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THE MUSIC OF CARL RUGGLES: A STUDY
OF COMPOSITIONAL PROCEDURES AND HARMONIC
ORGANIZATION IN HIS EIGHT PUBLISHED WORKS

presented by

Wha-Kyoung Woo

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OF COMPOSITIONAL PROCEDURES AND HARMONIC
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By

Wha-Kyoung Woo

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ABSTRACT

THE MUSIC OF CARL RUGGLES: A STUDY OF COMPOSITIONAL PROCEDURES AND HARMONIC ORGANIZATION IN HIS EIGHT PUBLISHED WORKS

By

Wha-Kyoung Woo

The present study provides a comprehensive examination of the technical procedures employed in Carl Ruggles' atonal compositions. Specifically, the present study examines ways that referential elements such as intervallic cells, rhythmic figures, and harmonic formations are used in Ruggles' music. One goal of this study is to determine whether Ruggles' compositional techniques are "systematic" or essentially "intuitive." Each aspect of his music, including pitch organization, counterpoint, form, and harmonic organization, receives a chapter.

Motivic relationships in Ruggles' compositions are studied, and the "harmonic" organization of Ruggles' music is explored using pitch-class-set analysis. In this study analysis of motivic relationships shows the transformation of compositional ideas at the surface level, whereas set analysis explicates both surface details and deeper harmonic structures such as set-complex relationships.

The results of the above analyses show that Ruggles' compositions are unified by referential cells and motives, but literal transformations of these short ideas seldom occur. Instead, these short ideas recur in ways that early linear repetitions of pitch classes are avoided. Thus, a combination of two elements, frequent appearances of referential ideas and the avoidance of early repetition of pitch classes, provides a "system" in Ruggles' music. There are no

significant stylistic differences between Ruggles' early and later compositions, and the principle underlying his music remains the same throughout his career. Ruggles' music manifests the principle of organic development of musical ideas resulting in a flexible, freely unfolding, and dissonant contrapuntal texture.

For Won, Nicholas, and Emily, with whom I have traveled this long and arduous journey and with whom I shall continue to travel on many journeys to come.

For my father, whose spiritual presence I feel, and for my mother, who has given me endless love, encouragement, and help.

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CHAPTER 1

INTRODUCTION

Background

Atonality was one of the major musical developments in the early part of the twentieth century. Many European composers at the turn of the century relied less and less on tonality and the tonic-dominant relationship. Traditionally dissonant chords began to be considered important sonorities that did not have to resolve to more consonant chords. George Perle states, "The expanded harmonic vocabulary of late nineteenth-century music had extended the range of tonal relationships to the point where the traditional articulative procedures were no longer adequate."¹ Steps toward the complete elimination of key were taken by Arnold Schoenberg in 1908 when he completed his first atonal work, *Two Songs* (Op.14), based on poems by Stefan Georg. Schoenberg's innovations were immediately adopted by his students Alban Berg and Anton Webern.

In atonal music dissonance no longer seeks resolution and functional harmony disappears. Motivic unity becomes more important. Most early atonal works are based on tiny intervallic cells which are transposed, inverted, and permuted in various ways. According to one

¹George Perle, Serial Composition and Atonality (Berkeley: University of California Press, 1981), 1.

of Schoenberg's pupils:

The study of the smallest musical unit, the motive, was the point of departure. Its logical development makes coherence in music possible, not only by exact repetition, subtle changes in melody, rhythm, or harmony, but by altering sound and character. These procedures comprise the basic compositional technique: variation.²

The new music, as explained in Paul Griffiths' Modern Music, "involved a suspension of most of the fundamental principals of the tradition."³ Most composers were troubled by the lack of system in new music, since early atonal pieces were written largely intuitively.

Schoenberg stated that:

It is striking, and suggestive of conclusions, that I and those who write in a similar vein distinguish precisely when a five- or six-note chord should appear, when a chord of yet more parts [should appear.] . . . Laws apparently prevail here. What they are, I do not know. Perhaps I shall know in a few years. Perhaps someone after me will find them.⁴

In later works conscious attempts were made by members of the Second Viennese School to impose a certain order by using contrapuntal devices, by implementing established traditional forms, and by employing extra-musical ideas such as texts and programs. Finally, in 1923 Schoenberg discovered serialism, which offered an effective and systematic means of governing order in atonal compositions.

Carl Ruggles was one of the first American composers to use

²Paul Pisk, "Memories of Arnold Schoenberg," Journal of the Arnold Schoenberg Institute 1 (1976): 40.

³Paul Griffiths, Modern Music (London: Thames & Hudson, 1978), 86.

⁴Arnold Schoenberg, Theory of Harmony, trans. Roy Carter (London: Faber, 1978), 421.

atonality. Ruggles was aware of the work of the Second Viennese School but refused to be influenced by or to use any musical ideas other than his own. He was an individualist who continually tried to perfect his musical works to the "sublime" quality he recognized in the music of Bach, Handel, Beethoven, and Ives. It is known that Ruggles worked slowly and painstakingly toward near perfection. He produced only a handful of works over forty years, and the exact chronologies and dates of these works are difficult to determine because he continued to revise them.

The music of Ruggles can be related to Schoenberg's atonal music in its dissonant counterpoint and avoidance of triadic tonality, but the long and continuous melodic line, open and spare texture, and motivic sequences of Ruggles' music distinguish it from that of his contemporaries. The guiding principle of Ruggles' melodic line is well described by Charles Seeger:

The determining feature or principle of the melodic line is that of non-repetition of tone until the tenth progression. . . . The offense felt by a false repetition depends to a large extent upon the context and handling of the intervening tones, as well as upon their number. . . . this avoidance of the repeated tone is not, with him, to any great extent an intellectual feat. . . . Reiteration (immediate repetition) is occasionally effective, but only occasionally.⁵

As with Schoenberg's School, the equal distribution of twelve pitch classes was one of the most important concerns for Ruggles. Ruggles adopted total chromaticism in his works, but he never developed his principle to the extent of the twelve-tone method and called the system,

⁵Charles Seeger, "Carl Ruggles," Musical Quarterly 18 (October 1932): 585.

"a dog chasing its tail."

Another distinctive aspect of Ruggles' music is its dissonant contrapuntal texture. Virgil Thomson describes it as "non-differentiated, secundal counterpoint."⁶ In other words, the voices in Ruggles' compositions tend to have a similar shape and character, and the harmony which results from the convergence of these lines is dissonant largely due to the composer's consistent use of vertical minor seconds, major sevenths, and minor ninths. The open spacing and doubling of the voices in different octaves produce bright and intense sonorities.

The main purpose of the present study is to provide a comprehensive examination of the technical procedures employed in Carl Ruggles' atonal compositions. Douglas Jarman, in his study of Alban Berg's music, points out the limitations that one may encounter in examining atonal music:

One of the problems facing the analyst of 'free' atonal music is the immense variety of the procedures employed and the difficulty in classifying these procedures according to neat, self-contained categories. . . . Each work creates afresh the compositional context within which it operates, a context which becomes clear only as the piece itself progresses.⁷

Ruggles' works unmistakably share the characteristics of much "free" atonal music written by members of the Second Viennese School. In seemingly complex and unserialized musical context, Ruggles employs a

⁶Virgil Thomson, American Music Since 1910 (New York: Holt, Rinehart and Winston, 1972), 32.

⁷Douglas Jarman, The Music of Alban Berg (Berkeley: University of California Press, 1979), 22.

small detail such as an intervallic cell, a rhythmic figure, or a harmonic formation, as a referential element. The present study explores these "referential elements" in Ruggles' music. Specifically, the study examines whether the repetition and the transformation of details are used often enough so that Ruggles' compositions can be called "systematic" rather than "intuitive." Each aspect of Ruggles' music, including pitch organization, counterpoint, form, and harmonic organization receives a chapter of the present study. All eight of his published works are considered, though not necessarily in chronological order.

Life and Works

Carl Sprague Ruggles was born on March 11, 1876, in East Marion, Massachusetts. His mother, Maria Josephine Ruggles who was a trained singer, played an important part in Ruggles' early musical experience. At the age of six, Ruggles played a "violin" made from a cigar box, and later began to study violin with George Hill, a New Bedford bandmaster who taught Ruggles to play quite difficult tunes.

When he was fourteen, after his mother had died and the family had moved to East Boston, Ruggles took private lessons in music theory from Josef Claus, who taught at the Boston Conservatory. Eventually Claus sent him to John Knowles Paine to take composition lessons at Harvard. "A letter of recommendation from Paine in 1902 describes him as 'thoroughly trained in Harmony, Counterpoint, and other branches of musical composition.'"⁸ Later (1907-1912) in Winona, Minnesota,

⁸John Kirkpatrick, "The Evolution of Carl Ruggles: A Chronicle Largely in His Own Words," Perspectives of New Music 6 (Spring-Summer 1968): 149.

Ruggles taught at the Mar d'Mar School of Music and founded the Winona Symphony Orchestra. He also worked on an opera, The Sunken Bell, based on Gerhart Hauptmann's drama, but never finished it and finally destroyed the copy around 1940.⁹

With Toys, his first published work, Ruggles began his career as composer at the age of 43. The song was written in 1919 to his own text for the fourth birthday of his son Micah. It used a new musical language which tended to move away from frequent triadic sounds toward more dissonant sounds. Toys was presented to the International Composers Guild (ICG), which was founded in 1921 by Edgar Varèse and Carlos Salzedo to provide performances of avant-garde works, and was accepted by the Guild. Thus, Toys began Ruggles' long and fruitful relationship with the ICG as an active member.

Angels appeared in 1920. The original version, written for six muted trumpets, was revised for four trumpets and three trombones in 1938. In this revision, the composer extended the middle part and transposed it down a minor third. The work maintains a high level of unresolved dissonance, indicating Ruggles' further departure from the traditional idiom of tertian harmony.

Vox Clamans in Deserto, for soprano and chamber orchestra, followed Angels in 1923. It is a setting of three late nineteenth-century Romantic poems: Parting at Morning (Browning), Son of Mine (Meltzer), and A Clear Midnight (Whitman). This work was sung by Greta Torpadie at the Guild concert of January 1924.

A year later, Men and Mountains was completed. The full

⁹Ibid., 151.

orchestral score was published in the first issue of Henry Cowell's New Music Edition (NME) in October 1927. Charles Ives, a subscriber to the NME, was impressed by Ruggles's piece, and became a long-time supporter and friend of Ruggles. The second movement, "Lilacs," scored for string orchestra, provides a calmness between the two outer movements, "Men" and "Marching Mountains," both of which have a majestic character with bold melodic contour.

Portals, for string orchestra, was completed in 1925. Originally written for chamber orchestra, the piece was revised for strings alone and performed in the Guild concert of January 1926 conducted by Eugene Goossens. Publication followed in 1930 in NME with a dedication to Harriette Miller, Ruggles' benefactress.

Ruggles' largest and best known work, Sun-treader was composed in 1931. The premiere, conducted by Nicolas Slonimsky, took place in Paris and Berlin in 1932, and the work was played again at the 1936 International Society for Contemporary Music Festival (ISCM Festival) at Barcelona. The score was printed by NME in late 1934, again with a dedication to Harriette Miller.

Evocations, subtitled "Four Chants for Piano," was written for solo piano between 1937 and 1945. Ruggles originally planned to write five short pieces, but the work was completed with the fourth piece. This work, published in NME in January 1945, was dedicated to his wife Charlotte.

The title Organum (1946-1947), which was suggested by Varèse, refers to the composition's organum-like parallel motions between voices. It was first performed by the New York Philharmonic Orchestra under Leopold Stokowski in 1950, and, "to the surprise of both the

composer and conductor, the work achieved a real popular success."¹⁰

After the completion of Organum, Ruggles planned on writing several major pieces. During 1949 to 1957, he mentioned compositions entitled Large Orchestra and Symphonia Dialectica, as well as a series of short piano pieces with flower titles; however, he completed only the simple tune, Exaltations, in memory of his wife Charlotte in 1958.

Exaltations is a hymn tune without text for a congregation singing in unison with an organ accompaniment. This piece is idiosyncratic in that it has only a few chromatic dissonances. It was the final composition Ruggles finished before his death in 1971 at the age of ninety-five.

In his later years Ruggles did achieve recognition as a composer. He received the honorary degree of Doctor of Music from the University of Vermont in 1960. Brandeis University awarded him a Creative Arts Award in May, 1964. Finally, in January 1966 Bowdoin College presented a festival of his music in which the American premiere of Sun-treader took place.

Ruggles has been described as "rugged," "salty," "witty," and sometimes "disrespectful." As an individualist, he worked laboriously, continuously revising details, until a piece reached "perfection." Ruggles looked for the "sublime" quality which he found in the works of other composers such as Bach, Handel, and Beethoven. According to Ruggles, most composers, both old and new, wrote music of "mediocre" quality. Even one of the nineteenth-century masters, Brahms, could not avoid Ruggles' outspoken criticism. "[Brahms] is just a big sissy--always hiding behind formal development resolutions, counterpoint--why

¹⁰Henry Cowell, "Organum, First Performance," Musical Quarterly 36 (April 1950): 272.

doesn't he just come out like a man and say what he means?"¹¹ Of his Contemporaries, Ruggles expressed his highest regard only for Ives' music:

He [Ruggles] is not easy on all his composing contemporaries. "What a punk," he will say of this one, or "that phony" of another or, of a third, "he had talent but he got over it." Sometimes he will temper his judgement: "Fine, very fine. Some really good things in his music." Then, a pause. "Still, I'd 'a' rather written one page of Charlie Ives' music than all that man's work put together."¹²

Ruggles was also opinionated about his own music and considered Suntreader as a piece in the same caliber as the St. Matthew Passion, Missa Solemnis, Der Ring des Nibelungen, and Tristan und Isolde.

Review of Literature

The studies of Ruggles and his works consist mostly of articles in journals and magazines. A majority are either biographical or concentrate on a few works. However, a dissertation written by Thomas Peterson in 1967, The Music of Carl Ruggles, is an extensive study.¹³ Peterson provides biographical information in detail and discusses six works in chronological order: Angels, Men and Mountains, Portals, Suntreader, Evocations, and finally Organum. Each chapter discusses important aspects of composition--melody, rhythm, texture,

¹¹Michael Thomas, jacket notes to The Complete Music of Carl Ruggles, Buffalo Philharmonic Orchestra (CBS Records ST 34591, 1980).

¹²Eric Salzman, "Carl Ruggles," HiFi Stereo Review (September 1966): 55.

¹³Thomas Peterson, "The Music of Carl Ruggles" (Ph.D. diss., University of Washington, 1967), 1-130.

orchestration, form, counterpoint, etc. According to Peterson, the following characteristics are shared by all of Ruggles' compositions:

1. A tendency to avoid repeating a note or its octave until eight or more different notes have been used in a line.
2. Flexibility of rhythmic motion with frequent changes of tempo and of meter which avoids the effect of the steady beat and regular accent.
3. Sonorities which are almost completely dissonant due to the use of minor seconds, major sevenths, and minor ninths between voices.
4. Counterpoint which avoids the squareness caused by exact imitation.
5. Instrumental writing emphasizing the blend of tone color, rather than clarity and contrast.

Peterson's dissertation is the only source available that discusses Ruggles' compositional output in detail, and Peterson deserves credit for beginning the complex task of analyzing Ruggles' atonal music.

More recently, Richard Devore examines the role of five avant-garde composers, J. Becker, H. Cowell, R. Crawford, W. Riegger, and C. Ruggles, in American music life.¹⁴ Whereas a thorough research is done on socioeconomic support of the American avant-garde music between 1929 and 1945 (years of the Great Depression and World War II), a chapter on Ruggles adds little to what has already been found.

An article by Charles Seeger is one of the earliest and the most

¹⁴Richard Devore, "Stylistic Diversity within the Music of Five Avant-Garde American Composers, 1929-1945" (Ph.D. diss., University of Iowa, 1985), 1-237.

often quoted sources on Ruggles.¹⁵ As a close friend of Ruggles, Seeger provides a perceptive but somewhat biased description of the composer and his work up to Portals. A statement on European music also raises a question about Seeger's objectivity: "Europe is such a slave to its musical past that it is almost impossible for it even to imagine the tyranny it suffers under. . . . Fifteen years have gone by without one even childlike effort at anything new."¹⁶

Lou Harrison provides a more objective and accurate assessment of Ruggles' music.¹⁷ Written in 1946 and revised in 1954, after the completion of the composer's last work, the article examines Ruggles' musical style and compositions, especially Evocations. Harrison observes that Ruggles' music is made out of the contemporary materials of secunda counterpoint, total chromaticism, enriched rhythm of cross-meter and gruppetto, and melody of wide, non-stepwise intervals.

Several articles by Steven Gilbert aim to explore Ruggles' pitch organization. With the aid of the analytical method developed by Allen Forte in "A Theory of Set-Complexes for Music,"¹⁸ Gilbert reveals that the continual presence of trichord type 3-5 binds the Evocations into a unified whole.¹⁹

¹⁵Charles Seeger, "Carl Ruggles," Musical Quarterly 18 (October 1932): 578-592.

¹⁶Ibid., 582.

¹⁷Lou Harrison, "Carl Ruggles," Score 12 (June 1955): 15-26.

¹⁸Allen Forte, "A Theory of Set-Complexes for Music," Journal of Music Theory 8 (1964): 136-183.

¹⁹Steven Gilbert, "The 'Twelve-Tone System' of Carl Ruggles: A Study of the Evocations for Piano," Journal of Music Theory 14 (Spring 1970): 88.

In "Carl Ruggles (1876-1971): An Appreciation," Gilbert examines Sun-treader, Organum, and Evocations No.2.²⁰ Gilbert observes that Ruggles basically shared the same concerns as Schoenberg in the following areas: the avoidance of triadic tonality; the use of the twelve chromatic tones as equally as possible; and the use of intervallic patterns to achieve coherence. Three-note set 3-5, along with sets 3-3 and 3-4 are prominently featured in Ruggles' mature works. Gilbert describes certain tendencies: "First, the music is predominantly linear and chromatic. Second, it is neither tonal nor twelve-tone." Finally, and most importantly, "Despite the composer's seemingly intuitive approach, there is a remarkably high degree of consistency in the melodic writing and in the harmonies which result."²¹ This very consistency, together with Ruggles' self-criticism, might have limited the scope and quantity of the composer's output.

Stephen Dombek, in the article, "A Study of Harmonic Interrelationships and Sonority Types in Carl Ruggles' Angels," provides an analytical view of one of the early works.²² Dombek shows that a close inspection of both the visual and aural reveals that Angels bears a close affinity to A^b major, but the relationship is obscured to a large extent by the dissonant counterpoint. Dombek concludes that this blending of tertian sonorities with secundal constructions distinguishes

²⁰Steven Gilbert, "Carl Ruggles (1876-1971): An Appreciation," Perspectives of New Music 11 (Fall-Winter 1972): 224-232.

²¹Ibid., 231-32.

²²Stephan Dombek, "A Study of Harmonic Interrelationships and Sonority Types in Carl Ruggles' Angels," Indiana Theory Review 4 (1980): 29-44.

Ruggles' music from that of other modern composers.

James Tenney reports the results of statistical analyses of Ruggles' melodic lines, carried out with the aid of a computer.²³ The result shows three significant changes: 1) a gradual shift in the distribution of melodic-interval frequencies shown by the increased use of minor seconds and major sevenths, and a corresponding decrease in the use of major seconds and minor sevenths; 2) increasingly effective avoidance of early pitch-class recurrences; and 3) an increase in the frequency and proximity of dissonant relations between each new pitch and one of the several immediately preceding pitches.

Two biographical articles on Ruggles present contradictory viewpoints of the composer's background. The first, written by a long time friend and executor of his estate, gives the "facts" as Ruggles himself described them.²⁴ The second reveals the "untruths and myths" about Ruggles,²⁵ including the fact that "His grandfather was not a whaling captain: he was a well-to-do farmer,"²⁶ and that "Carl only took one course one semester (English composition) at Harvard as a special student in the fall of 1903,"²⁷ and was not a Harvard graduate. The author suggests that these untruths were created by the composer himself and can be attributed to his social and musical insecurity. An

²³James Tenney, "The Chronological Development of Carl Ruggles' Melodic Style," Perspectives of New Music 16 (Fall-Winter 1977): 36-69.

²⁴Kirkpatrick, "The Evolution of Carl Ruggles," 146-66.

²⁵Marilyn Ziffrin, "Interesting Lies and Curious Truths About Carl Ruggles," College Music Symposium 19 (Fall 1979): 7-18.

²⁶Ibid., 7.

²⁷Ibid., 10.

account by Ziffrin describes Ruggles' life at Coral Gables (1937-1947) as a guest lecturer at the University of Miami where his son Micah attended.²⁸ During his residency Ruggles was active as a composer and conductor and received a favorable reviews from the community.

Set Theory

In Music Analysis, Jonathan Dunsby and Arnold Whittall discuss the various methods of dealing with atonal music.²⁹ Pitch-class-set analysis, voice-leading analysis (extension of Schenker's theory), motivic analysis, and several other methods are considered. The use of the same musical excerpt in illustration of the different analytical approaches reveals diverse aspects of a single work as well as the strengths and weaknesses of each analytical method. As opposed to voice-leading analysis, which relates best to music of implied or extended tonality, set analysis developed by Allen Forte³⁰ applies to compositions where pitch materials are considered as representative of total chromaticism (atonality). Set analysis provides 220 "prime forms" which are reductions of the enormously large number of different collections of pitch classes. By using set analysis the processes underlying atonal music can be described by means of set-complex relations and similarity relations. According to Dunsby and Whittall in their discussion of Forte's system:

²⁸Ziffrin, "Carl Ruggles and the University of Miami," Ex Tempore 4 (1987-88): 115-35.

²⁹Jonathan Dunsby and Arnold Whittall, Music Analysis: In Theory and Practice (New Haven: Yale University Press, 1988).

³⁰Allen Forte, The Structure of Atonal Music (New Haven: Yale University Press, 1973).

Pitch-class-set analysis is seen to best advantage when several different compositions are compared, or when the apparently disparate sections of large single compositions are analyzed in order to yield a thorough determination of their differences and similarities, in relation to 'the structure of atonal music', understood as 'the structural principles represented in all atonal compositions'.³¹

Goals of This Study

Ruggles' music has received little detailed analytical attention until recently. Not a single biography has been written, and there are fewer than two dozen articles. Among these articles, the researches by Steven Gilbert make a systematic effort to understand Ruggles' pitch organization. The present study expands these efforts to explore not only pitch organization but contrapuntal and formal structure in Ruggles' compositions with the aids of set analysis and motivic analysis. Whereas set analysis examines the compositional materials of unordered pitch collections, motivic analysis shows the transformation of compositional ideas at the surface level. Through motivic analysis, the small units of harmony, melody, and rhythm, and their logical developments are traced to evaluate their significance as unifying factors.

³¹Dunsby and Whittall, Music Analysis, 151.

CHAPTER 2

PITCH ORGANIZATION AND MOTIVIC STRUCTURE

Ruggles' early works are unified by short melodic and rhythmic ideas which are presented at the outset and then repeated or varied in later parts of the composition. As Ruggles' music gradually matures, the degree of consistency in his compositions increases. In each of the later works almost all of the pitch materials are generated by a principal theme and its segments.

Ruggles' first work, The Sunken Bell, is written in a late nineteenth-century style that is similar to that used by members of the Second Viennese School in many of their early compositions. Lou Harrison considers The Sunken Bell as corresponding to the Gurrelieder in Schoenberg's development. Harrison describes the style of the opera as "post-Brahmsian, [it] covers the technical field between Debussy and early Schoenberg and ends up with almost the full range of his [Ruggles'] mature style."¹ John Kirkpatrick explains the earliest sketch fragments of the opera as following: "The style is not unlike Strauss, frankly diatonic with Wagnerian excitement glowing in dissonant

¹Lou Harrison, "Carl Ruggles," Score 12 (June 1955): 16.

detail."² Later sketch fragments of September 1917 are "much further along toward his eventual abandonment of tonality and triadic sound. In one phrase the melody is lined out first in parallel minor ninths, then in major sevenths."³ Ruggles worked on the opera for about thirteen years (1911?-1923) but finally abandoned the project for uncertain reasons.

