NOW ALL THE FINGERS OF THIS TREE

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Thesis Prepared for the Degree of

MASTER OF MUSIC

UNIVERSITY OF NORTH TEXAS

May 2003

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Wood, Kelly Thomas, *Now All the Fingers of This Tree*. Master of Music (Composition), May 2003, Score 8 pp., Essay 31 pp., references, 9 titles.

*Now All the Fingers of This Tree* is a work in two movements based upon a poem of the same name by E. E. Cummings. It is divided into two movements: The first movement is scored for nine part solo soprano, where one performer records each of the nine vocal lines. The second movement is an electro-acoustic work derived from four phrases of the original recording of the first movement. Total duration of the work is approximately 19 minutes.

The paper provides a detailed analysis of both movements as well as a discussion on usage of text, problems addressed with traditional notation techniques, and technology utilized in the production of the work.
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COMPOSITIONAL OVERVIEW

now all the fingers of this tree has been through several mutations since its inception. I originally conceived the first movement of the piece as a nine voice women’s chorus work which could either be performed by an ensemble or by multi-tracking the eight lower voices while leaving the Soprano 1, or solo voice, live. The second movement would then be a digital echo of the first, or more exactly, a work of roughly the same length and form contrived from the recording of the first. Unlike the first, this movement would be performed by a solo voice accompanied by tape.

As the second movement progressed, however, the practicality of this idea began to diminish. Within the first several minutes, the amount of unprocessed vocal tone I began to feel necessary became minimal. The small amount desired was taken from the long, sustained lines found in the first half of the first movement, making the performers role in the second movement limited at best. In addition to this, my intentions for the movement shifted towards being more textural than melodic (as in the first movement), thus giving the movement a more hypnotic or disembodied sound, making the work more in tune with the digital echo idea. With such a limited role in the second movement, I felt the use of a live performer could possibly become a distraction to the listener.

From that ground, I began to ponder the wisdom of utilizing a live performer for only half of the work. The decision to do away with the performer in the second movement led the piece to its current form: a work for live performers plus processed audio, which is not performed live.
Strict rhythmic placement is avoided in the notated portions of the piece with traditional rhythmic notation making an appearance in only one brief section. Note duration is left to the performer or simply follows the natural rhythm of the text in any given section. Notation techniques employed in the work are discussed in more detail later in the paper.
ANALYSIS

First Movement

The first movement is scored for nine part solo soprano with each vocal line (hereafter referred to as S 1-9), recorded in succession and mixed down to a single stereo pair. Ideally, the same vocalist should perform each vocal line. This gives the movement and textures a more even flow from section to section and also produces some interesting vocal effects.

The movement opens with S1 singing the text “in this there is only one” on a long, chant-like sustaining G. This is actually the first note of an extremely elongated canon, which provides the source material for the first section of the movement (see figure 1). Rhythmic placement of the text is not strictly given, but rather implied by the spacing of note heads in the score and the inclusion of suggested duration time for page one of the score.

Cycling through voices one, two, three and four and heard partially in voices S5 through S9, the melodic line of the canon is constructed so that each pitch is doubled one or several times over by successive entering voices. With a written crescendo and the addition of voices slowly over time, a gradual wave of sound begins to build as all pitches of the canon eventually are heard together as a slowly evolving cluster chord. Figure 1. Six note canon.

\[\text{Figure 1. Six note canon.}\]
By page 4, seven of the nine voices have entered and the cluster has moved from threadlike pianissimo to dense forte. With the entry of S8 and S9 and the completion of the cycle of pitches by S1 on, the pseudo-canonical structure begins to break down and voices begin repeating the last pitch and phrase of text they were at in the cycle. From the end of page 4 to the start of page 5, the voices decrescendo and drop out individually as the texture fades.

