a tonal effect.

[36] Ives, *Essays Before a Sonata and Other Writings,* 117.