Ruggles employed the new harmonic language of atonality in most of his published works. While his early works show characteristics of traditional music in their melodic and harmonic formations, these characteristics are obscured by the nearly constant presence of dissonance. Toys and Angels represent Ruggles' early style, where secundal sonority and tertian harmony play an important role. Especially in Toys, all of the vertical sonorities contain interval class 1 (ic 1), although ic 3 and ic 4, as represented by the tertian sonorities, are almost equally important. In overall context, however, the triads produced by these tertian sonorities do not relate to each other according to traditional harmonic procedure.

In the absence of traditional harmony, the augmented triads at the beginning of Toys act as a cohesive element as the song progresses. The two augmented triads are stated simultaneously, resulting in ic 1 in every harmonic interval between the two triads (example 1a). A major portion of the opening measure is repeated at the same pitch level (example 1b) after the one measure of a recitative-like passage. An

²John Kirkpatrick, "The Evolution of Carl Ruggles: A Chronicle Largely in His Own Words," Perspectives of New Music 6 (Spring-Summer 1968): 151.

³Ibid., 152.

additional augmented triad is formed between the two hands of the piano part in measure 3. The three augmented triads in measure 3 present nine pitch classes. Another incidence of augmented triads, this time in a different context, occurs in the penultimate measure (example 1c). Three augmented triads are outlined in sixteenth notes in the piano against sustained notes.

EXAMPLE 1.--Toys

a)

b)

c)

Stars.

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The same augmented triad plays an important role in the first song of Vox Clamans in Deserto (Parting at Morning). In measure 1 (example 2a) the bassoon and contrabass parts introduce the augmented triad in unison. The next two statements of the motive⁴ occur at measure 5 and at measure 8, with a slight change in pitch and instrumentation (examples 2b and 2c). In each occurrence, the motive is associated with the same rhythmic pattern.

⁴The term "motive" is used to designate a short musical idea which retains its identity as distinctive figure when transformed or modified.

EXAMPLE 2.--Parting at Morning

a)

①

Bm.

I.

Vc.

Ch.

b)

⑤

Bm.

Vc.

Ch.

c)

⑧

Fl.

Ob.

B♭ Cl.

Bm.

Vc.

Ch.

In both Toys and Parting at Morning the triads recur in a ritornello-like fashion. Another similarity is that the augmented triads are one of the few repeated figures in both pieces. As Perle explains, "In the perpetually changing weft of the 'athematic' style, any recognizably consistent feature, regardless of its brevity, becomes a structural element."⁵

The diminished-minor seventh chords at measures 2 and 6 of Toys are another cohesive element (example 3). Both chords are played by the left hand of the piano and sustained throughout both measures against the fast moving upper parts. The pitch content in measure 2, with the exception of E^b in the piano and voice, comprises the whole-tone hexachord (on G^b), whereas the pitch content in measure 6 forms a chromatic scale from G to E.

The blending of secundal and tertian sonorities similar to that found in Toys comprises the harmonic formation of Angels. In terms of melodic intervals and rhythm, Angels is the most conservative piece among Ruggles' output: melodies with major seconds and thirds prevail throughout the piece, the note values frequently used in Angels range only from half notes to triplet eighth notes, and the rhythm of the composition is not complex despite many meter changes.

The source of almost all the materials in Angels is two motives stated at the beginning by the second trumpet and second trombone. The motive introduced by the trumpet (set 4-11) is used seven times in three different forms (example 4). All three forms are stated at structurally significant points of the piece: the first form (example 4a) is

⁵George Perle, Serial Composition and Atonality (Berkeley: University of California Press, 1981), 21.

introduced at the beginning, the second form of the motive (example 4b) starts the new section, and the third form (example 4c) is stated at the end of the piece by the first trombone.

EXAMPLE 3.--Toys

2

Voice

Come here, - tit-tle son, - and I will play with you.

Pf.

6

Voice

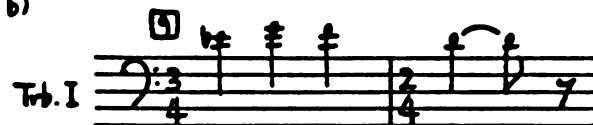
Pf.

EXAMPLE 4.--Angels

a)



b)



c)



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The above-mentioned two motives are the sources of small intervallic cells which, combined in various ways, form the motivic materials of the piece. Example 5a presents the five cells⁶ which dominate the piece and show their derivation from the two motives. Example 5b shows how these cells, combined in various ways, generate the material of the first eight measures of the piece. Cell z (set 3-5)⁷ does not appear until the end of the second section and is used frequently at the climax of Angels. Additional cells, also based on the two motives, emerge during the middle of the work.

⁶The term "cell" denotes a small melodic or harmonic shape which does not possess the identity or distinctive character, typically associated with "motive." In this study cell is often a part of motive.

⁷The term "set" indicates a collection of pitch classes. Hence, a set is an abstract form of a compositional idea.

Example 1a shows two staves of music. The top staff is in treble clef and the bottom staff is in bass clef. The top staff has a 'V' annotation above the first measure and a 'W' annotation below the second measure. The bottom staff has a 'Z' annotation above the first measure and a 'Y' annotation below the second measure. The notation includes various musical symbols such as notes, rests, and accidentals.

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A whole-tone scale passage based on the cell w (example 5a) occurs from measures 24 (example 6). The top two voices and bottom three voices are involved in a descending whole-tone scale; the top voices employ one whole-tone scale while the bottom voices employ the other whole-tone scale. In each measure, these voices are part of a sequence the stages of which are a minor second apart.

EXAMPLE 6.--Angels

The musical score for Example 6, 'Angels', consists of five staves. The first four staves are labeled I, II, Trpt., and IV, and the fifth staff is labeled Tuba. The key signature has two flats (B-flat and E-flat), and the time signature is 4/4. The score shows measures 24 through 28. Measures 24-28 feature a descending whole-tone scale passage. The top two voices (I and II) and the bottom three voices (Trpt., IV, and Tuba) are involved. The top voices employ one whole-tone scale, and the bottom voices employ the other. The stages of the sequence are a minor second apart. The score includes various musical notations such as notes, rests, and slurs.

Corresponding whole-tone passages are found in the first movement of Men and Mountains (measures 32 to 34) and Portals (measures 40 to 42). In both cases, the descending whole-tone passages are involved in sequences where one whole-tone hexachord is followed by another hexachord.⁸ By shifting the hexachords, the distribution of twelve pitch classes (twelve pc's) is achieved. These three whole-tone passages are placed right before the exact return of the main sections. The descending whole-tone scales function as a bridge which connects the culmination point with the main section.

The melodic structure of the third movement of Men and Mountains is based on clearly defined themes and on several intervallic cells derived from these themes. The movement is unified by the recurrence of three thematic ideas; for example, one entire section of "Marching Mountains" is made up of the constant rhythmic variation of the opening theme at the original pitch level. At the same time, the three thematic ideas are interrelated by several recurring cells.

A comparison of the three themes reveals the extent to which they are linked motivically. The opening theme in measure 7 (example 7b) is derived from the introduction (example 7a), two notes each from the first four measures. The two most important cells of the theme are marked r and s in example 7b. The three-note cell r (set 3-5), consisting of a falling tritone and a minor second, is followed by two statements of cell s; the second s is a retrograde-inversion of the first. The second statement of cell s in measure 10 (example 7c) is a

⁸Not all the voices are involved in whole-tone scales.

transposition of the second s in measure 7 at T-4.⁹ The three-note cell s develops into a four-note cell (t) in measures 10 and 23-24. The two statements of cell t (example 7d--main theme of the middle section) are transpositions of t in measure 10 at T-3 and T-7.

EXAMPLE 7.--Marching Mountains

a)

b)

c)

d)

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A similar relationship links the two main thematic materials of the first movement of Men and Mountains. Example 8 shows the thematic

⁹Allen Forte, The Structure of Atonal Music (New Haven: Yale University Press, 1973), 30-31.

ideas which open the first and second sections, respectively. Note that the second thematic idea uses all twelve pc's, with a repetition of G at measure 19 and B at measure 20. The three-note cell e in measure 1, consisting of G, F[#], and E^b, is rearranged at the opening of measure 19 and is used again in a less recognizable form at measure 20. Cell g, consisting of two rising minor seconds, develops into a four-note chromatic cell (g') in measures 19-20. The cell f in measure 19 (example 8b) is a retrograde of the original f at T-2.

EXAMPLE 8.--Men

a)

b)

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In Portals a method of thematic integration akin to that found in the Men and Mountains is employed. Connections among various thematic ideas in this composition depend on transformations and rearrangements of small intervallic cells. Portals is based on a theme of five measures length which is stated at the beginning by all instruments in

octaves. The opening theme undergoes constant variation throughout the work, resulting in various related sections.

Example 9 shows the thematic materials of Portals from seven different sections. The opening theme (example 9a) can be divided into two halves according to their intervallic characteristics. The first half of the theme contains small intervallic cells which are more atonal sounding (with C minor triad at the end) than the whole-tone hexachords of the second half of the theme.

The main integrative elements are the four cells marked m, n, o, and p, in example 9a. Examples 9e and 9f show two themes which start the sections with cell m, consisting of a falling minor second followed by a tritone or perfect fourth, set 3-5 in each case. The initial cell m in measure 26 (example 9e) shares same pitches (F, E, B^b) and melodic contour with the opening m in measure 1. Also, the third appearance of cell m in measure 27 (A^b, G, C[#]) is a rearrangement of the same pitches of the second cell m in the opening theme. These two three-note figures during measures 26-27 give a sense of return for a brief moment since these are one of the few obvious recurring elements associated with a particular pitch level. The themes given in examples 9f and 9g are closely related motivically to the first half of the opening theme. Cell m in measure 50 (example 9f) is a transposition at T-1 of the opening cell m in measure 1. In both 9a and 9f cell m is followed by cell n and then by another cell m; there is an additional n in measures 50-51. Example 9g shows the melody with repeated statements of cell n, the second one linked to cell m.

EXAMPLE 9.--Portals

a)

1

n

m

m

3

w.T.

P

m

3

o

w.T.

w.T.

b)

6

P

P

o

c)

13

o

o

m

P

3

w.T.

m

d)

15

Solo

m

Solo

o

e)

Staff e) is a single-line musical staff in treble clef with a key signature of one flat (B-flat) and a 7/4 time signature. It contains measures 26 through 32. Measure 26 starts with a boxed measure number '26'. The staff includes various musical notations such as eighth notes, quarter notes, and beamed sixteenth notes. There are several slurs and ties. Fingerings are indicated by 'm' (middle) and 'n' (ring). A dashed line labeled '8va' indicates an octave transposition for the final measure.

f)

Staff f) is a single-line musical staff in bass clef with a key signature of one flat (B-flat) and a 4/4 time signature. It contains measures 50 through 56. Measure 50 starts with a boxed measure number '50'. The staff includes various musical notations such as eighth notes, quarter notes, and beamed sixteenth notes. There are several slurs and ties. Fingerings are indicated by 'm' (middle) and 'n' (ring).

g)

Staff g) is a single-line musical staff in treble clef with a key signature of one flat (B-flat) and a 4/4 time signature. It contains measures 62 through 68. Measure 62 starts with a boxed measure number '62'. The staff includes various musical notations such as eighth notes, quarter notes, and beamed sixteenth notes. There are several slurs and ties. Fingerings are indicated by 'n' (ring) and 'm' (middle). A dashed line labeled '8va' indicates an octave transposition for the final measure.

h)

Staff h) is a single-line musical staff in bass clef with a key signature of one flat (B-flat) and a 5/4 time signature. It contains measures 70 through 76. Measure 70 starts with a boxed measure number '70'. The staff includes various musical notations such as eighth notes, quarter notes, and beamed sixteenth notes. There are several slurs and ties. Fingerings are indicated by 'o' (other) and 'P' (piano).

Staff h) continues from the previous staff, showing measures 71 through 76. It is in bass clef with a key signature of one flat (B-flat) and a 5/4 time signature. Measure 71 starts with a boxed measure number '71'. The staff includes various musical notations such as eighth notes, quarter notes, and beamed sixteenth notes. There are several slurs and ties. Fingerings are indicated by 'o' (other).

The melodic ideas shown in examples 9c and 9d illustrate the use of cells m, o, and p derived from both halves of the opening theme. The melodic materials from the coda (example 9h) demonstrate the use of two cells based on the whole-tone formation of the opening theme in various transformations. The second statement of cell o, consisting of A[♯], D, and E in measure 70, is a retrograde of the second o in measures 4-5 (example 9a). Also, the beginning three pc's in the third cello (E, D, B^b) are the same as cell o in measures 4-5 with the octave displacement of E.

Finally, example 9b shows three melodic ideas which begin the new section after the statement of the five-measure opening theme. Even though these melodies include cells o and p, the pitch organization of the section is independent from the opening theme since new cells other than those found in the opening prevail in measures 6-13. Also, this is the only section that is repeated without any significant changes. This repetition of a whole section is contrary to the over-all development of continuous variation.

The entire section is shown in example 10 where the four-note cell w (set 4-11)--the same set as is used for the main melodic motive of Angels--along with cells x (set 4-3) and y (set 3-1) unify the section. In the violin II, beginning at measure 6, cell w is stated in the form of a lower tetrachord of a major scale. Two more statements of w in different transformations are found in the viola in measures 6-7 and 10-11. Cell x is stated six times, the first time as a part of the viola theme in measures 6. The inverted form of x is presented by the cello during measures 7-8 with an octave displacement of C. Two more statements of x appear in parallel motion at measure 10 (violins and

cello). In measure 12 two additional presentations of x are found. Both cells are rearrangements of the x in the violin at measure 10 (G, F, E, A^b). Cell y, a new source of melodic material, is introduced by the lower violin II part at the beginning and developed into four- and five-note chromatic figures in measures 11 through 13. Cell z (set 3-2), included in both cells w and x, appears frequently not only as a component of melodic material, but also as separate independent figures in measure 9 (violin II and cello).

EXAMPLE 10.--Portals

The musical score for Example 10, "Portals", consists of four staves: Violin I (Vn. I), Violin II (Vn. II), Viola (Va.), and Cello (Vc.). The key signature is one flat (B-flat), and the time signature is 4/4. The score is divided into measures 9, 10, 11, 12, and 13. Various melodic cells are identified and labeled with letters in dashed boxes:

- Cell x:** A four-note chromatic figure (G, F, E, A^b) first appearing in measure 10 of the Violin I part, and rearranged in measures 11 and 12.
- Cell y:** A new source of melodic material introduced by the Violin II part in measure 11, developing into four- and five-note chromatic figures.
- Cell w:** A melodic cell appearing in measures 10 and 11 across the Violin II and Viola parts.
- Cell z:** A set 3-2 figure appearing frequently as a component of melodic material or as separate independent figures, notably in measure 9 of the Violin II and Cello parts, and in measures 11 and 12 of the Violin II and Cello parts.

Handwritten musical score for string orchestra, measures 10-14. The score is for Violin I (Vn. I), Violin II (Vn. II), Viola (Vla.), and Violoncello/Double Bass (Vc. Cb.). It features complex rhythmic patterns with triplets and various articulations. Handwritten annotations include 'x', 'y', 'w', 'y'', and 'z' with brackets indicating specific melodic or rhythmic cells. Measure 10 is marked with a circled '10'.

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Compared to the previous works of Ruggles, Portals uses more diverse and complex thematic materials. Unlike in Angels and Men and Mountains, the exact repetition of melodic materials in Portals is kept to a minimum. Instead, the composer develops the main theme constantly throughout the work while maintaining close relationships among important melodic materials through the use of referential cells.

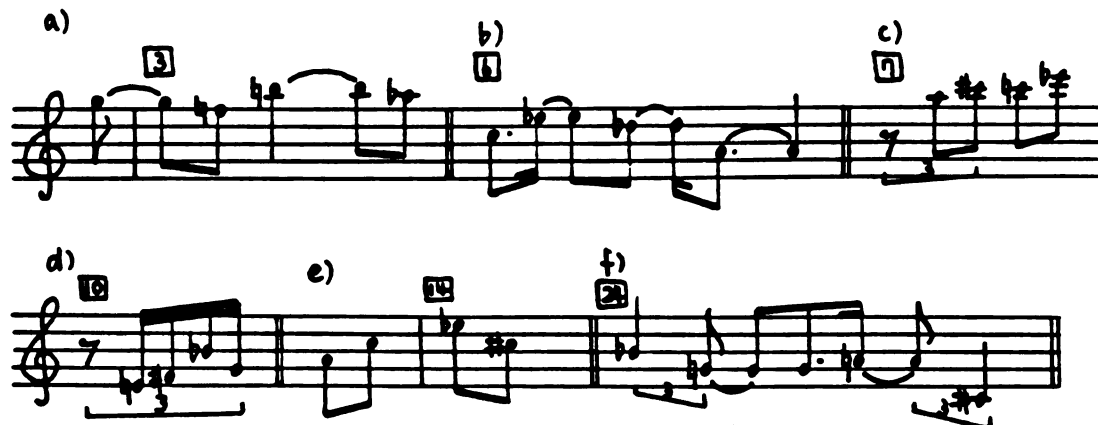
Written for string orchestra, "Lilacs," the second movement of Men and Mountains, shares several characteristics with Angels: both pieces

are for homogeneous ensembles (one for strings and the other for brass), the general feeling of both is calm and serene, and the formal structure in both cases shows a simple three-part form with the opening section returning at the original pitch level after the contrasting middle section.

The four-note motive (set 4-12) first stated by the violin I at measure 3 appears sixteen times in a thirty-measure long movement.¹⁰ Appearing only as a horizontal formation, this motive is established as the most important referential element as the piece progresses. Also, the motive is fairly recognizable since it is stated ten times in the top voice. Example 11 shows six different forms of the set 4-12 motives; the rest of the motives are transpositions at various intervals. The three forms in examples 11a, 11b, and 11c make their appearances in the opening and the closing sections, whereas the forms in examples 11d and 11e are presented in the middle section; example 11f appears once in the third section. The forms in examples 11b, 11c, and 11e are rearrangements of the same four notes E^b, D^b, C, and A. Example 11f is related to 11b in inversion with an octave displacement of the fourth pc C[#].

¹⁰The simultaneous presentation by two different parts in unison is counted once.

EXAMPLE 11.--Lilacs



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While various transformations of the same set hold "Lilacs" together, different sets in similar melodic contours with almost identical rhythmic patterns play an important role in song III of Vox Clamans in Deserto (A Clear Midnight). The two melodic ideas in measures 3 and 5 (examples 12a and 12b) are used several times both in exact and slightly varied forms throughout the piece. The five-note figuration in the cello (example 12a) is repeated in the next measure with the first note F replaced by F[#]. Both figurations are accompanied by the contrabass. The whole idea recurs at the original pitch level beginning at measure 22 in which the first five-note figure is reduced to four notes and stated twice. In measures 35 and 36, the four-note figure of measure 22 with slightly different interval content appears in the piano part. A further variant of the five-note figuration, still retaining the same rhythmic pattern, can be found in measures 14 and 15 (example 12a).

The thematic idea shown in example 12b, first stated in the horn at measure 5, appears a total of six times. The themes in measures 11 (violin) and 19 (voice) can be reduced to the same set 6-Z36; also, the themes in measures 19 (cello) and 20 (violin) are both set 6-Z39. All the six statements, although not related by inversion, retrograde, retrograde-inversion, or transposition, employ similar melodic contours and rhythmic patterns that can be easily recognized.

EXAMPLE 12.--A Clear Midnight

a)

The image displays two systems of handwritten musical notation for two staves, Violin II (Vc. II) and Cello (Cb.).

The first system is marked with a box containing the number 3. It shows a 4/4 time signature and a key signature of one sharp (F#). The Violin II staff begins with a treble clef and a key signature change to one sharp. The Cello staff begins with a bass clef and a key signature change to one sharp. Both staves contain musical notation including notes, rests, and accidentals.

The second system is marked with a box containing the number 22. It shows a 4/4 time signature and a key signature of one sharp (F#). The Violin II staff begins with a treble clef and a key signature change to one sharp. The Cello staff begins with a bass clef and a key signature change to one sharp. Both staves contain musical notation including notes, rests, and accidentals.

b)

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In Ruggles' early and middle compositions--Angels, Vox Clamans in Deserto, Men and Mountains, and Portals--harmonic structure is a product of diverse contrapuntal activity. While the motivic and thematic

formations of the four works are permeated by integrative cells, these intervallic cells exert little influence on harmonic formation. Instead, the almost constant presence of ic 1 in vertical sonorities unifies the "harmony." The following musical examples illustrate several ways the dissonant sonorities of minor ninth, major seventh, and minor second are produced. Two instances are found in example 10. In measure 10 of Portals, the four-note motive consisting of G, F, E, and A^b in the first and second violins is accompanied by the same motive in parallel motion (F[#], E, D[#], G in the cello and contrabass) a minor ninth apart. In measure 12 the motive in the violin I part (F, E, A^b, G) is simultaneously stated with the same motive (E, F, G, A^b) in the cello and contrabass in different orders. By exchanging the notes between the two dissonant parts, the ic 1 is retained; the F in the violin and E in the cello exchange their notes to E in the violin and F in the cello. The next two notes A^b and G are treated in the same way. The resulting harmony between the two motives alternates between a minor ninth and major seventh.

Example 13a from A Clear Midnight shows two melodies with similar melodic contours in which the dissonant harmonic intervals prevail in the phrase. The first two measures of "Marching Mountains" demonstrate the same characteristics (example 13b)--preserving as many ic 1 intervals as possible. The beginning two notes at the top, F and E^b, are accompanied by E, producing a minor ninth and major seventh; at the first beat of the second measure the F in the bottom voice supports the two notes F[#] and E in the top voice. In the later half of measure 1 the two quarter notes G and F[#] in the top voice are simultaneously stated with F[#] and G in the bottom, resulting in a minor ninth and major

seventh. Example 13c from Son of Mine shows a phrase with two different themes. The beginning two notes in the clarinet, F and E, are presented with E and F in the voice. The rest of the measure illustrates the careful selection of notes in both parts to maintain dissonant harmonic intervals.

EXAMPLE 13.--Harmonic Formations

a)

Fl.

Cl.

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b)

Trp

Bd.

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c)

Cl.

Voice

my soul is sick of its pain,

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It is interesting that the main cadential chords in "Lilacs," "Marching Mountains," and Angels all form the same set: 5-Z17 (example 14). The particular arrangements of this set in all three movements can be interpreted as a minor triad with an incomplete minor triad (root + third) a minor second apart: in "Marching Mountains" a G minor triad in second inversion plus A and F^b; in "Lilacs" an E^b minor triad with F and D; in Angels, a C^b minor triad in second inversion plus E^b and C. Also, the final chord of Organum forms set 5-Z17 and shares exactly the same pc's with the chord in "Marching Mountains."

EXAMPLE 14.--Cadential Chords

Mar. Mountains

Lilacs

Angels

Organum

A short example from Toys illustrates several ways Ruggles achieves extreme dissonance in a primarily chordal composition. The first chord in measure 7 (example 15) shows simultaneous statements of two minor triads a minor second apart--F[#] minor and G minor triads. At the fourth beat of the same measure, the right hand of the piano holds a D^b major triad while a C major triad is unfolding on top of it. In measure 9 the harmonic language is changed to explicit secundal harmony. Initiated by secundal chords in the piano, the voice part, beginning at measure 10, becomes extremely disjunct with frequent melodic intervals of a major seventh and minor ninth.