As the canon texture is diminishing, S2 begins a new motive based loosely on the canon material and on a new section of text: “now all the fingers of this tree”¹ (see figure 2). S3 shortly follows with the same motive and both are instructed to repeat the phrase with varying modifications to rhythm and text placement. S 4 and S 6 also enter with shorter motives on the texts “darling have hands” and “you are and i am”² respectively. With this as the underlying texture, S1 emerges with what amounts to a brief solo at the end of page 5. Here, for the first and only time in the piece, S1 conveys more than just a fragment of the Cummings poem with a more traditional setting of the text “and all the hands have people and more each particular person is (my love) alive”.³ Also at this section, specific rhythmic durations are supplied to the performer to ensure the proper placement of the text. Rhythmic durations are also given to S5 on the text “you are and i am”.

² Cummings.
³ Cummings.
Figure 2. Motive from start of second section, Soprano 2.

At the start of page 6, the S1 solo line returns to note head only style of notation and as it finishes the phrase of text, the remaining voices crescendo into the next section of text: “(my love) alive”. This briefly creates a very weak E b major 7th chord with the lowest and highest voices singing the 7th and root of the chord respectively (see figure 3). This undermines the harmony and creates more of a cluster chord than any functional harmony. This is reinforced as the harmony begins to break down with soprano 1 singing an octave motive on A at the text “than every world”.

Figure 3. 7th chord on “(my love) alive”.

As the textures of the repeated phrases continue, S6 picks up the octave A motive from S1 on the text “(my love) alive”, which takes the movement into the final section.

On page 7, S1 introduces the last motive: a three note descending phrase (C – B b – A) on
the text “you and i”. The other eight voices either drop out completely or pick up this motive, except for S5, which uses the same motive transposed down a whole-step. While the texture continues to thin, S1 slips down to the D below the staff and is the last voice heard, once again on the text “you and i”.

Second Movement

The second movement was composed entirely from four specific samples of the source recordings from the first movement and represents a digital variation of sorts from the written composition (see table 1). The first movement incorporates more textural elements than thematic, and this movement embellishes those textures through digital processing, layering and mixing to create a soundscape not unfamiliar to the first.

Table 1. Usage of Source Material from First Movement.

<table>
<thead>
<tr>
<th>Motive:</th>
<th>Motive One</th>
<th>Motive Two</th>
<th>Motive Three</th>
<th>Motive Four</th>
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<tr>
<td>Description:</td>
<td>First note of First Movement canon and First Soprano entrance on text: “in this there is only one” (see fig. X).</td>
<td>Eight note repeated phrase, which starts the second section of the First Movement on text “now all the fingers of this tree” (see fig. X).</td>
<td>Third note of First Movement canon (B4) on text “or scream” (see fig. X).</td>
<td>Ending phrase of first movement on text “you and i” (see fig X).</td>
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<td>Usage:</td>
<td>0’00” – 02’12” 01’15” – 03’17” 03’52” – 04’46”</td>
<td>02’50” – 04’47” 07’09” – 08’48”</td>
<td>04’36” – 07’34”</td>
<td>08’25” – 09’15”</td>
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The movement begins with the processed recording of introductory phrase from the opening of the composition: the sustained G on the text “in this there is only one” (see Figure 4).

Figure 4. Motive one.

The passage has been electronically altered in several ways. First, it has been time-stretched from 28 seconds to almost 47 seconds. This process only modifies the length of the file while leaving the pitch intact. Next, it was passed through a series of notch filters in order to reduce the presence of the fundamental frequency and amplify the harmonics and other frequencies higher in the spectrum (see figures 5 and 6). Finally, the filtered sample was given a medium-decay reverb.
Figure 5. Frequency analysis of unprocessed Motive One.

Figure 6. Frequency analysis of processed Motive One.
After this initial entrance, the processed sample is then transposed, in order, to each of the corresponding pitches of the opening four notes of the first movement canon (G 4, F# 4, B 4, C# 5). By filtering out all but narrow bands of the original sound’s spectrum, the text is reduced to a mere string of vowels, producing a scarcely recognizable, disembodied echo.