One way that Ruggles achieves a control over his pitch organization is through the careful distribution of twelve pc's. Ruggles' ordering of twelve pc's is not as strict as in serial procedures, but provides a degree of compositional structure. Several examples are found in three songs of Vox Clamans in Deserto. The final chord of the first song, Parting at Morning, contains eleven pc's. The F[#], the only missing note, is immediately presented in song II, Son of Mine, as a bass note of the opening chord. A similar situation occurs between song II and song III, A Clear Midnight. In the final chord of song II C[#] is the only absent pc and appears in the oboe as a member of the first sonority in song III.

A passage from A Clear Midnight shows an interesting way of distributing twelve pc's (example 16). The voice and piano parts are the principal participants and the clarinet, viola, and first violin are the secondary participants. The piano part in measure 29 contains eleven pc's with much repetition of the same pc's; for example, F[#] is repeated four times. The missing note A is found in the voice part and

EXAMPLE 15.--Toys

Handwritten musical score for "Toys" (Example 15). The score is written for Voice and Piano (Pf.).

First System:

- Voice:** The melody begins with a circled "1" above the staff. The lyrics are "Paint - ed ships. And trains of chee chee cars." The notes are mostly eighth and quarter notes, with some triplets indicated by a "3" over the notes.
- Piano (Pf.):** The accompaniment features a complex, flowing line in the right hand and a more rhythmic, bass-line-like line in the left hand. The right hand includes many sixteenth and thirty-second notes, often beamed together. The left hand has a steady eighth-note pattern.

Second System:

- Voice:** The melody continues with the lyrics "And a wren - chews bal - loon that". It includes a triplet of eighth notes and a triplet of sixteenth notes.
- Piano (Pf.):** The accompaniment continues with similar rhythmic patterns, including a triplet of eighth notes in the right hand.

The score is written in a key with one sharp (F#) and a 3/8 time signature. The piano part is marked with a forte "f" dynamic.

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sustained throughout the measure. The note A is reinforced by the clarinet momentarily, as it is presented as the beginning note of a melody. In measure 30 the absent notes in the piano part are increased to two, F[♯] and B[♭]. One of the missing notes, B[♭], is presented in the voice as a whole note and in the clarinet as the first note of a melody. The other missing note, F[♯], is found in the viola as a whole note. The piano part in measures 31 and 32 contains nine different pc's. Two of the absent pitches, D[♭] and B, appear in the voice part and the third absent pitch, B[♭], can be seen in the first violin.

EXAMPLE 16.--A Clear Midnight

The image shows a handwritten musical score for a piece titled "A Clear Midnight". The score is written for five staves: B[♭] Clarinet (Cl), Voice, Piano (Pf), First Violin (Vn. I), and Viola (Vla). The key signature has one flat (B[♭]), and the time signature is 4/4. A rehearsal mark [29] is placed at the beginning of the B[♭] Clarinet staff. The Voice part has lyrics "Night," and "Sleep,". The Piano part features complex rhythmic patterns with triplets and sixteenth notes. The First Violin and Viola parts have whole notes in the first measure of the system. The score is handwritten and appears to be a working draft.

31

B \flat Cl.

Voice

Pt.

Vn. I

Vn. II

Death and the

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The practice of not repeating a note until eight or more different notes in a melodic line have been used is applied as early as in Vox Clamans in Deserto and Men and Mountains in a free manner. This principle of construction permeates mostly the principal melodies in the early works (with exceptions). The entire voice part of four phrases in Parting at Morning illustrates the extent to which the principle is used. The first phrase (example 17a) starts with E reiterated six times, followed by three more notes, E \flat , C, and B. Example 17b includes

ten notes; the missing pitches are E and F[#]. The third phrase (example 17c) shows a melody with ten notes, but with eight different pc's. Seven different pc's are presented before the F[#] is repeated as the eighth note of the melody. Example 17d contains ten notes with eight pc's. One of the repeated pitches, D, appears as the fifth note of the melody.

EXAMPLE 17.--Parting at Morning

a) 3

Round the Cape — of a sud-den came the sea,

b) 6

And the sun looked o-ver the moun-tain's rim: —

c) 9

And straight — was a path — of gold for him, —

d) 13

And the need — of a world of men — for me. —

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In "Marching Mountains" the same principle is applied to a main theme as well as its imitation. A two-measure theme in measures 9-10

(example 18a), presented by the oboe, trumpet, and viola in unison, is imitated by three other instruments, English horn, clarinet, and second violin, with slight changes: interval contractions between the second and third notes, and the third and fourth notes; interval expansion between the fifth and sixth notes. In measure 13 the flute, second clarinet, and first violin present the first half of the theme in a varied version. The basic melodic contour and rhythmic pattern remain intact, but the melodic intervals are changed. In measure 14 the same head motive found in the previous measure appears in a different rhythm, followed by another rhythmic transformation in measure 15. The original theme in measure 9 has nine pc's with A, A[♯], and B absent. The three absent pc's are present at the imitation in measure 11. Note that the imitated theme has nine notes with seven different pc's; A and A[♯] are the only repeated pitches.

Another theme, shown in example 18b, dominates the entire passage exactly the same way as the theme in example 18a dominates the passage in measures 9-15. The whole theme is imitated once, with several interval changes in measures 25-26. In measure 27 the first half is imitated (not exactly) by the violin I, followed by a literal imitation of the theme's head motive in measure 28 (in the flute). The original theme in measures 23-24 has nine pc's, with the repetition of G[♯] (originally A^b) as the ninth note. The imitated version of the theme in the flute and trumpet in measures 25-26 includes three pc's missing from the original theme (C[♯], F, A). Note that A^b, the single repeated pitch in the original theme, does not appear in the imitated statement.

EXAMPLE 18.--Marching Mountains

a)

b)

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Compositional procedures which are refined gradually in Ruggles' earlier music--techniques of motivic and thematic transformations, non-repetition of pc in the melodic line, and dissonant harmonic formations--reach the highest development in Sun-treader. As in Portals, the intervallic cells contained in the opening theme are developed continually to produce new thematic and motivic materials throughout Sun-treader. Five main cells are used; each of the cells contains ic 1.

Cell r: Set 3-5

Cell s: Set 3-1

Cell t: Set 3-2

Cell u: Set 3-3

Cell v: Set 3-4

A chronological study of the important melodic and harmonic features will illustrate some of the determining developmental technique employed in Sun-treader.

The bold melodic contours of the opening phrase, shown in example 19a, accompanied by the quarter-note pounding of the timpani, convey the dramatic nature of Sun-treader. Throughout the piece cell r, the most essential and frequently used cell, generates a large portion of the horizontal formations and some of the important vertical formations. In the first theme, for example, cell r is included six times in various transformations (example 19a). The first theme ends with cell s and includes two other important intervallic cells, t and u, which give rise to main thematic ideas later in the work. The melodies given in examples 19b and 19c, which are extensions of the tail part of the first theme, contain overlapping statements of cell r with cell s, in each case, used once near the end.

These overlapping statements of cell r show little consistency in their interval patterns, but are arranged to avoid early repetition of the same pc's. The opening theme (example 19a) contains eleven pc's with A and A^b repeated as the eleventh and twelfth notes of the melody. The C[#], the only missing pitch, is presented in the next phrase as the longest note. The melodic ideas, shown in examples 19b and 19c, also include eleven distinct pc's with B and F[#] absent, respectively.

EXAMPLE 19.--Sun-treader

a)

b)

c)

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The melody in the bass tuba and contrabass from measures 9-10 (example 20a) is closely related to the first theme in its large melodic intervals, but contains integrative cells t, u, and s instead of r until the latter part of measure 10. The first four notes of the melody (set 4-3), reduced to smaller melodic intervals through octave displacement, become the basis of the new motive, which conveys a quiet mood in

measure 14 (example 20b). This five-note motive (set 5-1) is stated several times in the imitative counterpoint between measures 14 and 19 while the accompanying voices present figurations full of cells r and an occasional s.

EXAMPLE 20.--Sun-treader

a)

b)

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The five-note motive in measure 14 (example 20b) becomes the starting point of the second theme in measures 20-22 (example 21a). The second theme, which contrasts with the first theme, includes all twelve pc's, with cells s and t as main integrative elements. The thirteen-note idea (example 21b), presented with the large melodic intervals of tenth, ninth, and seventh, illustrates the close connection in pitch content with the second theme. In fact, this thirteen-note idea is a rearrangement of the second theme (with much octave displacement) in which cell u functions as the generating element; two pairs--the first and fourth u, and the second and third u--are related by transposition.

The same idea is used again in measures 36-38 without change.

EXAMPLE 21.--Sun-treader

Example 21 consists of two musical staves, (a) and (b), both in 2/2 time. Staff (a) begins at measure 20 and contains a melody with a four-note figure (D, C#, G#, A) repeated in different orders, labeled 't' and 's'. Staff (b) begins at measure 25 and contains a similar melody with the same four-note figure repeated in different orders, labeled 'u' and '3'.

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Beginning at measure 30, the four-note figure (set 4-8), based on cells *r* and *v*, becomes prominent (example 22a). Although found earlier in the piece, cell *v* here becomes the main source of the pitch materials for the first time. Initially, the set 4-8 figure is a component of the theme in measures 30-31, but it becomes an independent motive from the end of measure 32 on. In measure 33 the motive consisting of D, C[#], G[#], and A is presented simultaneously with the same four notes in different order, resulting in *ic* 1 between the motives. In measure 39, near the end of the section (example 22b), the set 4-8 motive is combined with another cell *r* in the clarinet and second violin, followed by chain statements of cell *r* in various forms in the first violin.

EXAMPLE 22.--Sun-treader

a)

b)

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Beginning at measure 52 there is a three-part canon that lasts until measure 61. As shown in example 23a, the voices involved in canon are generated by cell v, with the exception of the beginning portion. The four statements of v, each descending by minor thirds, comprise a twelve-note collection. The second violin (bottom) leads the canon (and quits in measure 57), followed by the viola in measure 53, second violin (top) in measure 54, and contrabass in measure 57; the latter three voices continue in canon until measure 61. Each entrance is a major second higher than the preceding canonic part, and augmented triads are produced by the horizontal alignment of the three canonic parts. At the same time, three additional voices partially imitate one another (example 23b). The melodic idea in the cello is imitated by the viola

in measures 52-54, followed by the first violin in measures 54-55.¹¹

EXAMPLE 23.--Sun-treader

a)

b)

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¹¹More will be discussed of Ruggles' use of canon in Chapter 3, p.111 and pp.115-119.

Beginning at measure 63 the retrograde-inversion of the set 4-8 motive from measure 30 appears and is extended into five- and six-note ideas in the next several measures (example 24).

EXAMPLE 24.--Sun-treader



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A major portion of the section lasting from measures 52-66 is restated in retrograde in measures 124 through 133, while measures 139 to 148 are an exact return of the original section except for changes in orchestration.

In measure 67 (example 25) two overlapping statements of cell r form another four-note motive, set 4-9, which becomes an important recurring unit at the climax of the piece. This motive, first seen as a part of the opening theme, can be viewed as an interval expansion of the four-note motive based on set 4-8 in example 22a.

EXAMPLE 25.--Sun-treader



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The section beginning in measure 68 uses rhythm as the main integrative element. In this section melodies with different pitch and intervallic contents are related by similar rhythmic patterns. As shown in example 26a, the prime form of the five melodic ideas in similar rhythm demonstrates a gradual shift from a step-wise formation (set 5-1), toward a more disjunct formation (set 5-21). The rhythmic pattern in measure 74 (example 26b) binds various melodic materials together by reappearing with slight changes in the first beat in measure 75, and again in 76, with further small changes in the second and third beats. In measures 77 and 78 the three-beat rhythm from measure 76 is used twice, this time without the second beat. The pitch structure in each stage demonstrates little consistency, with the exceptions of the melodic interval between the beginning two notes (ic 1), and the content in quintuplets (set 5-6).

The intervallic structure of the present section (measures 68-81) does not show total dependence on several integrative cells until the final passage of the section, where cell r, again, plays a dominating role as a source of melodic materials.

EXAMPLE 26.--Sun-treader

a)

69

70

71

Vla.

Cl.

Brn. Vc.

5-1

5-5

5-21

5-16

5-19

b)

74

75

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In measure 82 the piece arrives at its central section, where thematic complexity and textural density reach their maximum levels. The various transformations of cell r combined with additional cells become a major source of the many thematic and intervallic materials. The figurations, shown in examples 27a and 27b, demonstrate the frequent appearances of cell r and, occasionally, cell s. The initial cell r (D^b , C, F^{\sharp} --see example 27a) is related to the last r (B^b , A, D^{\sharp}) in

transposition at T-9. The last cell r in measure 83 becomes a starting point of a long descending theme in measure 86 (example 27b); the same set of three notes are presented again in the middle of the theme in measure 88.

In measure 83 the overlapping statements of cell r are arranged in such a way that the melody is composed of eight different pc's without any repetition. The theme in measure 86 includes two sets of eight pc's, each starting with the same three pitches, B^b, A, and D'. The tail of the long theme (example 27b) contains set 4-9 (C, F', G, C') which is first presented as an independent motive in measure 67. In measures 89-91 the set 4-9 motive is separated from the theme and is imitated in octaves several times. This motive is found frequently throughout the central section, especially as a component of less-thematic intervallic figuration.

EXAMPLE 27.--Sun-treader

a)

b)

While a significant portion of the melodic material is based on cell r, melodic ideas with other cells can be also found in the central section. The tail portion of the thematic idea in measure 105 (example 28a), which first started as a disjunct theme, contains cells s and u. This tail subject is imitated by various instruments in measure 107. The first violin part in measure 111 (example 28b) presents the descending melody, ranging from f'''' to d''', which is based on cells v, s, u, and t. Meanwhile, a modified version of the five-note motive (first found in measure 14) and the first seven notes of the opening theme (set 7-31) with a different intervallic content (without cell r) appear in the horn and contrabass parts.

A transitional passage in measures 119-123 precedes the canonic section beginning at measure 124, which is a restatement of the canon in measures 52-61 in retrograde. In this transition the set 4-8 motive, based on cells r and v, makes frequent appearances along with set 4-9 and other short figures (example 29); cell v is the generating cell for the canon.

The retrograde version of measures 52-61 marks the return of all of the first half of Sun-treader except for the center section. The canon in three parts remains intact, this time migrating from one instrument to another in the later part of the section. The main cell v generates four-stage sequences in ascending, instead of descending, minor thirds.

Example 30a compares canonic parts from the original section (measures 52-61) with the retrograde version. The two melodies compared in example 30b are the ones participating in the non-canonic imitation in both sections. The retrograde unfolds rather strictly with a few

changes in rhythmic values throughout the entire section.

EXAMPLE 28.--Sun-treader

a)

b)

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EXAMPLE 29.--Sun-treader

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EXAMPLE 30.--Sun-treader

a)

b)

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The intervallic and thematic materials used in the coda (measures 221-241) are closely related to the opening section, especially the opening theme. The coda starts the same way as measure 1 with the beating of the timpani and the theme based on set 7-31, but with a simpler texture (example 31a). The seven-note theme is restated at the same pitch level in measures 225-228 and appears for the last time in measure 230 at T-4, this time, without the seventh note. A melody from measure 231 (example 31b) contains integrative cells s, r, u, and t.

The last four notes, C[#], C, A, and B^b, can be reduced to the same set, 4-3, that can be found in measure 9, and which eventually becomes the basis for the second theme. A rhythmically modified version at T-1 is presented in measure 232 (example 31c) with an extra note, F, at the end adding one more r to its collection of cells.

EXAMPLE 31.--Sun-treader

a)

b)

c)

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The vertical formations in Sun-treader can be best described as highly dissonant. As shown in example 32, the cadential chords at the

structurally important points (mostly at the end of sections) demonstrate frequent appearances of ic 1 interval. In some cases the integrative cells, primarily used as horizontal figures, appear vertically (measures 66, 94, and 118). Examples taken from measures 94 and 118, both from the central section, show two motives based on sets 4-9 and 4-8 as vertical sonorities. The chords in measures 14, 42, 82, and 241 are permeated by the main cells, especially r, u, and v.

EXAMPLE 32.--Sun-treader

The musical notation for Example 32, 'Sun-treader', is presented in two systems. The first system contains measures 14, 42, 82, and 94. The second system contains measures 118 and 241. Each measure is shown with a treble and bass staff. Measure 14 is labeled with the interval 5-7. Measure 42 is labeled with the interval 8-5. Measure 82 is labeled with the interval 3-5. Measure 94 is labeled with the interval 7-4. Measures 94 and 118 are labeled with the intervals 4-9 and 4-8. Measure 241 is labeled with the interval 9-8. The notation includes various interval markings such as r, t, u, v, and s.

The initial appearances of the three important motives in measures 14, 33, and 67 (examples 33a) are associated with the integrative cells as vertical sonorities. The five-note motive in measure 14 (set 5-1) is stated simultaneously with its variant, with the middle voice providing the necessary notes to produce the vertical presentation of cells r and v. Measure 33 shows two statements of set 4-8 in a different order at the same time, with the sustained note F in the middle; the resulting harmony is cell u. Measure 67 presents the motive based on set 4-9 in the English horn and horn with a chromatic line in the middle. The harmonic result is four different cells: v, t, u, and r.

The passage in measures 20-22, which introduces the second theme, demonstrates the penetration of the vertical structure by the main cells (example 33b). Almost all of the vertical sonorities contain one (or more) of the main cells.

Evocations, subtitled "Four Chants for Piano," is a miniature version of Sun-treader in terms of pitch organization. These two pieces are good examples of compositions in which several sets are used throughout with remarkable frequency. As in Portals and Sun-treader, the opening idea and its intervallic cells play an important role in unifying Evocations. Listed below are the eight integrative cells; three to four cells are used extensively in each piece.

Cell a:	Set 3-5	Cell b:	Set 3-2
Cell c:	Set 3-8	Cell d:	Set 3-1
Cell e:	Set 3-4	Cell f:	Set 3-3
Cell g:	Set 4-1	Cell h:	Set 4-6

EXAMPLE 33.--Sun-treader

a)

14

r r v r v r

16

u u u u

E.h.

H.m.

18

v v t u v r

b)

20

u u v r u r r+v r+v r r etc.

As Ruggles' only works for piano, Evocations uses "after-note" technique notated by smaller than ordinary notes.¹²

The source of the pitch material of Evocation No.1 is presented at the first measure of the piece. The first four notes in measure 1, which form set 4-Z29, are extended to five and six notes in the next two measures (example 34) by means of the three-note cells (cells a, b, and c) included in the opening four-note motive.¹³ The consequent of the previous measures is presented in measures 4-5, followed by the rhythmically varied statement at the same pitch in measures 5-6. The first five phrases of this composition all contain a common subset, cell a; the last chord in measure 6 and the cadential chord in measure 7 also contain cell a. The eight pc's in measures 1-2 reduce to set 8-Z29, which is a complement of the opening motive, set 4-Z29. Also, the pitch content in measures 3-4, with the addition of C[#], the last note of measure 2, displays all twelve pc's.

Beginning at measure 9 cell a appears prominently as the main intervallic cell, culminating in measures 12-15 where cell a is formed by both horizontal and vertical figurations (example 35). This passage, beginning with F[#] (the last note of measure 12), contains all twelve pc's. These overlapping statements of cell a, already seen in Suntreader, appear frequently in the course of Evocations, especially in No.2.

¹²Harrison, "Carl Ruggles," 20.

¹³Steven Gilbert, "The 'Twelve-Tone System' of Carl Ruggles: A Study of the Evocations for Piano," Journal of Music Theory 14 (Spring 1970): 76.

EXAMPLE 34.--Evocation No.1

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EXAMPLE 35.--Evocations No.1

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The remaining portion of the piece (example 36) is a "return" of the opening section. While the rising melodic contour and rhythm remain similar to the opening phrase, the pitch content of the new motive is changed to set 4-16 (5-15 with the bass note). The five-note phrase in measure 16 is restated at T-9 in measure 17, followed by another five-note phrase with similar rhythmic and intervallic content in measures 18-19. Cell c makes four appearances in measures 16-17, and cell b initiates the phrase beginning at measures 18 (with an additional b at measure 19). The vertical formations in measure 20 include three cell a's.

A significant part of Evocation No.2 is based on twelve tones in succession.¹⁴ At the beginning a twelve-tone series is presented three times, untransposed, suggesting the use of serial technique. Here, the basic contour of a melodic line is kept intact except for some changes in the order when the series recurs; the third statement in measures 5-7 is incomplete without F (example 37). The twelve-tone series in measures 1-2 contains overlapping statements of cell a with two cell d's. Intervallic cells g and h are the result of dividing the series into three tetrachords. These four cells, a, d, g, and h, function as germinal ideas throughout Evocation No.2.

¹⁴Gilbert, "Evocations for Piano," 71, 74.

EXAMPLE 36.--Evocation No.1

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In measures 7-11 the twelve-tone series appears two more times in transposition at T-1 (example 38). In the second appearance of the series in measures 9-11, cell a no longer can be found due to the extensive internal reorderings (thirteen order changes according to Steven Gilbert). The left hand provides descending minor ninth intervals (and one major seventh interval) beginning at measure 9; the twelve-tone melody also moves in a generally downward direction.

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EXAMPLE 38.--Evocation No.2

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In measure 19 the twelve-tone series recurs at T-3, and becomes the basis of a canon at the octave. After the initial reappearance, the series changes the internal orders gradually beyond recognition, but the canon at the octave still continues until measure 29.

The two statements of the twelve-tone series during measures 44-46 constitute the beginning of the return (example 39). These statements are, actually, a repetition of the series in measures 7-11 in different rhythm. The pitch material for the last section includes frequent presentations of the integrative cells a, d, g, and h, in both dimensions.

Compared to other Evocations, Evocation No.3 has a distinctive character because of its regular use of chordal structures. The chordal passage in measures 1-2 recurs in measures 14-15. It also recurs varied in measures 23-24 and at the end of the piece (example 40). The third passage in measures 23-24 shares two sets, 4-3 and 6-Z49, with the original passage. Set 4-3, formed by two chords in the right hand in measure 1, is presented as a vertical formation in measure 23. The last chord in measure 2, set 6-Z49, appears untransposed in measure 24 and, then, three more times each time down a minor second. The last appearance of the passage in measure 27 is related to the original rhythmically, without close pitch relation; the rhythmic pattern in measure 2, 7 ♯ ♮ ♮ ♮ ♮ ♮ ♮ , recurs at the penultimate measure.

EXAMPLE 39.--Evocations No.2

The musical score is written for piano in 5/4 time. It consists of four systems of music. The notation includes various musical symbols such as notes, rests, accidentals, and dynamic markings. Fingerings are indicated by numbers 1-5. Articulation is marked with 'a' and 'h'. The key signature has one sharp (F#).

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EXAMPLE 40.--Evocations No.3

1

4-3

3 4

6-249

23

2 4

7 4

4-3

6-249

27

4 4

7 4

6-239

The pitch organization of the rest of Evocation No.3 has close links with the opening chordal structures. The passage in measures 3-6 (example 41) shows that intervallic cells, a, b, d, and f, which are a part of the opening chordal structure, generate most of the pitch materials. In measure 5 the texture simplifies to a single line doubled at the octave, providing a sense of relief that is hard to find in Portals and Sun-treader.

EXAMPLE 41.--Evocation No.3

Two tetrachords, 4-8 and 4-9, which play an important part in Sun-treader, make several appearances in Evocation No.3. As shown in example 42, set 4-8 is found mainly in the melody whereas 4-9 appears exclusively as a vertical sonority. In measure 26 a combination of two chords (each of which consists of an octave divided into two tritones which are a minor second apart) furnishes successive statements of 4-9's. Consequently, the passage results in twelve pc's with the beginning four pitches, (A, D[#], B^b, E), repeated at the end.

EXAMPLE 42.--Evocation No.3

The image displays two systems of musical notation for a piano piece. The notation is in treble and bass clefs, with a grand staff bracket. The first system contains measures 1 through 10. The second system contains measures 11 through 20. The music features complex harmonic structures with many accidentals. Annotations above and below the staff identify specific tetrachords: '4-8' is labeled above the melody in measures 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, and 20, and below the bass line in measures 2, 4, 6, 8, 10, 12, 14, 16, 18, and 20. '4-9' is labeled above the melody in measures 11, 13, 15, 17, and 19, and below the bass line in measures 12, 14, 16, 18, and 20. Some measures also have '4-1' or '4-4' annotations below the bass line.

Evocation No.4 starts out as a return of No.1 in "inversion."¹⁵

The falling figuration in measure 1 is transposed down a minor third in measure 2. This minor third sequence is continued in measure 3, but is broken at the end of the measure (example 43). The pitch content of both measures 1 and 2 is set 6-Z6 (excluding two small notes, F and C, at the bass clef in measure 2); eleven pc's are presented with the first note, D, repeated near the end of measure 2. The six pc's in measure 3 (excluding two small notes, D and A, at the first beat), the literal complement of pc's in measure 2, form 6-Z38, sharing the same ic content of two previous measures. The pitch content of measure 4, with the additional note, A, in the bass, forms set 7-6.

EXAMPLE 43.--Evocation No.4

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¹⁵Kirkpatrick, "The Evolution of Carl Ruggles," 160.

The three-note cells found at the beginning passage, cells a, d, and e, dominate the pitch material of the piece, frequently appearing in elision. The passage in measures 7-10 contains numerous examples of the three cells, both as chords and components of a melody (example 44). Note that the final chord in measure 8 is set 5-6 which is the complement of set 7-6 found in measure 4.

EXAMPLE 44.--Evocation No.4

The musical score for Example 44, Evocation No. 4, spans measures 7 through 10. It is written for piano with a treble and bass staff. The key signature has one sharp (F#). Measure 7 is marked with a circled '7'. Measure 8 contains a chord labeled '5-6'. Measure 9 has a '3' above the staff. Measure 10 has a '5' above the staff. Handwritten annotations 'a', 'd', and 'e' are placed above and below the staves, indicating specific three-note cells. The score ends with a double bar line and a sharp sign.

In the middle section, beginning at measure 15, cell a becomes the germinal idea where the left hand continues the sequence of cell a until measure 17 for five and half stages (example 45a). The right-hand part imitates the left hand in varied rhythm. The sequence and imitation come to an end at the first chord of measure 18. From the middle of measure 21 the right-hand part of measures 15-18 is reintroduced in retrograde (example 45b). The left-hand part participates in the retrograde from the beginning of measure 22 for three stages.

EXAMPLE 45.--Evocation No.4

The image displays two systems of handwritten musical notation for a piano piece. The first system, labeled 'a)' and '15', covers measures 15 through 18. It features a treble and bass staff joined by a brace. The key signature has one flat (B-flat). Measure 15 begins with a treble staff chord of B-flat, D-flat, and F, and a bass staff chord of G, B-flat, and D. A bracket labeled 'a' spans measures 15 and 16 in the bass staff. Measure 17 contains a treble staff triplet of eighth notes (B-flat, D-flat, F) and a bass staff triplet of eighth notes (G, B-flat, D). Measure 18 ends with a treble staff chord of B-flat, D-flat, and F, and a bass staff chord of G, B-flat, and D. The second system, labeled '21', covers measures 21 through 24. It also features a treble and bass staff. Measure 21 begins with a treble staff triplet of eighth notes (B-flat, D-flat, F) and a bass staff triplet of eighth notes (G, B-flat, D). Measure 22 contains a treble staff triplet of eighth notes (B-flat, D-flat, F) and a bass staff triplet of eighth notes (G, B-flat, D). Measure 23 contains a treble staff triplet of eighth notes (B-flat, D-flat, F) and a bass staff triplet of eighth notes (G, B-flat, D). Measure 24 ends with a treble staff chord of B-flat, D-flat, and F, and a bass staff chord of G, B-flat, and D.

b)

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The final section, given in example 46, is a return of the opening with several changes. Measure 25 duplicates the same six notes found in measure 2. The next two measures continue the sequential transposition in minor and major thirds, but in each stage there are alterations. The last several measures have frequent appearances of the main cells, a, d, and e. The cadential chord in the left hand (measure 32) forms set 4-Z29, the same set found at the beginning of *Evocation No. 1*; in both pieces, *No. 1* and *No. 4*, set 4-Z29 has greatest number of set-complex

relations among tetrachords.¹⁶ Also, the entire cadential chord is set 6-Z37, the same set as the final chord of Evocation No.3.

Organum for orchestra, Ruggles' last completed composition, is more conservative in its use of pitch resources than Sun-treader. Compound intervals are rarely used, and dissonant vertical sonorities are occasionally alternated with brief appearances of traditionally "consonant" intervals such as thirds and sixths. The piece begins with three gradually expanding phrases (example 47). The first phrase (measures 1-2) consists of the melodic interval of a minor second and its inversion. The second phrase (measures 3-4) includes an additional minor second, E-D[#], at the end. The beginning portion of the third phrase in measures 5-6 also consists of three minor second intervals; interval expansion is used between the fourth and fifth notes, compared to the second phrase.

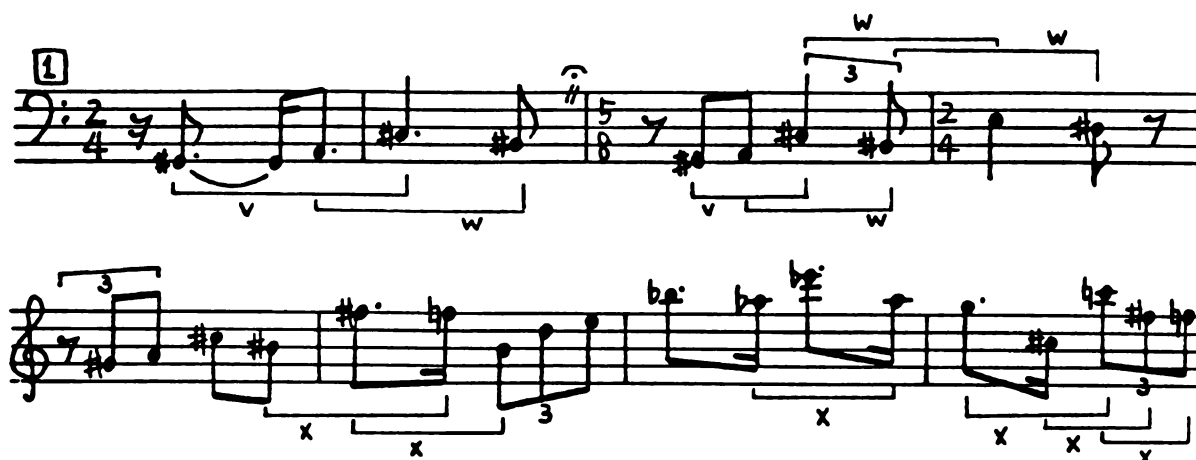
The use of several main intervallic cells as a basis of pitch material is as apparent as in Sun-treader and Evocations. As shown in example 47, cells v (set 3-4) and w (set 3-3) play a dominant role at the outset of the piece; the beginning motive is based on dovetail statements of cells v and w. Several other sets, such as x (set 3-5), y (set 3-2), and z (set 3-1) join the group of main cells as the piece progresses (all five main cells contain ic 1). For example, the third phrase in measures 5-7 now includes several cell x's in the melody.

¹⁶See Chapter 5, p.177.

EXAMPLE 46.--Evocation No.4

Handwritten musical score for "Evocation No. 4". The score is written in 4/4 time and consists of three systems of music. The first system begins with a box containing the number 35 and the instruction "(s:lent)". The piano part (left hand) features a series of descending eighth notes, while the vocal part (right hand) has a melody with a triplet of eighth notes. The second system continues the piano part with a triplet of eighth notes and the vocal part with a triplet of eighth notes. The third system shows the piano part with a triplet of eighth notes and the vocal part with a triplet of eighth notes. The score includes various annotations such as "e", "a", "d", "b", and "6-2 37" with arrows pointing to specific notes or measures. The time signature is 4/4, and the key signature has one sharp (F#).

EXAMPLE 47.--Organum



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Two melodies introduced in measures 9 and 12 contain main cells (example 48). These intervallic cells are seldom associated with certain interval patterns or pitch levels, but are arranged to present as many pc's as possible before any pc is repeated. The melodic idea in measure 9 has twelve pc's before E recurs, and the one in measure 12 includes ten pc's before C' is repeated. Among the seven statements of cell y in measures 12-14, there are two pairs each of cell y which are related by transposition at T-4.

In the middle portion of Organum triadic outlines are often used in the melodies; mainly, diminished triads appear between measures 22-33. The thematic idea in measure 34-37 (example 49) includes three different kinds of triads in the middle portion; the main cells make up the melodic idea at the beginning and the end. This outlining of triads gives evidence of more frequent use of ic 3 and ic 4 intervals in the melodies.

EXAMPLE 48.--Organum

Handwritten annotations in Example 48 include:
 Staff 1:
 - Above measures 10-11: 'z' (over a triplet), 'w' (over a pair), 'x' (over a triplet).
 - Below measures 9-10: 'v' (under a pair), 'v' (under a pair).
 - Below measure 10: 'w' (under a pair), 'w' (under a pair).
 Staff 2:
 - Above measures 12-14: 'y' (over a triplet), 'y' (over a pair), 'y' (over a pair), 'v' (over a pair).
 - Below measures 12-14: 'y' (under a pair), 'w' (under a pair), 'y' (under a pair), 'y' (under a pair), 'y' (under a pair), 'v' (under a pair), 'z' (under a pair).

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EXAMPLE 49.--Organum

Handwritten annotations in Example 49 include:
 Staff 1:
 - Above measures 25-26: 'm' (over a pair), 'd' (over a pair), 'M' (over a pair).
 - Below measures 24-25: 'x' (under a pair), 'y' (under a pair).
 - Below measure 25: 'y' (under a pair).
 Staff 2:
 - Above measures 27-28: 'd' (over a pair), 'v' (over a pair).
 - Below measures 27-28: 'x' (under a pair), 'x' (under a pair), 'x' (under a pair), 'z' (under a pair), 'v' (under a pair), 'z' (under a pair).

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The passage in measures 55-61 (especially the top and bottom voices--example 50), before the return of the opening section, makes use of cell x to a greater extent than elsewhere in the piece, resulting in more tritones and minor seconds in the melodies. This characteristic can be frequently found in Sun-treader in which every transitional passage makes increasing use of the same cell (set 3-5).

EXAMPLE 50.--Organum

The image displays musical notation for Example 50, titled "Organum". It consists of three staves. The top staff is a treble clef in 2/4 time, starting with a boxed measure number "55". It contains a series of notes with various accidentals (flats, sharps) and rests. Brackets labeled "x" are placed under several groups of notes, indicating specific intervals or cells. A triplet of notes is marked with a "3" above it. The middle staff is a smaller treble clef in 2/4 time, also starting with a boxed measure number "55", and contains a few notes with accidentals, with a bracket labeled "x" underneath. The bottom staff is a bass clef in 2/4 time, starting with a boxed measure number "58". It contains a series of notes with various accidentals and rests. Brackets labeled "x" are placed under several groups of notes, indicating specific intervals or cells. A triplet of notes is marked with a "3" above it. The notation is handwritten and includes various musical symbols such as flats, sharps, and triplets.

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Ruggles' musical language did not change significantly in the twenty-six years which separate the composition of Toys in 1919 from the completion of Organum in 1945. Instead, the compositional techniques used in Ruggles' earliest piece are consistently applied in a more

mature manner in his later works. For example, in Ruggles' later compositions main intervallic cells are used more extensively. In other words, in the later works more pitch materials are clearly related to main referential trichords and tetrachords than in the earlier works. Also, the harmonic formation, which is mostly independent from the horizontal formations in the early works, often is incorporated into the same musical vocabulary in the later compositions.

CHAPTER 3

COUNTERPOINT AND TEXTURE

Many twentieth-century composers have adopted traditional contrapuntal techniques as a means of structuring their music. The "harmony" of many twentieth-century compositions which incorporate canonic, fugal, or other highly contrapuntal textures, often principally results from the interweaving of independent lines. Carl Ruggles' free and dense polyphony frequently employs melodic lines which share common motivic elements. Virgil Thomson describes Ruggles' musical textures as "non-differentiated, secundal counterpoint"¹ in which "the voices making up this counterpoint all resemble one another in both character and general shape."²

Ruggles' use of contrapuntal devices is evidenced first by means of sporadic motivic imitation between parts in Angels. In his early works, Ruggles tended to avoid using imitation that is exact in rhythm and interval, favoring instead imitation with some alterations; this technique often resulted in subtly textured music. Even in Angels, one of the composer's more homophonically conceived pieces, some evidence is found of the contrapuntal techniques which would be more fully

¹Virgil Thomson, American Music Since 1910 (New York: Holt, Rinehart and Winston, 1972), 32.

²Ibid., 32.

implemented in Ruggles' later works. "Free" imitation was to become a distinctive feature of Ruggles' music, along with other important techniques such as parallelism (including voice leading by similar motion) and sequence (typically involving rhythmic shifting and intervallic changes).

The opening section of Angels (example 51) illustrates the use of free imitation between the five-note motives in the trumpet II (measures 1-4) and the trumpet I (measures 4-6). Not only is the rhythm varied, but the melodic interval between the third and fourth notes is contracted from a major third to a minor third. The four-note motive in the trumpet IV (measures 5-8) resembles the contour of the motive in the trumpet I (measures 4-6) in augmentation.

EXAMPLE 51.--Angels

The musical score for 'Angels' consists of four staves. The key signature has one flat (B-flat), and the time signature is 2/4. The score shows measures 1 through 8. Trumpet I has a first ending bracket over measures 4-6. Trumpet II and Trumpet IV have four-note motives. Trombone II has a four-note motive in measures 5-8.

The four-note motive in the trombone I in measures 9-10 (example 52) is based on the five-note motive in the trombone II in measures 5-7; there is interval expansion between the first and second notes, and the fourth note, C, is omitted. The trombone I motive (measures 9-10) is imitated by the trumpets I and II (measures 11-12), with a varied rhythm and a change of the last interval. In measures 11-16 the two trumpets continue to move in the same rhythm with a similar contour, forming parallel thirds in measures 12-16. The same two voices in measures 17-19 no longer move in the same rhythm. This kind of pairing of voices in which the two voices move in similar rhythm and contour is used extensively in Sun-treader.

The final passage of Angels shows imitation at the unison (example 53). The motive in the trombone I (measures 41-42), which first appeared in measures 9-10, is imitated in a rhythmically altered form by three upper voices (trumpets II, III, and IV) in measures 42-45. This rhythmic alteration, along with frequent meter and tempo changes, helps to avoid the effect of a regular beat. Throughout Angels a dense dissonant texture is maintained; all six parts are present, seldom relieved by a thinner construction. Some triadic sonorities such as intervals of a third are present in the harmonic structure as well as in the melodic lines, although a tonality in the traditional sense is lacking, mainly due to the pervasive presence of more than one interval in many sonorities.

EXAMPLE 52.--Angels

9

Trp. I

Trp. II

Trb. I

Trb. II

10

Trp. I

Trp. II

Trb. I

Trb. II

EXAMPLE 53.--Angels

Handwritten musical score for 'Angels'. The score consists of six staves, labeled I, II, III, IV, I, and II from top to bottom. The first four staves are for Trumpets (Tpt.) and the last two are for Trombones (Trb.). The time signature is 3/4. The key signature has one flat (B-flat). The score includes various musical notations such as rests, eighth notes, quarter notes, and triplets. A circled '4' is at the top left.

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The parallel and similar motions and free imitation which are found in Angels are also found in Vox Clamans in Deserto. The use of disjunct melodic intervals, rapid shifts of register, non-tertian harmony, and more independent contrapuntal writing are the new features that set Vox Clamans in Deserto apart from Angels. In the three songs

of Vox Clamans in Deserto, diverse linear and vertical musical ideas are used in the chamber orchestra. The text of the pieces serves to unify a variety of complex materials, with occasional use of repetition, imitation, and sequence as additional unifying devices.

In measure 5 of Parting at Morning the contrabass and bassoon state a line in unison, while the cello shares a similar melodic idea; the exchanging of notes and similar motion between the two parts result in minor ninth and major seventh vertical intervals. In measures 6-7 the flute, oboe, clarinet, and trumpet I parts present similar lines above the bass countermotive doubled by the bassoon, cello, and contrabass. The mezzo-soprano voice's melodic activity in measures 6-8 is independent from the instrumental accompaniment.

Measures 11-12 (example 55) contain the only instance of imitation in the course of song I. The melodic ideas stated by the flute and clarinet are imitated, first by the cello, and then by the violin and clarinet. While the rhythm remains almost intact in imitated statements, the interval content changes with each presentation. The two statements, one in the flute (measures 11-12) and the other in the clarinet (measures 12-13), can be reduced to the same set, 7-24, but are not a literal transformation of each other.

EXAMPLE 54.--Parting at Morning

Fl.

Ob.

Cl.

Bsn.

Trpt. I

Voice

And the Sun looked o-ver the moun-tain's rim:

V.

Cb.

EXAMPLE 55.--Parting at Morning

10

Handwritten musical score for 'Parting at Morning'. The score is written on five staves: Flute (Fl.), Clarinet (Cl.), Voice, Violin II (Vn. II), and Violoncello (Vc.). The key signature is one flat (B-flat major or D minor), and the time signature is 4/4. The first system (measures 1-4) shows the Flute and Clarinet playing a melodic line, the Voice singing 'straight ————— was a path — of gold for', and the Violoncello providing a bass line. The second system (measures 5-8) shows the Flute and Clarinet continuing their melodic line, the Voice singing 'him. —————', and the Violoncello continuing its bass line. The Violin II staff is empty in both systems.

Fl.

Cl.


Voice

straight ————— was a path — of gold for

Vn. II

Vc.

him. —————

The texture of Son of Mine can be described as a combination of chordal and free contrapuntal writing. Chordal accompaniment often appears in the piano, and occasionally in other instruments (measures 15 and 22 in the strings). The contrapuntal passages in the piece demonstrate free polyphony with little repetition of material. The only recurring element in song II is the rhythmic pattern of . This pattern is presented in measure 3 by the clarinet (example 56a), and then it recurs in measure 5 (piano) and measure 12 (violin I); each of these presentations of the rhythmic pattern appears in a different musical context. A similar rhythmic pattern also appears in measure 9 of song III (example 56b).

In measures 7-8 (example 57) the right and left hand lines of the piano part form dissonances, moving in parallel minor ninths. The flute and clarinet parts (measures 8-9) share a similar melodic contour; the two parts contain eight different pc's with two pitches repeated in both cases. In measures 10-11 the piano provides chordal accompaniment, while the voice and other instruments move independently without close motivic or rhythmic relationships. In measures 10-11 the clarinet part and the voice part each contain ten different pc's; in each part no pc is stated more than once.

EXAMPLE 56. Son of Mine

a)



b)



EXAMPLE 57.---Son of Mine

Handwritten musical score for "Son of Mine" in 4/4 time. The score is divided into two systems, each featuring Flute (Fl), Clarinet (Cl), Voice, and Piano (P) parts.

First System:

- Flute (Fl):** Starts with a treble clef and a key signature of one sharp (F#). The melody begins with a quarter rest, followed by a quarter note F#4, a quarter note G#4, and a quarter note A4. The piece then changes to a key signature of one flat (Bb) and continues with a quarter note Bb4, a quarter note C5, and a quarter note D5. The melody concludes with a quarter note E5 and a quarter rest.
- Clarinet (Cl):** Starts with a treble clef and a key signature of one sharp (F#). The melody begins with a quarter rest, followed by a quarter note F#4, a quarter note G#4, and a quarter note A4. The piece then changes to a key signature of one flat (Bb) and continues with a quarter note Bb4, a quarter note C5, and a quarter note D5. The melody concludes with a quarter note E5 and a quarter rest.
- Voice:** The lyrics are "Dark clouds — have dimmed the glow of the sky. —". The melody begins with a quarter rest, followed by a quarter note Bb4, a quarter note C5, and a quarter note D5. The piece then changes to a key signature of one flat (Bb) and continues with a quarter note Bb4, a quarter note C5, and a quarter note D5. The melody concludes with a quarter note E5 and a quarter rest.
- Piano (P):** The piano part consists of a series of chords in the right hand and single notes in the left hand, following the harmonic structure of the vocal and instrumental parts.

Second System:

- Flute (Fl):** The melody continues with a quarter note E5 and a quarter rest, followed by a quarter note F#4, a quarter note G#4, and a quarter note A4. The piece then changes to a key signature of one flat (Bb) and continues with a quarter note Bb4, a quarter note C5, and a quarter note D5. The melody concludes with a quarter note E5 and a quarter rest.
- Clarinet (Cl):** The melody continues with a quarter note E5 and a quarter rest, followed by a quarter note F#4, a quarter note G#4, and a quarter note A4. The piece then changes to a key signature of one flat (Bb) and continues with a quarter note Bb4, a quarter note C5, and a quarter note D5. The melody concludes with a quarter note E5 and a quarter rest.
- Voice:** The lyrics are "Son of mine the lone-ly night draw-eth nigh..". The melody begins with a quarter note Bb4, a quarter note C5, and a quarter note D5. The piece then changes to a key signature of one flat (Bb) and continues with a quarter note Bb4, a quarter note C5, and a quarter note D5. The melody concludes with a quarter note E5 and a quarter rest.
- Piano (P):** The piano part continues with a series of chords in the right hand and single notes in the left hand, following the harmonic structure of the vocal and instrumental parts.

Examples 54, 55, 57, and 58 each contain at least one obvious case of word painting. In example 54 the words "sun" and "mountain" are set with high pitches. Note that the pitch on the word "sun" is a minor second higher than that on the word "mountain." In example 55, the word "straight" remains pitched on E for more than a half-note duration. Also in examples 57 and 58, "night draweth nigh" is set to notes with falling melodic figuration and "emerging" to notes in rising figuration

In Men and Mountains individual voices gain full independence, and polyphonic writing functions as part of the overall textural design. Compared to Vox Clamans in Deserto, more examples of recurring rhythmic and melodic (motivic) patterns can be found, and these patterns serve as integrative elements.

An excerpt from section two of "Men" (example 59) demonstrates considerable unity through restatement of ideas. The violin and viola parts in measure 21 present a two-stage sequence with an interval change (between the second and third notes), while the middle and bottom parts have two- and three-stage sequences. Ostinato is found in the last beat of measures 23 and 24 in the bass clef: a six-note pitch pattern in the sextolets is repeated twice in measure 24 in a slower rhythmic pattern. A gradually thinning texture accompanied by rhythmic deceleration brings the section to a close.

EXAMPLE 59.--Men

The musical score for Example 59, titled "Men", is presented in three systems. The first system consists of three staves: the top staff is for Violins (Vn.), the middle for Horns and Trumpets (Hn. Trpt.), and the bottom for Violas, Basses, and Cellos (Vc. Bsn. Cb.). The key signature has one sharp (F#) and the time signature is 4/4. The first system includes a rehearsal mark [21] at the beginning. The second system continues the music with three staves, showing more complex rhythmic patterns and triplets. The third system shows the continuation of the music, with the bottom staff featuring a 5/4 time signature change.