At 01’15” this texture begins to diminish. Gradually, the bandwidths of the filters are expanded, allowing more of the original source to pass through until finally, the unprocessed soprano source emerges. The effect sought was that of the sound pushing its way through a membrane, which is continually stretched and thinned until finally it breaks, allowing the full sound to pour through. From 01’30” to 02’18”, the filtered texture is completely engulfed by overlapping instances of the unprocessed motive occurring first on the original pitch (G 4), and then by the same source pitch-shifted to the fourth below (D 4). This marks the entrance of a new section of the movement, where the source vocal line is pitch-shifted to create slowly evolving harmonies. The first clear harmony occurs at 02’18” when a G minor triad emerges as the sustaining fourth between the D and G is joined by Bb 4. This tonality is quickly undermined as other voices enter to create two conjoined perfect fifths (between C4 – G4 and D4 – A4) from 02’26” to 03’55”. This texture is capped by a transposed and time-compressed sample looping forwards and then backwards on the opening soprano line: “In this”.

By 03’05”, the voices begin to thin and slowly fade out as a new texture becomes noticeable from the mix. Although at this point the new texture has been underneath the transposed vocal harmonies of the previous section, it is exposed to become the focal
point at around 03’18’. This marks the appearance of the second slice of audio from the first movement to be used as source material, the repeated phrase on the text “now all the fingers of this tree” (see figure 7).

Figure 7. Motive two.

Almost insect like, the granulated quality of this sample is achieved by time-stretching the audio to an extreme length, in this case expanding a six second clip to six minutes, while keeping the number of overlaps set at zero. The lack of overlaps in processing creates this effect because of the nature of using granular synthesis techniques for time expansion. In the usual application of this technique, small slices (grains) of the original audio source are repeated and overlapped, thus expanding the tempo of the source while maintaining the continuity of sound and retaining the original pitch. By configuring the software used to expand the sample to use no overlaps, the space between grains becomes audible (see figures 8 and 9).

Figure 8. Granular synthesis time expansion with overlap.
Several portions of the resulting six-minute file were then taken and layered together into the mix to create the fragmented, disembodied chorus from 03’18” to 03’36”. While this texture continues, another sample is introduced at 03’37”. Based on the same source audio, the reverse process has been applied: time-condensing the sample. The result is more human-like than its predecessor, but still unearthly. By configuring the software to loop the source while condensing the sample to half its original length, slices of different vowels or pieces of consonants are crammed together in a rush to play through the entire file in the allotted time. The effect creates an unusual quality that renders the text almost discernible but still unrecognizable. This clip is also layered separately several times into the mix to create increasingly dense panned left and right echoes.

With this as the underlying texture, a partial entrance of the unprocessed first motive on its original pitch (G 4) emerges at 03’52, marking the beginning of a new section and a thickening of the overall texture. After stating the first two words of text, “in this”, the line fades only to re-surface at 04’06”. Shortly after its entrance at 04’06”, two more voices enter: one pitch-shifted a whole step to A4 on the text “one” and the second another appearance of the first motive. From 04’19”, these entrances are doubled
and quadrupled as more and more voices enter, either on G4 or A4, to congest the texture further. Also during this section, the granular texture derived from the second motive is multiplied by several voices. However, unlike the whole tone shifted un-processed entrances, these voices have been moved microtonally anywhere from a few cents to a quartertone.

Then, at 04’36” we hear the entrance of motive three, B4 of the canon from the first movement on the text “or scream” which marks the transition to another section of the movement (see Figure 10). Before this entrance is finished, it is joined by two more voices slightly softer in the mix. While one of these entrances sustains on the B4, the rest of the texture thins for a moment at 04’43”. This is meant to simulate a take, or breath preparing for what happens next.

Figure 10. Motive Three.

At 04’48” we have the final entrance of the text “or scream”. Although time-stretched and heavily processed, the text of this entrance is still recognizable. However, at 04’52” the sample is time-stretched enormously on the “e” vowel in “scream”. At roughly the same time, a low rumbling is heard emerging from within the mix. Here, the motive has been transformed into an electronic scream, ever increasing in frequency and amplitude. By 05’01”, the texture is joined by another frequency ramp just as the first
entrance comes to the muted “m” on the word “scream”. This event reaches its climax, and indeed the climax to the entire work, as more and more entrances of the ramped sample combine from 05’11” to 05’22” and increase in volume and rate of frequency ascent.

Although the original frequency ascent continues, by 05’25” the texture begins to thin and the speed at which the pitch is increasing slows, becoming nearly imperceptible (see figure 11). Not nearly as prominent yet still heard in the mix, a descending frequency ramp has also been taking place simultaneously with the upward one. This event reaches the bottom of the listeners hearing range just as the upper frequency ramp fades completely at 06’12”.

Figure 11. Sonogram of frequency ramp (05’06” – 05’18”).
At this point, all that remains of the “scream” is a strange cloud of sound, neither advancing nor receding. Although the original vocal quality is completely masked, the audio in this section is a mixture of several extremely long time expansions of the “s” from the word “scream” in Motive Three. The effect is almost ocean-like in its repetitive drone; indeed the entire section, from the build on the word scream at 04’48” until 07’30”, was intended to emulate the surge and discharge of a gigantic wave.

Out of this long release of energy emerges something familiar at 07’09”. Motive Two, used throughout the movement in unrecognizable forms, enters with little modification. It is distant at first, masked by the dissipating static texture and processed with a heavy reverb added, but continues to emerge to the forefront until it is the only sound remaining at 07’30”. Not pitch-shifted from its source, the main modification to the motive is a time-expansion as the soprano reaches certain parts of words of the phrase. This gives a hesitation to the line, as if the performer were searching for the words. This uncertainty is strengthened as several time-expanded samples include more pronounced vibrato, giving an unusual wobble to the resulting audio.

The first voice is joined by a second at 07’58”; each sustaining different sections of the phrase while the diminishing reverb provides greater clarity and focus. By 08’16”, most of the reverb has disappeared. The final appearance of material from the first movement, Motive Four on the text "you and i," appears at 8'24" (see figure 12).
Figure 12. Motive Four.

This voice is unmodified from its source (Soprano 1, First Movement) and, just as in the first movement, it is the last voice heard as it fades into silence.
TEXT

There are two sources of text used in this work. The first is a poem by the American poet E. E. Cummings (1894 – 1962) from his 1950 collection XAIPE⁴.

now all the fingers of this tree(darling) have hands,and all the hands have people;and more each particular person is(my love) alive than every world can understand

and now you are and i am now and we’re a mystery which will never happen again, a miracle which has never happened before- and shining this our now must come to then

our then shall be some darkness during which fingers are without hands;and i have no you;and all trees are(any more than each leafless)its silent in forevering snow

-but never fear(my own,my beautiful my blossoming)for also then’s until

As a reaction to the Cummings poem’s acute observation on the importance of life, I begin the piece with text of my own: “in this there is only one, and whisper or scream will not bring two”.

The use of text in this work represents a culmination of sorts from my experiments with text setting over the past several years. Greatly influenced by Luciano Berio’s treatment of Samuel Beckett’s The Unnamable in Sinfonia⁵ and György Ligeti’s a cappella choral works Lux Aeterna⁶, Pleykázó asszonyok from Két Kánon, and Éjszaka, among others, I began to experiment with my own settings of vocal music. Beginning

⁴ Cummings.
with my 1996 composition *Stairs* (for chorus and tape) and continuing with *Red River* (1997, SATB chorus) and *Wednesday Ash* (1998, SSAATTBB soloists), I incorporated various devices in dealing with text.