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The beginning portion of "Lilacs" is more homophonic than most of the two outer movements. The violin I part has the most active voice while the cello often forms chords of major sevenths and minor ninths. In the middle section there is more interaction among the parts. Imitation at the octave occurs in measures 9-13 between the viola and violin I (example 60). The violin II is homorhythmic with the violin I, but in fluctuating harmonic intervals ranging from minor third, major third, perfect fourth, to tritone. The cello and contrabass loosely imitate the leader (viola and violin) from the middle of measure 9 until measure 12; rhythm in these parts remains almost intact (except the first note in the contrabass in measure 11), whereas many intervals are varied throughout the imitation. There is a sequence (not strict) in the violin I from measure 13, beginning with the second note, E. Each stage consists of six notes, with the last three notes outlining a triad.

The march-like eight-note theme stated in measure 7 dominates "Marching Mountains." In addition to the two themes which are imitated several times,³ the opening theme is one of the most important integrative elements throughout the movement. From measure 33, the beginning of section three, rhythmic variations of the opening theme make up the entire section. The theme appears eight times, untransposed, every other time in rhythmic diminution. There is a final transposed statement of the opening theme in the original rhythm at the end of the coda, in measures 47-49.

³See Chapter 2, p.47.

EXAMPLE 60.--Lilacs

Handwritten musical score for "Lilacs" (Example 60). The score is written for five instruments: Violin I (Vn. I), Violin II (Vn. II), Viola (Vla.), Violoncello (Vc.), and Contrabass (Cb.). The key signature is one flat (B-flat), and the time signature is 4/4. The score is divided into three measures. The first measure is marked with a "9" in a box. The notation includes various musical symbols such as notes, rests, accidentals, and dynamic markings. The score is written in a handwritten style.

The score is organized into five staves, each labeled with an instrument name on the left:

- Vn. I
- Vn. II
- Vla.
- Vc.
- Cb.

The notation includes various musical symbols such as notes, rests, accidentals, and dynamic markings. The score is written in a handwritten style.

12

Handwritten musical score for measures 12-15 of "Marching Mountains". The score is in 3/4 time and features six staves: Violin I (Vn. I), Violin II (Vn. II), Viola (Vla.), Violoncello (Vcl.), Double Bass (Cb.), and Clarinet (Cl.). Measures 12-15 show a complex texture with many accidentals and triplets. In measure 15, the lower staves (Vcl., Cb., and Cl.) end with a 7-measure rest, indicating a reduction in texture for the following section.

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Example 61 shows the beginning of the second section of "Marching Mountains." In measures 19-22 the texture is reduced to three parts for the first time, and rhythm and pitch material remain simple and repetitive. In measures 23-26 the solo melody in the oboe and the

countermelody in the viola are shaped to remain dissonant to each other. Thomas Peterson explains: "The relationship between the individual lines, as well as their very shape, is largely determined by the maintenance of a consistently high level of dissonance in the vertical element."⁴ The minor ninth harmonic intervals in the bass clef in measures 23-26, already seen in Son of Mine and Lilacs, are frequently found in Sun-treader and Evocations.

EXAMPLE 61.--Marching Mountains

The musical score for 'Marching Mountains' is presented in two systems. The first system includes parts for Flute (Fl.), Oboe (Ob.), and Clarinet (Cl.). The second system includes parts for Solo Oboe (Solo Ob.), Violin I (Vn. I), Viola (Vla.), Violoncello (Vc.), and Double Bass (Cb.). The music features complex rhythmic patterns, including triplets and sixteenth notes, and a key signature of one flat (B-flat).

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⁴Thomas Peterson, "Music of Carl Ruggles" (Ph.D. diss., University of Washington, 1967), 41.

The two outer movements of Men and Mountains achieve a majestic quality through regular employment of large melodic intervals, intense dissonant harmony, and generally loud dynamics. According to Peterson, this vitality in Ruggles' style can be attributed to certain restrictions in melodic writing:

One such restriction that tends to prevail is that the same interval is not immediately repeated more than once. . . . Another significant restriction is that the octave is not used as a melodic interval except on a few occasions. . . . As in Angels, the immediate reiteration of the same note in the individual lines is stringently avoided in Men and Mountains.⁵

In the program note for the International Composers Guild concert of January 24, 1926 Ruggles describes Portals as "a prose poem in the form of Rhapsodic Variations based on a theme of seven measures announced at the beginning." The piece is scored for string orchestra with the first violins divided into three parts, second violins into two parts, violas and cellos divided into three parts each, and contrabasses often divided into two parts. Ruggles seldom makes use of special instrumental effects such as ponticello, mute, or other experimental techniques. Rather, the solo writing in Portals provides textural variety to the otherwise homogeneous ensemble. Parallel and similar motions combined with independent contrary motion make up a significant part of the piece. The harmony of Portals is highly dissonant, but the composition has an open and resonant sound due to the consistently wide spacing used. The monophony found in the opening five measures is quite contrary to the harmonic principle of the composer's earlier works as

⁵Ibid., 33.

well as to the rest of Portals.

In Ruggles' freely unfolding counterpoint, with its long and expansive melodic lines, there are only a few instances of motivic imitations (example 62): in measure 16-17 the figuration in the violin I is imitated (stretto) by the cello; in measures 19-20 the solo line played by the viola is imitated by the violin with E replaced by D, and with varied rhythm. The six-note idea in measure 52 recurs three times in the next measures. The first five notes are repeated, doubled by the violin II in measure 53. In measure 54 two more varied statements of the idea from measure 53 (reduced to four notes) can be found in the violins. This kind of melodic (motivic) repetition with variation is found often in Sun-treader.

EXAMPLE 62.--Portals

The image displays five musical staves from the piece 'Portals'.
 - The first staff (labeled 16) shows Violin I (Vn. I) in treble clef with a six-note melodic line.
 - The second staff (labeled 19) shows Viola (Vla.) in treble clef with a six-note melodic line.
 - The third staff (labeled 20) shows Violin I (Vn. I) in treble clef with a six-note melodic line, including a triplet of eighth notes.
 - The fourth staff (labeled 52) shows Viola (Vla.) in treble clef with a six-note melodic line.
 - The fifth staff (labeled 53) shows Violin I (Vn. I) and Violin II (Vn. II) in treble clef. The Vn. I part has a six-note melodic line, and the Vn. II part has a five-note melodic line that is a variation of the Vn. I line.

In Sun-treader, compared to Ruggles' other works, the composer makes use of the fullest variety of contrapuntal techniques and textural devices: free imitation, melodic sequence, complex melodic material, extensive pitch register, and dense dissonant polyphony. Ruggles' largest work, Sun-treader, exhibits vastly diverse materials which are given coherence by means of textural consistency. Throughout the piece, the outer voices are often paired and move in the same or similar rhythm. According to John Kirkpatrick,

Much of the work is stated in a kind of three-part texture that Carl used briefly toward the end of Portals, the widely separated outer voices (often in octaves) sharing the same rhythms and approximate interval-spans in mirror fashion, the compact handful of middle voices embodying a unified melodic strain with its own contrasting dissonances and rhythms. (This suggests a twentieth-century analogy to the Renaissance parallel tenths enclosing a free inner voice.)⁶

Also, consistency is provided in Sun-treader by offsetting the sections containing complex rhythmic motion and those with regular repetitive motion. Even though passages exhibiting a variety of durations in difficult and free rhythm predominate in the composition, the recurrence of a simple rhythmic pattern (frequently combined with sequence) can be found regularly throughout the piece.

An excerpt from Sun-treader (example 63) displays two-part texture in which the two voices move in similar rhythm. The two voices move in mostly contrary motion, and the resultant pitch combinations often form a 1 interval with each other. In other words, maintenance of a dissonant vertical relationship is one of the determining factors in the

⁶John Kirkpatrick, "Evolution of Carl Ruggles: A Chronicle Largely in His Own Words," Perspectives of New Music 6 (1968): 157.

passage's contrapuntal motion.

EXAMPLE 63.--Sun-treader



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The passage encompassing measures 62-64 (example 64) exhibits three string parts moving in parallel motion and one free voice in a middle register, the horn. The vertical alignment of the parts in the strings, made up of harmonic intervals of tritones and perfect fourths, forms set 3-5. The four-note string idea found in measure 63 is restated with one additional note at the end in measure 64, during which the horn motive is repeated literally. The overall effect brought by the passage is that of regularity of melodic and harmonic content.

EXAMPLE 64.--Sun-treader

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An excerpt in example 65 illustrates Kirkpatrick's description of Ruggles' "three-part texture"; in this example, actually, three groups of parts appear. The two outer voices, moving largely in contrary motion, exhibit widely spaced registers, and the intervallic relationship between the two voices remains *ic 1* throughout. The group including the three middle voices has its own pair moving in parallel motion, forming harmonic intervals of a minor ninth until the middle of measure 75. The horn melody in the middle register displays a free rhythm and contour independent of the other two voices in the group.

EXAMPLE 65.--Sun-treader

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The passage from measures 25-30 illustrates a different kind of three-part texture in which all parts progress in a similar downward direction. The two voices in the bass clef, moving mostly in parallel motion, form ic 1 interval, while the two voices in the middle form ic 1 of their own, with two exceptions, both in measure 27. In the top voice, a three-stage sequence appears (measures 25-27), after which only the rhythmic pattern from the initial statement in measure 25 is repeated, without the tie, for two more stages. The three-note cell (set 3-3) provides the germinal idea for the sequence and for the rest

of the melodic line. The same cell appears eight times in the bass clef.

EXAMPLE 66.--Sun-treader

The musical score is written in 2/4 time and consists of two systems of staves. The first system includes a treble staff, a bass staff, and a lower bass staff. The second system includes a treble staff, a middle staff, and a lower bass staff. The notation is handwritten and includes numerous triplets, indicated by brackets with '3' or '3-3' above or below the notes. The key signature has one flat (B-flat). The score is characterized by complex rhythmic patterns and a recurring cell in the bass clef, as mentioned in the text.

The use of canon in some sections of Sun-treader evidences Ruggles' increased preoccupation with contrapuntal writing.⁷ In contrast to the previously discussed works, Ruggles employs exact imitation for a relatively extensive period (ten measures) for the first time in this composition. The canonic passage from measures 52-61 exhibits considerable regularity in pitch, rhythm, and texture because the canonic voice is generated by a three-note cell (set 3-4) and a four-stage sequence of the cell (example 67) .

EXAMPLE 67.--Sun-treader



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Only a few instances of imitation (usually using short motives) can be found in Sun-treader; these passages occur, for example, in measures 30-34, 50-51, 88-90, 94-96, and 233-239. With the exception of measures 233-239, these imitative passages share two common characteristics: each displays imitation at the unison or octave, and each imitative statement follows the pitches of the leading voice without alteration. In measures 30-32 (example 68) the melody in the winds (flute, oboe, English horn, and clarinet) is imitated by the violins, followed by the first four notes (set 4-8) in varied rhythm. In measure 33 the set 4-8 motive alone is imitated by the winds (flute,

⁷See Chapter 2, p.53.

oboe, and bassoon) and echoed by the strings (violins, cello, and contrabass), leading to the original melody found in measure 31.

EXAMPLE 68.--Sun-treader

The musical score for Example 68, 'Sun-treader', consists of three staves. The first staff, labeled with a boxed '29', is for Flute (Fl.) and Oboe (Ob.). It features a melodic line with a triplet of eighth notes, a quarter note, and a half note, followed by a triplet of eighth notes. The second staff, labeled with a boxed '31', is for Violins I & II (Vn. I & II). It features a melodic line with a triplet of eighth notes, a quarter note, and a half note, followed by a triplet of eighth notes. The third staff, labeled with a boxed '33', is for Flute (Fl.), Oboe (Ob.), Bassoon (Bsn.), Violins (Vn.), Viola (Vc.), and Contrabass (Cb.). It features a melodic line with a triplet of eighth notes, a quarter note, and a half note, followed by a triplet of eighth notes.

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The two passages in measures 88-91 and 94-96 contain imitation of set 4-9 motive (example 69). In measure 88 the set 4-9 motive is found as a tail of the long melodic line in the flute, oboe, violin, and viola. The four notes are separated from the melody and imitated by the horn in measures 89-90, and another imitation of the motive takes place in the cello and contrabass in measures 90-91. Another form of the set 4-9 motive appears in measure 94 in the trumpet and, this time, the

motive is expanded to a melody in the clarinet, harp, and cello in measure 95. This longer melody is restated in the cello, doubled by the bassoon, in the next measure.

EXAMPLE 69--Sun-treader

88 Fl. Ob. Vn. I Vla.

89 Hn.

90 Vc. Cb.

91 Trpt.

92 Cl. Vc. Harp

93 Vc. Bsn.

94 Vc. Bsn.

95 Vc. Bsn.

96 Vc. Bsn.

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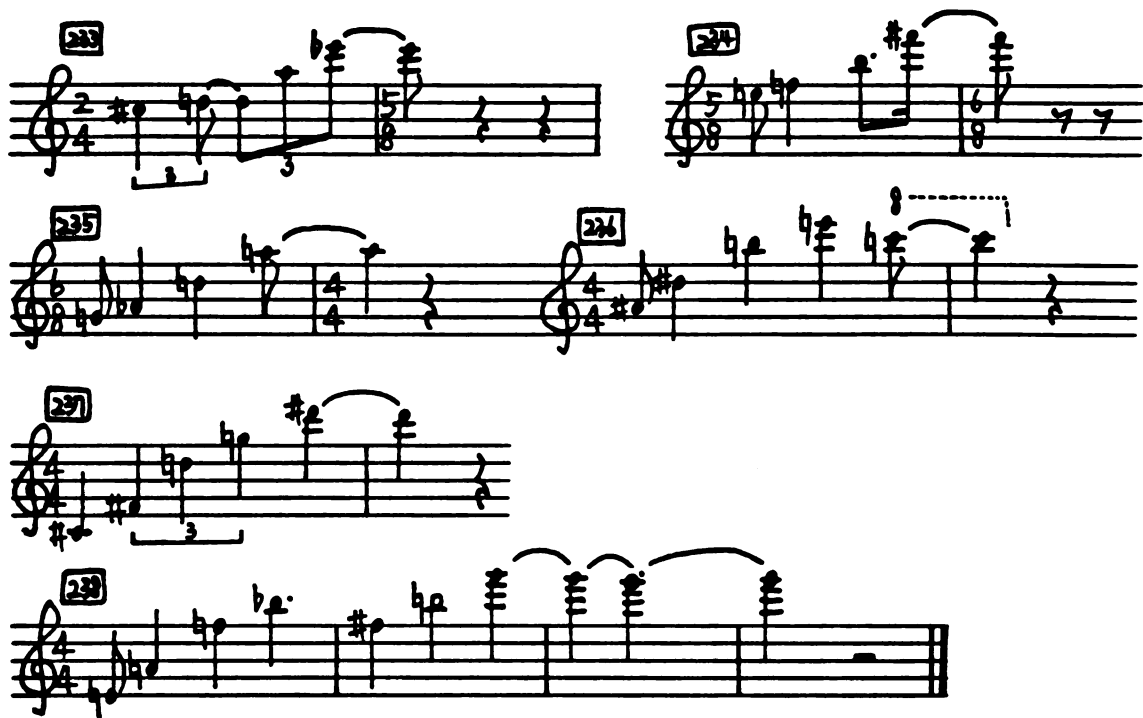
Ruggles uses the same kind of repetition in measures 14-19 where

the five-note motive (set 5-1), which is the basis of the second theme in measure 20, is stated several times before being blended into the second theme. In Sun-treader principal ideas are often emphasized by this method of repetition using exact imitation and restatement in pitch.

The passage from the coda shows a typical melodic variation by Ruggles (example 70). The ascending figuration found in measure 233 is imitated with altered rhythm and intervals in measure 234. In measure 235 the imitative statement shares the same interval content as the one in measure 234, with small changes in rhythm. In measure 236 the ascending motion remains, but the figuration is expanded to a five-note motive, incorporating larger leaps. The same five-note idea is imitated twice, in measures 237 and 238-239, with different rhythm and an octave displacement at measure 239. The interval of imitation remains a minor third (or major sixth). Note that the first note of every new statement forms ic 1 with the last note of the preceding statement. The ascending figuration and its variations eventually brings Sun-treader to a close.

This technique of melodic variation (combined with imitation) is one of the important ways in which Ruggles achieves consistency in Sun-treader. The two principal themes of this composition are subjected to the same kind of melodic variation. The tail portion of the first theme in measures 4-5 is developed to a longer idea in measures 5-7 and subjected to more changes in measure 8. The second theme of the twelve-note idea in measures 20-22 (oboe, clarinet, violin II) is imitated in stretto by the bassoon, trombone, and cello in slightly different rhythm. Another restatement of the theme in measures 22-24 is varied and shortened in its second half.

EXAMPLE 70.--Sun-treader



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Ruggles' last two compositions, Evocations and Organum, employ two- and three-part textures that are simpler than those of Sun-treader. Like Sun-treader, Organum opens with three rising phrases, employing a pedal point in the timpani. In both compositions, the pedal (G^{\flat} in Organum and A^{\flat} in Sun-treader) serves as the foundation for several layers of dissonance and for a gradual thickening of texture. Another device used in both pieces, and also Evocation No. 2, is canon. In Organum the use of canon is a factor in delineating the overall structure; throughout the piece, canonic sections are offset by homophonic sections.

Example 71 shows the initial statement of a canon at the octave; this canon continues until the end of the first section. The contour of

the melody remains almost intact in the imitating voice with occasional octave displacement, while the rhythm of the imitating voice is independent of the leading voice throughout. Note that during measures 5-8, there are eight instances of thirds and sixths used as harmonic intervals, whereas only five chords contain ic 1.

EXAMPLE 71.--Organum

The musical score for Example 71, titled 'Organum', is presented in two systems. Each system consists of two staves. The top system is in 2/4 time, and the bottom system is in 3/4 time. The music features complex harmonic intervals, including thirds and sixths, and includes various musical notations such as accidentals, slurs, and dynamic markings.

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In section three (measures 34-47) the canonic melody from the first section is stated in retrograde in the top part. There are

several changes in pitch (mainly omissions) in the retrograde answer, and its rhythm is altered. From measure 40, the bottom part freely imitates the retrograded melody until measure 47. Example 72 shows the final four measures of the section where the top voice (retrograde of the top part in example 22) is imitated freely by the bottom voice, with independent rhythm and many octave displacements, creating two distinct melodic lines.

EXAMPLE 72.--Organum

The musical score for Example 72, titled "Organum", consists of two systems of staves. The first system begins at measure 44, indicated by a box containing the number 44. It features a treble staff and a bass staff, both in 2/4 time. The treble staff contains a melodic line with various accidentals (sharps, flats, and naturals) and a triplet of eighth notes. The bass staff contains a corresponding melodic line, also with accidentals and a triplet of eighth notes. The second system continues the piece, with the treble staff changing to 5/8 time. It includes further melodic development with accidentals and triplets in both staves. The notation is clear and detailed, showing the relationship between the two voices in this organum setting.

Section four (measures 48-62) includes a two-part canon at the octave based on a new melody. Like the canon in section one, the leading voice and following voice have a similar melodic contour, each with a different rhythm. Between measures 53-55 (example 73), the third voice in the middle participates in free imitation, resulting in a three-part canon for a brief period. In this free canon, during which pitch imitation remains strict, melodic contour is changed to a certain extent, and the rhythm is free, helping to maintain the independence of individual lines.

EXAMPLE 73.--Organum

The image displays a musical score for Example 73, titled "Organum". It consists of two systems of staves. The first system has a treble staff and a bass staff, both in 3/4 time. The treble staff begins with a key signature of one sharp (F#) and a common time signature (C). The bass staff begins with a key signature of one sharp (F#) and a common time signature (C). The second system also has a treble staff and a bass staff, both in 3/4 time. The treble staff begins with a key signature of one sharp (F#) and a common time signature (C). The bass staff begins with a key signature of one sharp (F#) and a common time signature (C). The score includes various musical notations such as notes, rests, accidentals, and dynamic markings.

The canon found in Evocation No.2 is based on the twelve-tone series established at the outset of the piece.⁸ The canon is strict while the twelve-tone series remains relatively intact in measures 19-25. The twelve-tone series changes the internal ordering extensively after two appearances from measure 25, but the canonic imitation continues until measure 29 during which the following voice imitates only the pitches of the leading voice.

Throughout his career Ruggles continues to write freely dissonant contrapuntal music. Ruggles achieves unity and consistency by repeating pitch and rhythmic patterns, but he generally maintains a freely unfolding texture in his music by avoiding exact repetition. Lou Harrison explains:

No voice is ever given over to repetitious arpeggiation or figuration of any kind at all. Each voice is a real melody, bound into a community of singing lines, living a life of its own with regard to phrasing and breathing, . . . and sustaining a responsible independence in the whole polyphonic life.⁹

As has been shown in this chapter, there are very few instances in any of Ruggles' works where a musical idea is restated without some kind of alteration. The strict canon in Sun-treader is the most clear example of exact repetition. The canons in Evocation No.2 and Organum, on the other hand, exhibit freer imitation by incorporating more independence of rhythm and melodic contour among the voices.

⁸See Chapter 2, p.68.

⁹Lou Harrison, "Carl Ruggles," Score 12 (June 1955): 16.

CHAPTER 4

FORM

In Ruggles' compositions, form is the most conservative aspect of the composer's music. All of the instrumental works demonstrate formal designs traditionally employed in tonal music: three-part form, rondo, variations, and sonata form. Each piece is closely bound together by continual reappearances of the basic idea in various forms. Mary Wennerstrom's observation that in much twentieth-century music "variational methods are evident not only in 'theme and variation' works but in pervasive techniques of motive transformation, permutations of sets, and contrapuntal reworkings of material,"¹ aptly summarizes the methods used by Ruggles in creating his entire compositional output.

Compared to other aspects of his music, form in Ruggles' music is relatively straightforward regarding the way in which the composer combines elements of contrast and restatement into a whole. In most of Ruggles' instrumental works many of the phrases² are clearly delineated

¹Mary Wennerstrom, Aspects of Twentieth-Century Music, ed. Gary Wittlich (New Jersey: Prentice-Hall, 1975), 4.

²The term "phrase" is used to designate short musical units of various lengths. Douglass Green defines "phrase" as "the shortest passage of music which, having reached a point of relative repose, has expressed a more or less complete musical thought." Form in Tonal Music: An Introduction to Analysis (New York: Holt, Rinehart and Winston, 1979), 7.

by rests or pauses; the end of a section³ is often recognizable either by means of a change of tempo or by a return of previous material. All of Ruggles' works, with the exception of Sun-treader, are of moderate scope, and most adhere to simple three-part form.⁴ Some pieces feature the obvious return of opening material, and a few merely suggest a return. Three songs of Vox Clamans in Deserto are freely composed without immediately apparent formal design, but motives from the opening passages do appear near the end of the pieces. These recurring motives are an important means of providing a certain degree of structural coherence in the pieces.

Angels exhibits a clear three-part form in which the opening section is restated at the original pitch level after the contrasting middle section. Even though the piece is only forty-seven measures long, there are several possible analyses concerning its form, as illustrated by Stephen Dombek (figure 1).

There are five distinctive subsections, each characterized by a ritardando and a short pause at the end as shown below in option B. Option A best describes the overall structure of Angels in that measures 31-38 present a literal repetition of measures 1-8, and measures 41-47 provide a varied return of measures 9-16. Measures 39-40 feature a slightly varied repetition of measures 37-38.

³The term "section" denotes the primary division of Ruggles' works. A further division of a section is called subsection in this study.

⁴The term "simple three-part form" is applied to a musical piece consisting of three main sections in which the material in the first section recurs in the third section with or without modification.