Most notable of these compositions is *Wednesday Ash*, with text taken from the first section of T. S. Eliot’s six-part poem *Ash Wednesday*. It was while composing this work that I developed a disregard for staying true to the source, not out of any sort of disrespect for the work, but because of the desire not to simply repeat what the poet set forth on paper. It became my opinion that a setting should not be the composer trying to convey the poet’s meaning through music, but rather the composer’s personal interpretation of the work. By setting the text, we usurp the listener’s notions of the text and replace them with our own. At that point, the poem becomes less of a literary object to be transmitted and more of a grab bag of words and ideas to be manipulated.

In *Wednesday Ash*, I presented my own interpretation of the narrator’s struggle with the acceptance of Faith by mangling words or phrases of the poem into different or nonsensical meanings. The inspiration for this began with the poem itself. In the opening verse, Eliot repeats the opening line in three contexts, each with a different meaning:

Because I do not hope to turn again  
Because I do not hope  
Because I do not hope to turn

The poet continues to apply this technique to several phrases.

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In now all the fingers of this tree, these same basic ideas are still at work. The Cummings poem served as an inspiration for the tone of the work. In other words, the poem evoked a feeling or emotional response which I attempted to highlight or concentrate in the composition. This, I feel, is an ideal compromise between trying to present a “musically enhanced” version of the poet’s work and using the text as a simple means of assigning the singers vowels and consonants.
NOTATIONAL TECHNIQUES

Several issues dictated notational style in the first movement, most notably the use of aleatoric textures to avoid unnecessary complexity in the notation. Although this work is indeed indebted to Ligeti’s micropolyphonic textures, it is my opinion that these textures are best achieved through the use of indeterminacy in reference to rhythmic detail. Borrowing and combining notational techniques from such composers as Krzysztof Penderecki and Witold Lutoslawski, I began to define a standard that I felt remained true to my compositional ideas while reducing the degree of difficulty for the performer.

As a composition of motives and textures rather than counterpoint and harmony, strict adhesion to the exactness of note placement in performance of the first movement is not only unnecessary, it is undesired and creates an unreasonable level of complexity for the performer. With the desired result being a texture that is free of rhythmic pulse, it becomes an issue of the music not being served well by standard notation. While certainly not impossible to perform, especially given the simple melodic lines used to construct the texture, use of standard notation creates several problems. To illustrate these issues, I have recreated a portion of the first movement score using traditional notation (see figure 13).
The first problem is simply that the work becomes more difficult to perform. In order to create melodic lines that appear, for the listener, to move independently from one another, notes must be placed on strange divisions of the beat. This naturally leads to another problem: unwanted accentuation of notes in the phrase. In my experience as a vocalist, it is a common practice of singers to rehearse difficult rhythmic sections on a neutral syllable, such as “ta”, while accenting notes that do not fall on a downbeat to ensure accuracy. Once rehearsed, it is possible that these accents could carry over into the performance, undermining the intentions of the section. Another issue, perhaps more subtle but still significant, is the actual appearance of the score. The repeated vocal lines in this section are meant to be performed with smooth, connected phrases, an idea that does not come across clearly when notated traditionally.

To address these issues, I have employed three main notation techniques. The first of these is a note head only temporal notation with note extenders, used for the long,
sustained lines, which begin the movement. Pitch duration is merely implied by the spacing of notes and the continuity of the sustained lines defined with bars, which connect the notes of the phrase. The timing of entrances is also visually implied by vertical spacing (see figure 14). Using this notation style, the broadness and continuity of the elongated canon is more evident. It also allows the performer the freedom to speed up or slow down in relation to the other vocal lines.

Figure 14. Temporal notation with note extenders.

The second technique uses notehead only notation in combination with a repeat bar “box” surrounding the phrase (see figure 15). The section included in figure 15 is the same excerpt recreated using standard notation in figure 13. Although visually dissimilar, the idea is comparable to techniques employed in much of Lutoslawski’s work, including String Quartet⁸. Lutoslawski described his use of indeterminate elements in his music as thus: “The point at issue is not a matter of differences between one performance and another. . . I did not intend, either, to free myself of part of my

responsibility for the work by transferring it to the players. The purpose of my endeavors was solely a particular result in sound."^9

These phrases are marked “tempo ad libitum,” instructing the performer to take liberties with the tempo and rhythmic durations of pitches in the phrase, varying the vocal line from repetition to repetition. This does little to affect the overall texture, while simplifying the notation greatly. Following the boxes are trailing lines, indicating to the performer how long to continue repeating the phrase.

Figure 15. Repeat bar phrase box.

Finally, standard rhythmic notation is used on page 5 when a brief duet between S1 and S 5 occurs. In this section, I wanted strict placement of pitches between these two voices. Although each pitch is given a specific rhythmic duration, the section is not long enough to warrant a time signature (see figure 15).

^9 Quoted in liner notes for recording, Deutsche Grammophon 13701.
Using these techniques, I felt that I was able to strike a balance between control over the textures I desired to create and practicality in regards to performance.
TECHNOLOGY USED

A variety of computer tools were utilized in the production of the second movement. The source material for this movement was recorded with a Røde NT 2™ onto an Alesis ADAT™ eight-channel recorder.

Once the resulting nine tracks of audio were transferred onto a computer as digital audio files, I used Syntrillium Software’s Cool Edit Pro™ to filter background noise from the source recordings, most notably air conditioner noise from the recording space. This low rumble was present throughout most of the recording session and was eliminated by applying a high-pass filter to the affected sections. Once the source material had been cleaned up, two Unix-based digital audio tools were utilized.

The first of these is Cecilia¹⁰, an environment for music and signal-processing that uses Csound¹¹ as its underlying audio processing engine. Developed by Alexandre Burton and Jean Piché at the Université de Montréal, this tool was chosen because of its ability to allow the user real time control over audio processing via mouse controlled sliders. Cecilia was used primarily for applying filters, reverb, and frequency ramps.

The second tool used was Snd¹², a somewhat archaic but infinitely useful application written by Bill Schottstaedt at Stanford’s Center for Computer Research in Music and Acoustics (CCRMA). Like Cecilia, one of Snd’s many functions includes the ability to modify audio in real time using a visual interface (see figure 17). I used Snd

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¹² Schottstaedt, Bill SND
primarily for time compression and expansion where this real time ability allowed me to use the software as an instrument of sorts. Rather than making a guess at how a processed sample might work in a certain section, I would play back the section I was working on and manipulate the audio while listening. This enabled me to react to the piece much as a performer might react to other voices or instruments during a performance. I would usually rehearse the controls several times before applying the process to the sample and adding it into the mix.

Figure 17. Snd controls.

Finally, the resulting audio files were mixed together using the multi-track features of Cool Edit Pro.

CONCLUSION

now all the fingers of this tree is the summation of several issues, which, individually, have dominated my compositional output for several years. It is through this composition that, by utilizing solutions pioneered by other composers and modified to assist my own needs, I have solidified what I feel is a viable technique for notating extended sections of independent polyphony in a way that both simplifies preparation of the work and better serves the intended sounds.

This is also my first composition intended solely for recorded media as opposed to a traditional or electro-acoustic concert setting. This addresses what I feel more realistically describes our interactions with music in these adolescent years of the 21st Century, an idea which has been only recently made possible due to widely expanding availability of technology.

Finally, dividing the work into two movements, the first essentially a choral work and the latter an electro-acoustic work enabled me to combine the two areas of composition that have most held my interest and compositional desires.
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now all the fingers of this tree
Kelly Thomas Wood
now all the fingers of this tree

Text By: c.e. cummings and Kelly Wood

Kelly Thomas Wood

-2-
each particular person is my love alive than every world can understand