FIGURE 1.--The Form of Angels⁵



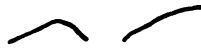
Measures:	<u>1-8</u>	<u>9-16</u>	<u>17-19</u>	<u>20-30</u>	<u>31-40</u>	<u>41-47</u>
Harman:	A				B	
Ostander:	I	II	III	IV	V	VI
(themes:)	A	B	trans.	C	A ext.	B ext.
Ziffrin:	A	B			A'	coda
Option A:	A			B	A'	
Option B:	I	II		III	IV	V

The middle section, encompassing measures 20-30, begins by repeating the ideas in measure 18 and part of measure 19, but proceeds to generate more active melodic lines and make use of interval content which differs from the opening section. Thus, a combination of option A and option B best explains the formal structure of Angels: an overall three-part structure (A B A') in which the first and third sections consist of two subsections each (figure 2).

The general contour of the principal melody in each subsection of Angels draws an arch shape, reaching a climax of the subsection at the middle or two-thirds point. The final subsection, spanning measures 41-47, ends at the climax, a technique which is typical of Ruggles' conclusions.

⁵Stephen Dombek, "A Study of Harmonic Interrelationships and Sonority Types in Carl Ruggles' Angels," Indiana Theory Review 4 (1980): 31.

FIGURE 2.--Angels⁶

Measures:	1-19	20-30	31-47
Sections:	I	II	III
Subsections:	1-8, 9-19	20-30	31-40, 41-47
Motives:	a b	c	a' b'
Contours:			

Opening melodic ideas (i.e., motives or themes) return in all three movements of Men and Mountains; some of these ideas are altered when they return. In "Men," section one and section two each open with principal thematic ideas which bear close motivic relationship to one another,⁷ but which are presented in different ways. The opening theme is at a fortissimo dynamic level with instrumental doubling in the winds, piano, and strings, whereas the second theme is mezzo piano, presented by the solo horn. A large portion of section one is occupied by the opening theme, its variation, and its fragments. Section two is developmental in a sense, in that the motives from the preceding section take on new appearances in various transformations. More diverse pitch materials are introduced in section two, but many melodic ideas can still be reduced to intervallic cells identical to those found in the first section. The final five measures of "Men," almost too short a passage to be called a "section," are a much abbreviated return of section one. The opening theme from measures 4-5 is restated in

⁶In figures 2 through 8, roman numerals refer to sections and the lower-case letters refer to motivic relationships.

⁷See Chapter 2, p.28.

transposition with the same rhythmic pattern, immediately followed by a cadential passage in gradually ascending motion, ending in a major climax with a fortississimo dynamic level.

FIGURE 3.--Men

Sections:	I	II	Coda
Measures:	1-18	19-35	36-40
Themes:	a	b	a'

The middle movement, "Lilacs," employs a three-part form similar to that of Angels, but there is no clear sign of division between the first and second sections. Section three is a varied and expanded restatement of section one in which fewer than three measures reappear literally. The second section makes use of contrasting rhythm, texture, and dynamic levels, compared to the two outer sections; section two exhibits more active rhythm in all instrumental parts and louder dynamic levels (fortissimo and forte) throughout.

"Marching Mountains" also makes use of a three-part form with an introduction and a coda (figure 4). The seven-measure introduction presents the two-note fragments of the opening theme in the top part over the tenor and bass drum beats. The sum of these fragments appears in measure 7 as a whole theme comprised of eight notes.⁸ There are three principal thematic ideas (the first and second themes at the beginning of section one, and the third theme near the beginning of

⁸See Chapter 2, p.26.

section two), all of which are closely related motivically and somewhat related rhythmically.⁹ As is the case in "Men," the three themes of "Marching Mountains" are introduced in contrasting ways. The first theme (measure 7) is doubled by twelve instruments in octaves with no added harmony. The second theme (measures 9-10) is presented by the oboe, trumpet, and viola, with additional parts providing dissonances. The third principal theme appears in the oboe solo accompanied by a countermelody in the viola. A significant portion of "Marching Mountains" is based either on these three principal themes or segments of these themes. Each section depends on the organic development of single basic idea. The transformation of a motive or theme throughout a work is a hallmark of Ruggles' mature style.

FIGURE 4.--Marching Mountains

Sections:	Introduction	Section I	Section II	Section III	Coda
Measures:	1-6	7-18	19-32	33-42	43-52
Themes:	a frag.	a, b	c	a'	a

Each of the Four Evocations, Ruggles' much later composition for piano, demonstrates a resemblance to three-part form. Evocations No.1, No.2, and No.4 show return of their opening sections, and each return is varied to a differing degree. In Evocation No.3 the two-measure chordal passage at the beginning is restated twice, near the end and at the end,

⁹See Chapter 2, pp.26-27.

but both times with considerable changes.¹⁰ Evocations No.1, No.3, and No.4 have rhythmically more active middle portions, whereas No.2 has a middle section with a different texture.

Evocation No.2 is divided into three sections by the silence which follows the melodic lines in measures 18 and 43 (example 74). Each of these sections is initiated by the presentation of a twelve-tone series. The twelve-tone series at the beginning (three statements) recurs in measures 19-24 (two statements) in transposition and with rhythmic variations. In measures 44-48 the twelve-tone series reappears at T-1, again with changes in rhythm. The two internal cadences at measures 18 and 43 achieve an effect of a full termination through slower rhythm followed by a rest and pause. The two cadences share a similar rhythmic motive, with the agogic accent in the penultimate notes.

Both cadential measures are repeated immediately and become the starting point for the twelve-tone series of the following section. The two notes, E-D[♯], in measure 18, transposed up a major second, are the initial two notes for the twelve-tone series begun in measure 19. The pitches of the cadential measure (measure 42) and their repetition in measure 43, E^b-F^b-B^b-F, are identical with the first four notes of section three.

¹⁰See Chapter 2, p.71.

EXAMPLE 74.--Evocation No.2

Handwritten musical score for "Evocation No. 2". The score is written on two systems of grand staves (treble and bass clef). The first system is marked "l'istesso tempo (♩ = 92)" and "più andante (♩ = 84)". The second system is marked "quasi tempo primo (♩ = 100)" and "tempo primo (♩ = 116)". The music features complex rhythmic patterns, including triplets and sixteenth notes, and a variety of accidentals (sharps, flats, naturals). The left hand often plays intervals of minor ninth, major seventh, and minor second, while the right hand plays a twelve-tone melody.

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In the two outer sections of Evocation No.2, the left hand of the piano presents mostly intervals of minor ninth, major seventh, and minor second in accompaniment for the twelve-tone melody and other melodies. The middle section shows a more contrapuntal texture, due to the canonic passage based on the same twelve-tone melody. The overall structure of Evocation No.2 displays a three-section form (A A' A") with a twelve-tone idea as a basis of each section (figure 5).

FIGURE 5.--Evocation No.2

Sections:	I	II	III
Measures:	1-18	19-43	44-54
Themes:	a	a'	a''
Texture:	Twelve-tone series with ic 1 intervals	Twelve-tone series in canon	Twelve-tone series with ic 1 intervals

Taken as a whole, the four Evocations suggest the general plan of sonata form as a background:

Exposition: No.1 Largo
 Development: No.2 Andante con Fantasia
 No.3 Moderato Appassionato
 Recapitulation: No.4 Adagio Sostenuto

Evocations No.1 and No.4 share similar characteristics in that both emphasize linear motion, the former ascending melodic motion, and the latter descending melodic motion; No.4 can be viewed as an inversion of No.1. Also, both pieces are in an A B A' structure, the return being shorter than the opening section, and the climax appearing in the middle section. Evocation No.2 develops the linear motion in No.1 and expands to a twelve-tone idea. In Evocation No.3 the main cells are presented in vertical form, appearing first in the opening chordal passage.¹¹ The fact that the cadential chord in the left hand of Evocation No.4 forms set 4-Z29, the same set found at the beginning of No.1, reinforces

¹¹See Chapter 2, p.74.

the idea of Evocations as a unified whole.

The formal structure of Portals illustrates an advance over the simpler design of Ruggles' previous works. Ruggles regarded the form of Portals as "Rhapsodic Variations." The piece employs variation form in that the principal opening idea is developed continuously, using four main intervallic cells as an integrative element between the important melodic ideas in each section.¹² At the same time, the piece contains a rhapsodic quality, brought about by the presentation of a variety of ideas in different moods, while the interrelationship between melodic ideas is not readily comprehensible on the surface.

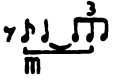


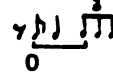

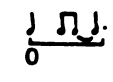

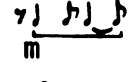


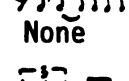

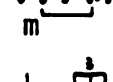

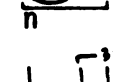
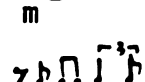


Portals can be divided into a theme plus ten variations, each of which is five to ten measures long (figure 6). Each section is freely composed without an exact retention of any element from one section to the other. The most apparent common feature is a rhythmic motive that is shared by all of the principal melodies that are found at the beginning of each section. In six of the sections (theme, sections one, two, four, six, and coda) the principal melodies begin in the weak part of the beat with the pattern of ♪ ♪ , ♪ ♪ or ♪ ♪ . Three sections (sections five, eight, and nine) share a similar opening rhythmic pattern. The patterns of ♪ ♪ , and ♪ ♪ initiate sections eight and nine, respectively. Section five begins with ♪ ♪ , the retrograde of the pattern found at the beginning of section eight. The two remaining sections, three and seven, are not related motivically to the other sections.

¹²See Chapter 2, p.29.

These rhythmic motives are accompanied by one of the integrative cells found in the opening theme. Cell m (set 3-5) accompanies the rhythmic motives at the outset of the theme, sections four, five, seven, and nine. Cell o (set 3-8) initiates sections two, three, and the coda, and cell n (set 3-1) appears at the beginning of section eight. Section one and its return in section six (with a few minor changes) do not contain integrative cells until later. This repetition of an entire section provides diversity within the general tendency towards continuous variation in Portals.

Compared to the other Ruggles' works, Portals exhibits more subtle formal elements. Instead of combining similar and contrasting sections, seemingly different sections are put together without apparent order. Seven out of eleven sections begin with a thin texture, after which gradually more instruments and parts are added, along with an increasing dynamic level (with two exceptions). The piece, as a whole, starts with a single melodic line in octave doubling and ends with a cadential chord of eleven pc's with e'''' at the top.

FIGURE 6.--Portals

Sections	Measures	Theme	Accompanying Rhythm & Cell	Dynamics	Texture
Theme	1-5	m.1 in all Str.		f-ff-f	Full
I	6-12	m.6 in Vla.	 None	p-mf-f	
II	13-18	m.13 in Vc.		ff-f-ff	
III	19-25	m.19 in Vc.		p-mf-ff	
IV	26-32	m.26 in Vn.I & Vc.		f-ff->	
V	33-42	m.33 in Vc.		ff-f-ff	Full
VI	43-49	m.43 in Vla.	 None	p-mf-f	
VII	50-55	m.50 in Vc.		ff-mf-f	
VIII	56-61	m.56 in Vc.		ff-f	Full >
IX	62-69	m.62 in Cb.		fff-ff	Full
Coda	70-75	m.70 in Vc.		p-mf-f	

Organum, almost the same length as Portals, employs a five-part rondo with a coda, in which section one appears three times with a different contrasting section between each recurrence (figure 7). The length of the sections varies from five measures (coda) to twenty measures (section one). The form is an extension of a three-part form used in Ruggles' short works, with longer patterns of alternating contrast and return. A significant portion of the refrain in sections one, three, and five is occupied by a canon at the octave. In section one the leading voice is stated in the treble (from measure 5) by the oboe, English horn, violin, and viola, and imitated by the bass instruments, cello, contrabass, and bassoon (from measure 7) until the penultimate measure of the section. Section three states the leading voice from section one in retrograde in measures 37-47. The lower parts participate in canonic imitation of the retrograde melody from measure 40 on. There is a third voice which does not make use of imitation. Section five is an abbreviated return of section one. About half of section one is restated literally, leaving six measures of canonic passage in measures 67-72. The episode in section four also includes a two-part canon using a new melody in measures 50-62. The third voice in a middle register joins the canon momentarily in measures 53-55. The remaining sections, section two and the coda, are in different texture; although individual lines maintain their independence, all the parts move in a similar rhythmic pattern, creating homophony.

FIGURE 7.--Organum

Sections	Measures	Themes	Texture
I (Refrain)	1-20	a	canon (mm. 5-19)
II (Episode 1)	21-33	b	chordal passage
III (Refrain)	34-47	a'	canon in retrograde (mm. 40-47)
IV (Episode 2)	48-62	c	new canon (mm. 50-62)
V (Refrain)	63-73	a	canon (mm. 67-72)
Coda	74-78	d	chordal passage

In several of Ruggles' works--Angels, Evocations, and Sun-treader--a new section often begins by repeating an idea stated at the end of the preceding section. This is true in every intersection of Organum. Kirkpatrick describes the composition as follows: "Each section has the air of one large curve. Sections 2, 3, 4, and 6 all start with delicate echoes of the preceding notes, out of which the new curve rises."¹³ Example 75a shows a repetition of the melodic ideas between the first and second sections (measures 19-22) and the third and fourth sections (measures 46-51). The eight notes at the end of section three (measures 46-47) are the same as the notes comprising the melodic idea in measures 5-6 (example 75b) in retrograde (except that the B-natural from measure 6 is omitted), and the first six notes of measures 5-6 are found at the beginning of section four in retrograde.

¹³John Kirkpatrick, "Evolution of Carl Ruggles: A Chronicle Largely in His Own Words," Perspectives of New Music 6 (Spring-Summer 1968): 162.

EXAMPLE 75.--Organum

a)

b)

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In Sun-treader, the recurrence of main ideas and whole sections becomes the basis of formal design to a degree unprecedented in Ruggles'

other works. Large portions of musical material are repeated at the same pitch level, providing stability as well as a unity. The structure of this piece--Ruggles' largest--resembles sonata form, encompassing an exposition, a long development, and a recapitulation (figure 8), but without the tonal relationships which typically provide distinctive functions to different thematic groups. The piece exhibits clear form, even with its constant motivic development, and without tonal contrast.

Melodic materials in the different theme groups in the exposition are "developed" even before the beginning of the "real" development section. The second theme is a motivic development of the first theme with smaller melodic intervals, while each theme still maintains a distinct thematic identity. Transition one, bearing close motivic resemblance to the first theme, prepares the second theme group by repeating four statements of what is to become the beginning portion of the second theme. Instead of a closing section, the first theme group is restated in transposition at the end of the exposition, producing a certain amount of contrast with the original statement.

The development section has a three-part design itself. The canonic passage (measures 52-66) and the following passage (measures 67-81) are repeated at the same pitch level after the climactic section in measures 82-118. Between measures 124-137 the canon from the beginning of the development is restated in retrograde almost literally.

FIGURE 8.--Sun-treader

Exposition	Measures	Theme
First theme group	1-13	a
Transition 1	14-19	
Second theme group	20-41	b
First theme group	42-49	a' (transposed m.3 down)
Small transition	50-51	
Development		
Canonic passage	52-66	c
Passage with rhythmic unity	67-81	d
Climactic passage	82-118	e
Transition 2	119-123	
Canon in retrograde	124-137	c'
Small transition'	138	same as m.51
Canonic passage	139-153	c
Passage with rhythmic unity	154-168	d
Recapitulation		
First theme group	169-184	a" (transposed m.2 down)
Transition 1	185-190	same as mm.14-19
Second theme group	191-211	b
Transition 3	212-220	
Coda	221-241	based on a

The recapitulation brings back the first and second theme groups and the first transition passage. The first theme group is presented at a different pitch level from the previous two statements, and the remainder of the passage returns to the original pitch level from measure 187. The entire coda is based on pitch material from the first theme group; the passage begins with a slightly varied version of the opening theme.

Like the first transition, transitions two and three anticipate passages to come by repeating motives in imitation and sequence, interrupting the continuous flow of melodies. The two small transition passages in measures 50-51 and 138 also contain short motives and restatements of the ideas taken from the end of the preceding passages; these ideas then become the starting point for the new passages. Consequently, almost all sections in Sun-treader share melodic or motivic ideas.

CHAPTER 5

HARMONIC ORGANIZATION

The main goal of this chapter is to discover the degree of harmonic "connectedness" (to be defined below) in Ruggles' compositions. Although Ruggles' music does not have tonal structure, much of it is, none the less, harmonically connected. It is possible to measure degrees of harmonic connectedness in atonal music using an analytical method called set analysis which is substantially based on Allen Forte's approach as explicated in The Structure of Atonal Music.¹ Set analysis was carried out on all eight of Ruggles' published works using the Computer-Assisted Set Analysis Program (CASAP).²

According to Forte, The Structure of Atonal Music is intended "to provide a general theoretical framework, with reference to which the processes underlying atonal music may be systematically described."³ Forte also states ". . . major emphasis has been placed upon fundamental components of structure. For instance, one can deal with pitch and disregard orchestration, but the reverse is not, in general,

¹Allen Forte, The Structure of Atonal Music, (New Haven: Yale University Press, 1974).

²Charles Ruggiero and James Coleman, Computer-Assisted Set Analysis Program Version 1.07 (Okemos, MI.: Okemos Music Software).

³Forte, The Structure of Atonal Music, ix.

possible."⁴ In the discussion of set analysis in Music Analysis, Jonathan Dunsby and Arnold Whittall explain, "[Forte] seeks to distinguish between an account of 'successive segments' in atonal composition that stresses their motivic or thematic characteristics, and an account motivated by the conviction that the most important segments and sets are the means whereby atonal music achieves harmonic coherence."⁵

Forte designates each of these "most important segments and sets" as a "nexus set" which he defines as "a referential set for a particular set complex."⁶ Therefore, a connected set-complex structure occurs when all of the sets occurring in a particular section of music are interrelated through one or more nexus sets.

In The Structure of Atonal Music Forte also provides guidelines for determining which sets are nexus sets.⁷ Forte's first rule indicates that priority is given to hexachords, pentachords, and tetrachords, in that order. The larger sets are more important because of the closure property. Rule one also explains that trichords will qualify as nexus sets "only in exceptional cases."

Forte's second rule states: "The set with the greatest number of Kh and K' relations is designated provisionally as primary nexus set. If this set is related to all others, it is the only nexus set, and no

⁴Ibid., ix.

⁵Jonathan Dunsby and Arnold Whittall, Music Analysis: In Theory and Practice, (New Haven: Yale University Press, 1988), 151.

⁶Forte, The Structure of Atonal Music, 210. See Forte's "Glossary of Technical Terms" on pp.209-211 for definitions of much of the common set-theory terminology used in this chapter.

⁷Ibid., 113-114.

further determination is required. And, if this specific situation exists, the set-complex structure is said to be connected--in the specific sense that the nexus connects all the other sets. If it is unrelated to some (or only in the relation K) then an attempt is made to find a secondary nexus set (rule 3)."

The third rule states: "A secondary nexus set of the same cardinal number as the primary nexus set must be in the set-complex relation to all sets not in the set-complex relation to the primary nexus set. And if the secondary nexus set is of the same cardinal number as the primary nexus set then an additional secondary nexus set must be found, such that it is in the set complex about the primary nexus set and in the set complex about the other secondary nexus set."

These rules need further clarification since they do not cover certain details. For example, Forte's second rule does not explicitly state whether the "provisional" nexus set must be related to all other sets via K or Kh, or just Kh.⁸ Furthermore, Forte does not specify whether, for example, under his third rule two hexachords connected by a tetrachord would be better choices as nexus sets than two pentachords connected by a hexachord.

The list of preferred nexus sets, which expands and clarifies Forte's rules, is presented below.⁹

A single hexachord or a single pentachord

A single hexachord with a single pentachord

⁸The terms K, K*, and Kh are arbitrary. See pp.93-100 of The Structure of Atonal Music for the detailed discussion of these terms.

⁹Trichords are not considered as candidates for nexus sets in this chapter since the set-complex relations with trichords are very abundant, and lack any significance.

A single hexachord with a single tetrachord

A single pentachord with a single tetrachord

A pair of hexachords with a single pentachord or tetrachord

A pair of pentachords with a single hexachord or tetrachord

A single tetrachord

A pair of tetrachords with a single hexachord or pentachord

As Forte explains in his first rule, the priority for determining the nexus set is given to hexachords and pentachords since the two hold the closure property. The closure property is concerned with the set-complex relations within the set complex.

This [closure property] is of interest because if every member of some set complex were in the set-complex relation with every other member, that set complex would be a self-contained and highly structured unit. If the members of some set-complex are only in the set-complex relation to the nexus set and there are no internal set-complex relations, then that set complex is effectively isolated from other set complexes.¹⁰

According to Forte, "the only cases in which the set-complex relation extends to components of all cardinalities are those of Kh for nexus sets of cardinals 5 or 6. Only those set complexes possess the closure property."¹¹ The following summary extracted from Forte's book clearly demonstrates the closure property among different cardinal numbers.¹²

¹⁰Forte, The Structure of Atonal Music, 101-102.

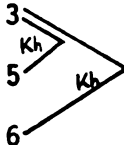
¹¹Ibid., 104.

¹²Ibid., 102-104.

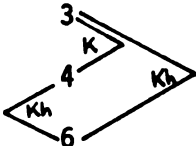
In case of a set complex about a nexus set of cardinal 3, K and Kh are non-transitive for all components.

nexus set	components
3	4
	5 (none)
	6

For Kh about nexus sets of cardinal 4 all members of cardinal 3 are in the relation Kh to all members of cardinal 5 and cardinal 6.

nexus set	components
4	

Transitive relations for Kh with nexus sets of cardinal 5 are that all members of cardinal 3 are in the relation K with all members of cardinal 4, while all members of cardinal 6 are in the relation Kh with all members of cardinal 3 and cardinal 4.

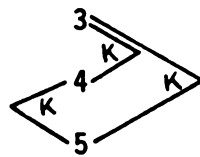
nexus set	components
5	

For Kh about nexus sets of cardinal 6, all components are in at least relation K. This does not exclude the possibility that Kh may hold between some members.

nexus set

components

6



The following examples help to distinguish between connectedness and closure. The set-complex structure of the final section of Angels is shown in example 76. The table confirms that the relation Kh with trichord 3-4 does not ensure K or Kh relations with other components in the section. For instance, tetrachord 4-16 is in Kh with 3-4, but is in null relation with pentachord 5-217 and hexachord 6-2. Pentachord 5-2, in spite of the relation Kh with set 3-4, is in null relations with tetrachord 4-19 and hexachord 6-225. Also, hexachord 6-2 is in null relation with tetrachords 4-16 and 4-19, and with pentachord 5-217.

For Kh about the nexus set 4-11, set 3-4, a member of Kh(4-11), is in Kh with all pentachords and hexachords in this section. However, the two sets which are members of Kh(4-11), pentachord 5-2 and hexachord 6-2, are in null relations with hexachord 6-225 and pentachord 5-217, respectively. Thus, the final section of Angels is unified with 4-11 as one of the nexus sets, but without the closure property.

EXAMPLE 76.--Angels Final Section

	3-4	3-11					
4-11	Kh	K					
4-16	Kh	K					
4-19	Kh	Kh	4-11	4-16	4-19		
5-2	Kh	K	Kh	K	0		
5-217	Kh	Kh	K	0	Kh	5-2	5-217
6-2	Kh	0	Kh	0	0	Kh	0
6-225	Kh	Kh	K*	Kh	0	0	0

The table in example 77 contains the set-complex relations of Motto of Berg's Chamber Concerto and the opening section of the Thema scherzoso.¹³ It is certain that the set-complex structure is connected, this time with closure. All of the sets are members of Kh(6-5), and this Kh relation is transitive to all components. Trichord 3-5 is in set-complex relation with all four- and five-element sets. Tetrachords 4-13, 4-14, and 4-18 are in set-complex relations with all three- and five-element sets. Finally, set 7-4 is in set-complex relation with all three- and four-element sets. Therefore, the relation Kh with a nexus of cardinal 6 automatically guarantees the internal set-complex relations with other components.

Most of the tables of set-complex relations of Ruggles' works included in this chapter demonstrate connected structures, but only a few show the closure property.

EXAMPLE 77.--Berg, Motto of Chamber Concerto and Thema scherzoso

	3-5				
4-13•	Kh				
4-14•	K				
4-18	Kh	4-13•	4-14•	4-18	
7-4.....	Kh	Kh.....	K.....	K.....	7-4.....
6-5	Kh	Kh	Kh	Kh	Kh
6-Z19	Kh	O	K*	Kh	O
6-Z44	Kh	C	K	Kh	O

Before the set analyses were performed that are the foundation of this chapter, the following expectations were formed, based on the study of pitch organization and motivic structure of Ruggles' music which was

¹³Forte, The Structure of Atonal Music, 126.

fully reported in chapter 2. It was expected that:

1. the tables of set-complex structure from Ruggles' earliest to latest compositions would show a gradually increasing degree of connectedness. In other words, Ruggles' mature works would reveal more unified set-complex structures than his early works.
2. there would be a correlation between the "harmonic" structure¹⁴ of a composition and its thematic and motivic structure. For example, set 7-31, which is the first theme in Sun-treader and contains all the important integrative cells of the piece, would have abundant set-complex relations and probably would be one of the nexus sets.

However, the results of the set analyses proved that both assumptions were false:

1. The set-complex structure of all of Ruggles' compositions show similar degree of connectedness, with sparse relations between the hexachords and pentachords. Also, Ruggles' mature works do not necessarily show more connected set-complex structures than his early works.
2. The principal themes of a composition do not necessarily have abundant set-complex relations with other occurring sets, even though their small intervallic cells play an important role throughout each composition. Set 7-31, the first theme in Sun-

¹⁴Forte defines "harmony" as "not merely the chords or verticals, but the unordered pitch-class sets (pc sets) that underlie melodic configurations, combinations of horizontal lines, and segments of various shapes." Allen Forte, The Harmonic Organization of "The Rite of Spring," (New Haven: Yale University Press, 1978), 23.

treader, is in null relations with all of the hexachords in the piece except four, including its own subsets, 6-Z13 and 6-27. As a further example, the two hexachords, 6-Z6 and 6-Z38, found at the beginning of Evocation No.2 and No.4, have few set-complex relations with other occurring sets in each piece. In this case, however, their subsegments,¹⁵ especially set 3-5, appear with remarkable frequency throughout each piece.¹⁶

Three of Ruggles' works--Toys (his earliest), Men and Mountains, and Evocation No.1 (one of his latest)--are now discussed in more detail. These works are chosen not only for their chronological discrepancy but because of the interesting set relations that occur in each piece.

Toys, for voice and piano, is divided into five sections, each of which begins with a short piano solo passage. The opening measures of Toys (Toys A) are shown in example 78. It is apparent from the table of set-complex relations given in example 79 that the set-complex structure of Toys A is connected, and the nexus sets are 4-27 and 5-33/7-33. Set 4-27, which is a prominent set in this section as well as throughout the piece, is in set-complex relations with all eight sets except 5-Z37. All of the sets are K(5-33, 7-33) with one exception, 4-18. Set 5-33 consists of the last six notes of the voice part in measure 2, while set 7-33 is formed as a composite segment of those six notes and the chord held in the piano part at the end of measure 2.

¹⁵Forte defines "segment" as "A musical unit of fixed extent." The Structure of Atonal Music, 210. A further division of a segment is called subsegment in this chapter.

¹⁶See Chapter 2, p.68.

EXAMPLE 78.--Toys A

1

Anima

Voice

Piano

5-10

4-18

4-27

6-34

5-33

7-20

4-2

6-21

7-21

7-31

4-27

7-33

2

4-27

4-27

4-27

4-21

4-21

5-34

5-34

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EXAMPLE 79.--Toys A

	4-2	4-18	4-21	4-27							
5-10	K	K	K	K							
7-20	K	K	O	K							
7-21	K	K	O	K							
7-31	O	Kh	O	Kh							
5-33•	K	O	Kh	K							
5-34	O	O	Kh	Kh							
5-237	K	K	K	O	5-10	7-20	7-21	7-31	5-33•	5-34	5-237
6-21	Kh	O	Kh	Kh	O	O	O	O	Kh	O	O
6-34	O	O	Kh	Kh	O	O	O	O	Kh	Kh	O

The sets in measure 1 are quite unattached to the sets in measure 2; all of the sets in measure 1 are in null relations with the two hexachords present in measure 2, 6-21 and 6-34. The set 6-34 (the voice part in measure 2) and the set 6-21 (the piano chord in measure 2) have five common pc's (B^b, C, D, E^b, G^b) which form set 5-26; set 5-26 appears in Toys C and E. The two hexachords are in set-complex Kh with both nexus sets, 4-27 and 5-33/7-33.

Only two sets, 5-10 and 4-27, are repeated in Toys A. In measure 1 set 5-10 is present in the left hand, but has pitches repeated in different octaves by the right hand (D[#] and C). The nexus set 4-27, in measure 2, is present both in the left hand chord and in the first four notes of the voice part. In this case, the two forms have identical pc's. A tetrachordal and pentachordal imbrication of the voice part in measure 2 (example 78) reveals a recurrence of three sets, 4-27, 4-21, and 5-34, including circular permutations of 4-27 and 5-34. The seven-element sets in measure 1 (7-20, 7-21, and 7-31) and set 5-10 are all members of K(4-27). Thus, set 4-27 is a connection between measures 1 and 2 as well as being one of the nexus sets for the section.

The set-complex structure of Toys B (measures 3-5) is connected (example 81). The table exhibits that the hexachords and pentachords are sparsely related, but two tetrachords, 4-Z15 and 4-2, qualify as primary nexus sets since they have the greatest number of set-complex relations in Toys B, a total of fifteen, including five Kh's in each case. Set 4-Z15 occurs three times in the piano accompaniment, twice in measure 4 and once in measure 5; 4-Z15 is also present in Toys D and Toys E. Set 4-2 is stated in the piano accompaniment with set 4-Z15 in the middle of measure 4. As the secondary nexus set, hexachord 6-22,

also from the piano accompaniment in measure 4, is chosen since 6-22 is in the relation Kh with both primary nexus sets.

At measure 3, two statements of set 7-21 produce three invariants (D, F[#], B^b) which form set 3-12 at the beginning of measure 3. Set 7-21 is in null relations with all of the hexachords present except 6-14. Set 6-14 appears twice in Toys B, once at the end of measure 3 and the other as a vertical sonority at the middle of measure 4. Set 6-14 is in set-complex Kh with five sets including the nexus set 4-2 and the opening set 5-Z37; set 6-14 is the only Kh of 5-Z37 which is also the opening set for Toys A.

EXAMPLE 80.--Toys B

The musical score for 'Toys B' consists of two staves: Voice (top) and Piano (bottom). The key signature has one flat (B-flat), and the time signature is 4/4. The score is annotated with various set-theoretic labels and brackets.

Annotations:

- Measure 1:** A box containing the number '3' is above the first measure of the Voice staff.
- Measure 2:** A bracket labeled '6-Z29' spans the first two measures of the Voice staff. A bracket labeled '5-Z18' spans the last two measures of the Voice staff.
- Measure 3:** A bracket labeled '6-Z11' spans the first two measures of the Voice staff. A bracket labeled '7-25' is above the last measure of the Voice staff.
- Measure 4:** A bracket labeled '7-21' is below the first measure of the Piano staff. A bracket labeled '6-14' is below the second measure of the Piano staff. A bracket labeled '5-b' is below the third measure of the Piano staff. A bracket labeled '4-13' is below the fourth measure of the Piano staff. A bracket labeled '7-1' is below the fifth measure of the Piano staff. A bracket labeled '5-24' is below the sixth measure of the Piano staff. A bracket labeled '6-14' is below the seventh measure of the Piano staff. A bracket labeled '6-22' is below the eighth measure of the Piano staff. A bracket labeled '5-218' is below the ninth measure of the Piano staff. A bracket labeled '6-5' is below the tenth measure of the Piano staff. A bracket labeled '5-7' is below the eleventh measure of the Piano staff. A bracket labeled '5-10' is below the twelfth measure of the Piano staff.
- Measure 5:** A bracket labeled '5-15' is below the first measure of the Piano staff.
- Measure 6:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 7:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 8:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 9:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 10:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 11:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 12:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 13:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 14:** A bracket labeled '5-10' is below the first measure of the Piano staff.
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- Measure 16:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 17:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 18:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 19:** A bracket labeled '5-10' is below the first measure of the Piano staff.
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- Measure 21:** A bracket labeled '5-10' is below the first measure of the Piano staff.
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- Measure 24:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 25:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 26:** A bracket labeled '5-10' is below the first measure of the Piano staff.
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- Measure 52:** A bracket labeled '5-10' is below the first measure of the Piano staff.
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- Measure 57:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 58:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 59:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 60:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 61:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 62:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 63:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 64:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 65:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 66:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 67:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 68:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 69:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 70:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 71:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 72:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 73:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 74:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 75:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 76:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 77:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 78:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 79:** A bracket labeled '5-10' is below the first measure of the Piano staff.
- Measure 80:** A bracket labeled '5-10' is below the first measure of the Piano staff.

EXAMPLE 81.--Toys B

[illegible]

Of the pentachords, K(5-Z18) reveals the greatest number of set-complex relations in Toys B, a total of eight. Set 5-Z18 is a subsegment of the voice part as well as a vertical set at the end of measure 4. Set 5-Z18 has set-complex relations with three of the six hexachords in Toys B: K* with sets 6-Z11 and 6-Z29, which are both subsets of the voice part in measures 3-5, and Kh with 6-5, which is a vertical set at the beginning of measure 5. Set 5-Z18 is connected to the set-complex structure of the section through the nexus sets 4-2 and 4-Z15.

Set 4-14 appears both as quintuplets in the piano in measure 3 and as a subcomponent of the voice line in measure 4. Set 4-14 is the only set in the relation Kh with set 7-20, which occurs in the piano in measure 3. Also, 4-14 is in Kh with three hexachords, 6-5, 6-11, and 6-14, as well as being in K* with 6-Z29.

Toys C (measures 6-8) begins and ends with set 5-31, which occurs as the first piano sonority in measure 6 and in the voice part in measures 8-9 (example 82). Although set 5-31 has few set-complex relations in this section, it is still a significant set because its two subcomponents, 4-27 (the left-hand chord in measure 6) and 4-12 (a subsegment of the voice part in measure 8) are in set-complex relations with all of the pc sets present in Toys C. Most notably, set 4-27 has seven Kh relations and three K relations. Consequently, 4-27 is chosen as the nexus set. The union of the two tetrachords, 4-12 and 4-27, shares one pc (B^b) and forms set 7-26 which is found as a horizontal set in measure 7-8. A highly unified set-complex structure is illustrated by the vertical sets: 4-27 in measure 6, 4-17, 7-Z38, 4-4, and 5-26 in measure 7, and 6-Z24 in measure 8. Set 7-Z38 is in Kh relation with 4-4

and 4-27, and in K' with 6-Z24, and the vertical set 5-26 is contained in 7-Z38. All of the above-mentioned vertical sets are members of $K(6-Z24)$.

In Jovs C there is a complement relation between the vertical and melodic sets. Three of the vertical sets have complement-related pairs which are present as horizontal sets. The vertical set 5-26 is sustained as a chord from measure 7 to the beginning of measure 8, while set 7-26, the literal complement of 5-26, is present in the right hand as melodic sixteenth notes and an eighth note. Also found in measures 7-8 is a complementary pair 6-Z24/6-Z46; 6-Z24 contains 5-26, and 6-Z46 is contained within 7-26. Finally, set 8-4, which encompasses the entire right-hand melody in measure 6, is the complement of set 4-4, which is a vertical set in measure 7.

EXAMPLE 82.--Toys C

Handwritten musical score for "The Rose Tree". The score is written for Voice and Piano (Pf.). It includes various musical notations such as notes, rests, and dynamic markings. Annotations include circled groups of notes, bracketed sections, and handwritten numbers like "6-245", "6-13", "8-4", "4-8", "4-1", "4-2", "6-246", "4-12", "5-31", "4-27", "4-8", "4-1", "6-27", "6-24", "6-219", "5-26", "6-224", "5-31", "6-20", "7-19", and "7-3".

EXAMPLE 83.--Toys C

	4-1	4-2	4-4*	4-8	4-12	4-13	4-17	4-27					
7-3	K	Kh	Kh	0	K	K	K	K					
7-19	K	0	K	K	K	Kh	0	K					
5-26*	0	K	K	0	Kh	0	K	Kh					
5-31	0	0	0	0	Kh	Kh	K	Kh					
7-238	0	K	Kh	K	K	K	K	Kh	7-3	7-19	5-26*	5-31	7-238
6-219	0	0	K	Kh	K*	0	Kh	K	0	0	0	0	K*
6-224	0	K	K	0	K*	K*	K	Kh	0	0	K*	0	K*
6-30	0	0	0	0	Kh	Kh	0	Kh	0	Kh	0	Kh	0
6-245	0	K*	0	0	Kh	Kh	0	Kh	0	0	0	K*	0
6-246	0	K*	K*	0	K	K	K*	Kh	0	0	K	0	K

The table of set-complex relations (example 85) shows that the set-complex structure of Toys D (measures 9-11) is connected. The primary nexus sets are 6-Z41 and 6-5, and the secondary nexus set is 5-5. Set 6-Z41, which occurs as a septuplet in the piano part in measure 11 (example 84), has the greatest number of set-complex relations, and only one set, 4-7, is in null relation with 6-Z41. Set 4-7 is in set-complex relations with two hexachords, set 6-5 (beginning of measure 11) and set 6-Z10 (left hand in measure 9). The two latter sets each have eleven set-complex relations, but 6-5 is considered a nexus set because it is in Kh relation with eleven sets including set 4-7, while set 6-Z10 has fewer Kh relations and is in K* with 4-7. Pentachords 5-4, 5-5, and 5-7 could be considered secondary nexus sets since they are in set-complex relations with both primary nexus sets. However, set 5-5, the subset of 6-Z41, is chosen as the secondary nexus set since, of the three pentachords, 5-5 has the greatest number of Kh relations (seven) and the least number of null relations (five).

In measure 9 of the piano accompaniment many intervals of a second are found; after this measure larger intervals, especially major

EXAMPLE 84.--Toys D

9

The musical score for 'Toys D' consists of three systems. The first system includes a vocal line and a piano accompaniment. The piano part is heavily annotated with figured bass notation, including circled figures such as 6-33, 6-20, 6-234, 5-7, 4-22, 6-210, 5-214, 4-23, 4-8, 6-18, 5-4, 4-11, 4-1, 4-1, 5-4, 4-1, 5-4, 4-2, and 6-9. The second system continues the piano accompaniment with figures like 4-11, 6-241, 4-7, 6-5, and 7-7. The third system shows a single melodic line with figures 5-5, 5-21, 4-5, 4-14, 4-3, 4-6, 4-11, and 4-27.

EXAMPLE 85.--Toys D

	4-1	4-2	4-5	4-6	4-7	4-8	4-11	4-14	4-215	4-22	4-23	4-27	4-229	
5-4	Kh	K	Kh	K	K	K	K	K	K	K	O	O	K	
5-5	Kh	K	Kh	Kh	K	K	K	Kh	K	K	K	O	Kh	
5-7	K	O	Kh	Kh	K	Kh	O	K	K	O	K	K	K	
5-24	K	K	K	K	O	O	Kh	K	K	Kh	K	K	Kh	
5-29	O	K	K	K	O	K	K	Kh	K	K	Kh	Kh	K	
6-5	Kh	O	Kh	Kh	Kh	Kh	O	Kh	Kh	O	O	O	Kh	5-4
6-9	Kh	Kh	Kh	Kh	O	O	Kh	Kh	Kh	Kh	Kh	O	Kh	5-5
6-210	K	Kh	K	O	K	O	Kh	K	O	K	O	K	Kh	5-7
6-18	O	O	Kh	Kh	O	Kh	O	Kh	Kh	O	Kh	Kh	Kh	5-24
6-224	O	K	K	O	O	O	Kh	Kh	Kh	Kh	K	Kh	O	5-29
6-33	O	O	O	O	O	O	Kh	Kh	O	Kh	Kh	Kh	Kh	
6-241	K	K	Kh	Kh	O	K	K	K	Kh	K	K	K	K	

sevenths and minor ninths, are found in the voice part. Three occurrences of set 5-4 and four occurrences of set 4-1 indicate the prevalence of ic 1 in Toys D. The two statements of set 4-1 at the end of measure 9 form set 8-1. The chord at the center of measure 10, set 9-1, is composed of nine pc's of a chromatic scale from D^b to A, and this chord marks the culmination of the passage as well as of the entire piece.

All of the sets in Toys D are member of K(4-14); 4-14, which also appears in Toys B, is one of the components of the primary nexus set, 6-Z41. Set 4-27, another component of 6-Z41 as well as being an important set in Toys A and C, is comprised of exactly the same pc's in measure 11 as in measure 6. Both tetrachords are members of K'(6-Z41).

The table of the final section, Toys E (example 87), exhibits that the set-complex structure of this section is connected. Many of the sets, especially hexachords and pentachords, are sparsely related, but the complementary pair, 4-Z15/8-Z15, is in set-complex relations with all sets in Toys E except set 6-1 (the vertical set in the middle of measure 13). Of the five sets which are in Kh with set 6-1, the pair 4-11/8-11 is selected as the nexus set since, of the five sets, 4-11/8-11 holds the greatest number of Kh relations and the least number of null relations. Although hexachord 6-22 is in the relation Kh with both pairs, 4-Z15/8-Z15 and 4-11/8-11, and hexachord 6-Z40 (the beginning set of the section) is only in K with 4-Z15/8-Z15 and in Kh with 4-11/8-11, set 6-Z40 is chosen as the secondary nexus set because it holds a far greater number of set-complex relations (seventeen) than those of 6-22 (seven).

There are four eight-element sets present in Toys E, most of which

are formed as composite segments: sets 8-11, 8-Z15, 8-18, and 8-19. Three of these sets have complement-related pairs in this section. Set 4-11, found at the beginning of measure 12 and contained in set 8-Z15, is the complement of the cadential set 8-11. Set 4-Z15 appears as a vertical set at the end of measure 14. Set 4-19 appears four times, first in the second half of measure 12 and three times in the penultimate measure as subsegments of sixteenth notes. Set 8-19 is formed as a vertical sonority near the end of measure 14. Each complementary pair shares three pc's, forming sets 3-6 (4-11/8-11), 3-5 (4-Z15/8-Z15), and 3-4 (4-19 in measure 12/8-19). All three eight-element sets, 8-11, 8-Z15, and 8-19 contain the tetrachords 4-11, 4-Z15, and 4-19. In other words, each of the eight-element sets contains its own complement as well as the complement of the other two eight-element sets.

A tetrachordal imbrication of the voice part in Toys E (example 86) yields two appearances of sets 4-21 and 4-3. In each case, the second form is a circular permutation of the first. At the beginning of measure 14 there is another occurrence of set 4-3. An imbrication of the running sixteenth notes in the penultimate measure includes recurrences of four tetrachords: 4-24, 4-19, 4-20, and 4-27 (example 86). Set 4-24 occurs four times; the first and last forms share the same pc's, and the second and third forms share the same pc's. Set 4-20 appears twice and also shares identical pc's. Three additional occurrences of set 4-20 are found in Toys E: twice in measure 14 and once at the beginning of measure 15. Set 4-19 occurs four times in this section: three times in the imbrication of the penultimate measure and once in the piano accompaniment in the second half of measure 12.

EXAMPLE 86.--Toys E

Handwritten musical score for "Toys E", Example 86, showing Voice and Piano (Pf.) parts with figured bass notation.

System 1 (Measures 1-12):

- Voice:** Measures 1-12. Figured bass: 7-6, 5-6.
- Pf.:** Measures 1-12. Figured bass: 4-14, 4-11, 4-6, 4-13, 4-21, 4-19, 4-10, 5-23, 6-240, 8-215, 8-18, 6-244, 6-23, 5-1, 6-1, 5-2, 5-19.

System 2 (Measures 13-24):

- Voice:** Measures 13-24. Figured bass: 7-6, 5-6.
- Pf.:** Measures 13-24. Figured bass: 6-240, 4-20, 5-11, 6-16, 5-26, 6-22, 6-16, 4-20, 4-3, 6-219, 8-19, 4-215, 7-27, 8-11.

System 3 (Measures 25-36):

- Voice:** Measures 25-36. Figured bass: 4-21, 4-21, 4-3, 4-3, 4-5, 4-8.
- Pf.:** Measures 25-36. Figured bass: 4-19, 4-24, 4-24, 4-20, 4-24, 4-19, 4-27, 4-27, 4-19.

System 4 (Measures 37-48):

- Voice:** Measures 37-48. Figured bass: 4-21, 4-21, 4-3, 4-3, 4-5, 4-8.
- Pf.:** Measures 37-48. Figured bass: 4-19, 4-24, 4-24, 4-20, 4-24, 4-19, 4-27, 4-27, 4-19.

EXAMPLE 87.--Toys E

	4-3	4-5	4-6	4-8	4-10	4-11	4-13	4-14	4-215	8-16	8-18	4-19	4-20	4-21	4-24	4-27
5-1	Kh	K	O	K	K	K	K	O	K	O	O	O	O	K	O	O
5-2	K	K	K	O	Kh	Kh	K	K	K	K	K	O	O	K	O	O
5-6	K	Kh	K	Kh	O	O	K	K	Kh	K	K	K	K	O	K	O
7-7	O	Kh	Kh	Kh	O	O	K	K	K	Kh	K	O	K	O	O	K
7-10	Kh	K	K	O	Kh	K	Kh	K	Kh	O	K	O	K	O	O	K
5-11	K	K	O	K	K	K	K	Kh	K	K	K	O	K	O	K	K
5-19	O	K	K	K	O	O	Kh	K	Kh	K	Kh	O	K	O	O	K
5-23	O	K	K	K	O	Kh	K	Kh	K	K	K	O	K	K	O	K
5-26	K	K	O	O	O	Kh	O	K	K	K	K	Kh	K	K	Kh	Kh
7-27	K	O	K	O	K	Kh	K	Kh	K	K	K	K	Kh	O	K	K
5-27A	K	Kh	K	K	K	K	K	K	K	K	Kh	K	Kh	O	K	Kh
6-1	Kh	O	O	O	Kh	Kh	O	O	O	O	O	O	O	O	O	O
6-23	Kh	Kh	O	K	K	K	Kh	K	K	O	K	O	O	O	O	O
6-16	O	O	Kh	O	O	Kh	O	O	Kh	Kh	O	Kh	Kh	O	Kh	O
6-219	O	K	O	Kh	O	O	O	K	K	K	Kh	Kh	Kh	O	O	K
6-22	O	Kh	O	O	O	Kh	O	O	Kh	Kh	O	Kh	O	Kh	Kh	O
6-240	K	K	Kh	O	Kh	Kh	Kh	Kh	K	K	Kh	O	K	O	O	K
6-241	O	Kh	Kh	K	O	K	Kh	K	Kh	Kh	K	O	O	K	O	K
6-244	K	K	O	Kh	O	O	O	K	K	K	Kh	Kh	Kh	O	O	K
6-247	O	O	K	K	K	K	Kh	Kh	K	Kh	K	O	K	O	O	Kh

	5-1	5-2	5-6	7-7	7-10	5-11	5-19	5-23	5-26	7-27	5-27A
6-1	Kh	Kh	O	O	O	O	O	O	O	O	O
6-23	K	K	K	O	K	K	O	O	O	O	O
6-16	O	O	Kh	O	O	Kh	O	O	O	O	O
6-219	O	O	K	O	O	O	O	O	O	O	K
6-22	O	O	O	O	O	O	O	O	O	O	O
6-240	O	K	O	O	K	O	O	K	O	K	K
6-241	O	O	O	K	O	O	K	O	O	O	O
6-244	O	O	K	O	O	O	O	O	O	O	K
6-247	O	O	O	O	O	K	O	K	O	K	O

Finally, set 4-27 appears three times: twice in the tetrachordal imbrication of the sixteenth notes in measure 15 and once in measure 12. The interval content of these recurring tetrachords includes many

occurrences of ic 3 and ic 4. These triadic intervals appear with less frequency in his later works.¹⁷

Set-complex structures of all five sections of Toys are connected. Toys D is the only section in connected structure with closure, and it has different interval content from the other sections. In this sixteen-measure composition, twenty-five of the twenty-nine possible tetrachords are used. Twenty-six of the thirty-eight possible pentachords and twenty-three of the fifty possible hexachords are found in the piece.

The main ideas of the three movements of Men and Mountains--"Men," "Lilacs," and "Marching Mountains"--are closely associated by pc set relations. Set 8-6, which is the opening theme (measure 7) of the third movement, generates a large amount of material for the movement including several principal thematic ideas (example 88). One of these principal themes forms set 9-1 in measures 9-10, and its imitative statement forms set 7-Z36 in measures 11-12. Both sets, 9-1 and 7-Z36, are in set-complex Kh with 8-6.

Another principal theme of "Marching Mountains," shown in example 89, includes ten pc's, and its imitative statement includes nine pc's (set 9-8). The two thematic ideas can each be divided into a hexachord plus a tetrachord: 6-Z4 plus 4-2 (measures 23-24) and 6-Z12 plus 4-2 (measures 25-26). Set 6-Z4 is in the relation K' with 8-6, and 6-Z12 is in the relation Kh with 8-6. Tetrachord 4-2 is also contained in set

¹⁷The statistical analyses of Ruggles' melodic lines suggest that there are significant changes in the distribution of melodic-interval frequencies toward a progressive elimination of triadic/tonal implications. James Tenney, "The Chronological Development of Carl Ruggles' Melodic Style," Perspectives of New Music 16 (1977): 37.

8-6.

EXAMPLE 88.--Marching Mountains

7 8-6

9 9-1

11 7-236

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EXAMPLE 89.--Marching Mountains

23 6-24 4-2

25 6-212 4-2

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Examples 90-92 show four other prominent sets in the third movement which are all related to the principal harmony, set 8-6. Hexachord 6-9, a member of Kh(8-6), is introduced at the outset of the

1

6-9

20

Cl. 6-9

The cadential harmony at the end of the introduction (example 91) is set 6-Z3; 6-Z3 is a member of K*(8-6) and is immediately followed by the first presentation of the set 8-6 theme in measure 7 (example 88).

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The melodic idea in the bass clef in measures 13-14 (example 92) forms set 6-Z43. The end of the first section is signaled by the recurrence of 6-Z43 (measures 17-18), accompanied by 7-Z38 as a countermelody. Set 6-Z43 is in the relation K with 7-Z38 (none of the five-element sets is in Kh with 6-Z43), and both sets 6-Z43 and 7-Z38 are in set-complex relations with set 8-6, the opening theme. Moreover, the complement of set 7-Z38, 5-Z38, occurs in the first and second movements of Men and Mountains as a significant set.

EXAMPLE 92.--Marching Mountains

13

6-Z43

17

6-Z43

7-Z38

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Set 4-5 in measure 14 (example 93) is followed in measures 15-16 by its complement, set 8-5. The set 8-5 melody is an expansion of the 4-5 motive. Set 4-5 recurs at the end of the second section (measures 31-32) as a subsegment of the set 6-2 melody. Pentachord 5-5, which

accompanies set 6-2 in measures 31-32, is a member of Kh(4-5, 8-5) as well as of Kh(8-6).

In the second movement one of the primary harmonies, set 8-18, appears at the end of the second section as a cadential chord (example 94). Set 8-18 is a source of many motivic and other melodic ideas throughout this movement, much as set 8-6 is in the third movement. For example, the final chord of "Lilacs," set 5-Z17, is one of the many ideas which are related to 8-18. Set 5-Z17 occurs earlier in the movement (measures 15-16) as a melody in the viola.

EXAMPLE 93.--Marching Mountains

EXAMPLE 94.--Lilacs

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Tetrachord 4-18, the complemented-related pair of 8-18, appears in measure 7 in the cello (example 95). Another tetrachord, 4-12, which is stated sixteen times in various transformations,¹⁸ is an important referential motive in "Lilacs." Set 4-12 is contained in the cadential set, 8-18. The complement of 4-12, 8-12, occurs in measures 4-5 in the first violin (example 95). Thus, the two complementary pairs, 4-12/8-12 and 4-18/8-18, are the main harmonies in the second movement.

The two eight-element sets, 8-12 and 8-18, have five pc's in common as they appear in measure 4 and measure 19 (D, E, F, A^b, B). These pc's form set 5-31 which occurs twice in measures 9-10 (example 97).

¹⁸See Chapter 2, pp.35-36 for detailed discussion and musical examples.

EXAMPLE 95.--Lilacs

7 4-18

4 8-12

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Examples 96-98 contain some of the important melodic ideas of "Lilacs." Set 5-Z38, which is also a main theme in the first movement, appears in measures 4-5 (violin I) and measures 25-26 (viola). Set 5-Z38 is a member of K(4-12, 8-12) and of Kh(4-18, 8-18).

EXAMPLE 96.--Lilacs

4 5-Z38

25 5-Z38

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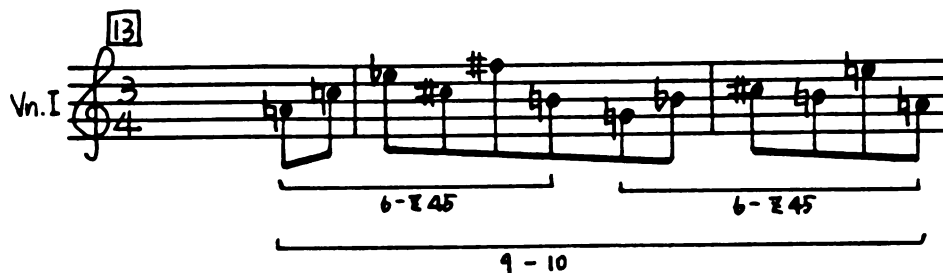
The first real melody given to the contrabass, near the beginning of the second section (measures 8-10), forms sets 6-Z36 and 5-19 (example 97). Hexachord 6-Z36 is in set-complex Kh with 4-12/8-12 and in K' with 4-18/8-18. Pentachord 5-19 is in the relation K with 4-12/8-12 and in the relation Kh with 4-18/8-18. Above the contrabass melody, set 5-31 leads imitation at the octave which begins in measure 9 in the viola, followed by the first violin in measures 9-10; 5-31 is in set-complex Kh with 4-12/8-12 as well as 4-18/8-18.

EXAMPLE 97.--Lilacs

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Hexachord 6-Z45, another set which is related to the two complementary pairs, 4-12/8-12 and 4-18/8-18, is used to generate a two-stage sequence in measures 13-15. The two stages share three invariants and together form set 9-10. Set 9-10 is also in the relation Kh with both pairs.

EXAMPLE 98.--Lilacs



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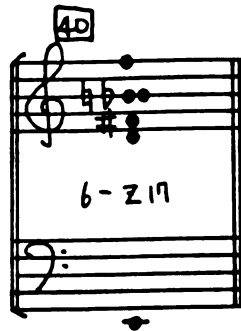
Note that the most significant segment of the third movement, set 8-6 (example 88), and one of the most significant segments of the second movement, set 8-18 (example 94), share seven pc's which together form set 7-Z36. Set 7-Z36 is also a principal theme of the third movement (example 88).

In the first movement, "Men," the antecedent phrase of the opening idea presents set 5-Z36 (example 99), the complement-related pair of set 7-Z36 which is the common subset of 8-6 and 8-18. Set 5-Z36 is in the relation Kh to both sets, 8-6 and 8-18. The consequent phrase of the opening idea forms set 5-Z38 which is also in set-complex relation with sets 8-6 and 8-18.

The cadential chord of the first movement, set 6-Z17 (example 101), is in set-complex relations with the opening ideas, 5-Z36 and 5-Z38 (example 99). It is interesting that the cadential chord in the first movement, 6-Z17, and the cadential chord in the second movement,

5-Z17 (example 94), share four pc's (D, F, F[#], B^b) which form set 4-18, a primary set in the second movement.

EXAMPLE 101.--Men



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The main ideas of the three movements of Men and Mountains are not related motivically, but are connected by pc set relations. The sets 8-6 and 8-18 are related by subsets of cardinal number seven and similar interval content. The seven pc's in common between these two sets form set 7-Z36 whose complement, set 5-Z36, is a principal theme in the first movement.

The last piece under discussion, Evocation No.1, is divided into three sections. The table of set-complex structure of the first section of Evocation No.1 (example 103) reveals sparse relations between the hexachords and pentachords, but more numerous relations when examining certain tetrachords. The section is unified by the opening motive, 4-Z29, and its complement, 8-Z29 (measures 1-2); set 4-Z29 recurs at the end of measure 5. The pair 4-Z29/8-Z29 is in set-complex Kh with four of the five hexachords, 6-21, 6-16, 6-22, and 6-Z10. Sets 6-21 (measure 4) and 6-16 (measure 5) are vertical hexachords, and sets 6-22 (measure

3) and 6-Z10 (measure 5-7) are melodic hexachords.¹⁹ The complementary pair, 4-Z29/8-Z29, is also in the relation K with set 6-Z44, the cadential chord at the end of the first section (measure 9). All of the five- and seven-element sets in this section are in set-complex relations with 4-Z29/8-Z29.

Of the five-element sets, 5-13 (the vertical set in measure 4) has the largest number of set-complex relations, a total of nine. This pentachord, 5-13, is in null relation with only two tetrachords, 4-6 and 4-9, both of which appear in measure 2. (Set 4-6 recurs as a whole-note chord in measure 7.) Sets 4-6 and 4-9 are the only two tetrachords with a greater number of null relations than set-complex relations. However, the union of 4-6 and 4-9 in measure 2, set 5-7, is related to the set complex of the section through 4-Z29/8-Z29. Pentachord 5-13 is in set-complex relation with four of the five hexachords, the only null relation being with the cadential chord, 6-Z44. Set 5-Z18, which appears in the bass clef in measure 6, has equal number of set-complex relations as 5-13. 5-Z18 is in the relation K with the three sets which are in null relations with 5-13 (4-6, 4-9, and 6-Z44). Also, set 5-13 is in the relation Kh with the three hexachords which are in null relations with 5-Z18 (sets 6-16, 6-21, and 6-22). Therefore, sets 5-13 and 5-Z18 are the primary nexus sets, and the pair 4-Z29/8-Z29 is the secondary nexus set for the first section of Evocation No.1.

The largest set in section one, set 8-5, is found in the second half of measure 4. Set 8-5 contains set 4-5, the vertical chord

¹⁹In Evocation No.1 melodic sets can be difficult to distinguish from harmonic sets because liner entries are often sustained and thus create vertical sonorities.

sustained from measure 3, as well as sets 5-13 and 6-21, two additional vertical sets sustained in measure 4. The complementary pair, 4-5/8-5, is in set-complex relations with all of the sets except two pentachords, 5-32 and 5-Z37. Both of these sets, 5-32 and 5-Z37, are from the last phrase of the section (measures 7-8) and have the least number of set-complex relations of the pentachords.

In the first section, tetrachord 4-16 is in set-complex relations with all but one set, 6-21. As a subsegment of the rising melodic phrase in measure 3, set 4-16 recurs in the third section in a similar context (example 104).

The third section of Evocation No.1 (example 104) is a varied return of the first and contains four sets from the opening section: 4-5 (measures 16, 17, and 20), 4-16 (measures 16 and 17), 5-13 (measures 20-21), and 6-21 (measure 19). Sets 5-13 and 6-21 occur in completely different forms than in the first section, but set 4-16 in measures 16-17 appears in a similar figuration as in the first section, as a part of the ascending melodic motion. Tetrachord 4-Z15 from the first section (measure 7-8) finds its complementary pair, 8-Z15, in the third section (measure 19-21). Set 7-Z38 in measures 4 also has its complementary pair, 5-Z38, in the third section (measures 19-20).

The table in example 105 shows that sets 4-5 and 8-Z15 are in set-complex relations with all sets, including set-complex Kh with two hexachords, 6-5 (measure 20) and 6-21 (measure 19). Sets 6-5 and 6-21 hold an equal number of set-complex relations, a total of five, all of which are in the relations Kh. Only two sets, 4-5 and 8-Z15, are members of both Kh(6-5) as well as of Kh(6-21). Thus, the set-complex structure of the section is connected with the nexus sets 4-5 (one of

EXAMPLE 102.--Evocation No.1 Section 1

Handwritten musical score for a piece titled "Largo (J=44)". The score is written in G major (one sharp) and 2/2 time. It consists of three systems of staves.

System 1: The piano part (left) and violin part (right) are shown. The tempo is marked "Largo (J=44)". The piano part has a key signature of one sharp (F#) and a 2/2 time signature. The violin part has a key signature of one sharp (F#) and a 2/2 time signature. The score includes extensive fingering and interval markings. The piano part has markings such as 4-22, 5-4, 4-4, 4-6, 4-16, 5-24, 7-238, and 8-5. The violin part has markings such as 8-229, 6-22, 6-210, 4-5, 5-13, and 6-21.

System 2: The piano part (left) and violin part (right) are shown. The piano part has markings such as 6-16, 7-30, 4-224, 5-22, 5-5, 4-6, 5-32, 4-215, and 5-237. The violin part has markings such as 6-210, 5-24, 4-19, and 4-18.

System 3: The piano part (left) is shown. It has a marking of 6-244.

EXAMPLE 103.--Evocation No.1 Section 1

4-5*	4-6	4-9	4-215	4-16	4-19	4-229*
5-5	Kh	Kh	K	K	0	Kh
5-7	Kh	Kh	K	Kh	0	K
5-13	Kh	0	K	K	Kh	Kh
5-218	K	K	K	Kh	K	K
5-22	K	0	K	K	Kh	K
5-24	K	0	K	Kh	K	Kh
5-32	0	0	Kh	K	K	K
5-237	0	0	0	K	Kh	K
7-238	Kh	K	K	K	K	K
6-210	K	0	0	K*	K	Kh
6-16	Kh	0	Kh	Kh	Kh	Kh
6-21	Kh	0	Kh	0	Kh	Kh
6-22	Kh	0	Kh	Kh	Kh	Kh
6-244	K*	0	K*	K	Kh	K



EXAMPLE 105.--Evocation No.1 Section 3

	4-5	4-13	8-215	4-16	4-23	8-27						
7-6	Kh	K	Kh	K	0	0						
5-8	K	K	K	0	0	K						
5-13	Kh	0	K	K	0	K						
5-15	Kh	K	K	Kh	0	0						
5-29	K	Kh	K	Kh	Kh	K						
5-238	Kh	K	K	K	K	Kh	7-6	5-8	5-13	5-15	5-29	5-238
6-5	Kh	Kh	Kh	Kh	0	0	Kh	0	0	0	0	0
6-21	Kh	0	Kh	0	0	Kh	0	Kh	Kh	0	0	0

The set-complex structure of the second section of Evocation No. 1 is connected (example 107). The Z-related hexachords, 6-Z17/6-Z43, are in set-complex relations with all sets but four, 4-1/8-1, 5-2, 7-3, and 5-5. These four sets are in the relation K^* with hexachord 6-Z40. Thus, the three sets, 6-Z17/6-Z43 and 6-Z40, make up a group of primary nexus sets. Set 6-Z40 is the beginning set of the section (measures 9-

10) and is followed by of set 6-Z43 (measure 10). There are two occurrences of set 6-Z17 in measures 10-11, the first one as melodic figuration and the second as a composite of melody and harmony at the end of measure 11. Pentachord 5-Z36, a subcomponent of 6-Z17 in measure 11, is chosen as the secondary nexus set since it is the only five-element set which is in set-complex relation with all three primary nexus sets.

The interval content of the second section is more consistent than the outer two sections, and this is reflected in the table of set-complex structure as well as in the recurrence of sets.²⁰ There are two statements of set 4-6, one at the end of measure 10 and the other in measure 11, both as motivic figurations. Both tetrachords can be further analyzed as two overlapping statements of set 3-5. Set 4-6, which was shown to be one of the most sparsely related tetrachords in the first section, is in set-complex relations with all but two sets in the second section, including relations with all primary and secondary nexus sets. Tetrachord 4-8 occurs five times in the second section: one at the beginning of measure 10, two using identical pc's in measure 12, and two additional forms in elision in measures 13-14. Three of the five statements of 4-8 in measures 10 and 13-14 are composed of overlapping statements of 3-5. Finally, there are three occurrences of 5-7 in measures 12-13 each of which contains more than two statements of 3-5 as well as one of 3-1. Compared to the four recurring tetrachords in Toys E (example 86) in which ic 3 and ic 4 frequently appear, the interval content of the three recurring sets present in the second

²⁰See Chapter 2, p.66.

section of Evocation No.1 is more atonal in character.

In the second section of Evocations No.1 alone, there are five complement-related pairs. Sets 4-1/8-1 appear in measure 11, 8-1 immediately followed by 4-1. Recurring set 4-8 finds its complement, 8-8, in measure 13; moreover, within the statement of 8-8 is one occurrence of 4-8. Set 5-6 in the middle of measure 10 finds its complementary pair, 7-6, in measure 13. In measure 13 set 7-7 and one of the three occurrences of set 5-7 appear. Lastly, set 5-20, the beginning set of measure 10, finds its complement, set 7-20, at the end of measure 11. All of the five complementary pairs are related to the harmonic structure of the section because all of the pairs are related to either nexus sets 6-Z17/6-Z43 or 6-Z40. The pair 4-1/8-1 is a member of $K^*(6-Z40)$; 4-8/8-8 is a member of $Kh(6-Z17, 6-Z43)$. The three five- and seven-element pairs are in K^* and K relations with 6-Z17/6-Z43.

As a whole, the harmonic structure of Evocation No.1 is unified (example 108). The opening sets, 4-Z29/8-Z29, reveal the most abundant relations and are in set-complex relations with all seventeen pentachords and twelve hexachords, except set 6-20 which is the beginning set of the second section; 6-20 is in set-complex relation with only two sets, 4-19 and 4-20, in Evocation No.1. Two additional complementary pairs, 4-5/8-5 and 4-Z15/8-Z15, also show many relations. Twenty-seven sets are members of $K(4-5, 8-5)$ with three null relations. The pair 4-Z15/8-Z15 is in set-complex relations with twenty-six sets, having null relations with four sets; set 8-Z15 closes the whole piece. All three of the above-mentioned tetrachords and their complements are found either in the first section or the third section of Evocation No.1; only one set, 4-5, is found in both sections.

EXAMPLE 106.--Evocation No.1 Section 2

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EXAMPLE 107.--Evocation No.1 Section 2

	4-1*	4-2	4-6	4-8*	4-9	4-20													
5-2	Kh	Kh	K	O	O	O													
7-3	K	Kh	K	O	O	K													
5-5	Kh	K	Kh	K	K	O													
5-6*	K	K	K	Kh	K	K													
5-7*	K	O	Kh	Kh	Kh	K													
5-20*	O	K	K	Kh	K	Kh													
5-236	K	Kh	Kh	K	O	K	5-2	7-3	5-5	5-6*	5-7*	5-20*	5-236						
6-5	Kh	O	Kh	Kh	Kh	O	O	O	Kh	Kh	Kh	O	O						
6-26	K	O	Kh	Kh	Kh	K	O	O	K	K*	Kh	K	O						
6-210	K	Kh	O	O	O	K	K	O	O	O	O	O	O						
6-217	O	K*	Kh	K*	K	O	O	O	O	K	K*	K	K*						
6-18	O	O	Kh	Kh	Kh	O	O	O	O	O	Kh	Kh	O						
6-20	O	O	O	O	O	Kh	O	O	O	O	O	O	O						
6-237	K*	Kh	K*	K	O	O	O	K*	K*	K	O	O	O						
6-240	K*	Kh	Kh	O	O	K*	K*	K*	K*	O	O	O	Kh						
6-243	O	K	K	Kh	K	K*	O	O	O	K*	K	K*	K						

EXAMPLE 108.--Evocation No.1

	4-1*	4-2	4-5*	4-6	4-8*	4-9	4-13	4-215*	4-16	4-19	4-20	4-23	8-27	4-229*		
5-2	Kh	Kh	K	K	0	0	K	K	K	0	0	K	0	K		
7-3	K	Kh	K	K	0	0	K	0	0	K	K	0	K	K		
5-5	Kh	K	Kh	Kh	K	K	K	K	K	0	0	K	0	Kh		
5-6*	K	K	Kh	K	Kh	K	K	Kh	K	K	K	0	0	K		
5-7*	K	0	Kh	Kh	Kh	Kh	K	K	Kh	0	K	K	K	K		
5-8	K	Kh	K	0	0	0	K	K	0	K	0	0	K	K		
5-13	0	Kh	Kh	0	K	0	0	K	K	Kh	K	0	K	Kh		
5-15	0	K	Kh	K	K	K	K	K	Kh	K	0	0	0	K		
5-218	K	K	K	K	K	K	K	K	Kh	K	K	0	K	K		
5-20*	0	K	K	K	Kh	K	K	K	Kh	K	Kh	K	K	Kh		
5-22	0	0	K	0	Kh	0	0	K	K	Kh	K	0	K	K		
5-24	K	K	K	K	0	0	K	K	Kh	K	0	K	K	Kh		
5-29	0	K	K	K	K	K	Kh	K	Kh	0	K	Kh	Kh	K		
5-32	0	0	0	0	K	0	K	Kh	K	K	K	K	Kh	K		
5-236	K	Kh	K	Kh	K	0	Kh	K	K	0	K	K	K	K		
5-237	0	K	0	0	K	0	0	0	K	Kh	K	0	0	K		
5-238*	0	K	Kh	K	K	K	K	K	K	K	Kh	K	Kh	K	5-2	7-3
6-5	Kh	0	Kh	Kh	Kh	Kh	Kh	Kh	Kh	0	0	0	0	Kh	0	0
6-26	K	0	Kh	Kh	Kh	Kh	0	K*	Kh	0	K	K*	0	K	0	0
6-210	K	Kh	K	0	0	0	K	0	K*	K	0	0	K*	Kh	K	K
6-16	0	Kh	Kh	0	Kh	0	0	Kh	Kh	Kh	Kh	0	0	Kh	0	0
6-217	0	K*	Kh	K*	Kh	K*	K*	Kh	Kh	K*	K	0	K*	Kh	0	0
6-18	0	0	Kh	Kh	Kh	Kh	Kh	Kh	Kh	0	Kh	Kh	Kh	Kh	0	0
6-20	0	0	0	0	0	0	0	0	0	Kh	Kh	0	0	0	0	0
6-21	0	Kh	Kh	0	0	0	0	Kh	0	Kh	0	0	Kh	Kh	0	0
6-22	0	Kh	Kh	0	0	0	0	Kh	Kh	Kh	0	0	0	Kh	0	0
6-237	K*	Kh	Kh	K*	K	0	0	K	0	K*	0	0	0	K*	0	K*
6-240	K*	Kh	K*	Kh	0	0	Kh	K	K	0	K*	K	K	K*	K*	K*
6-243	0	K	Kh	K	Kh	K	K	Kh	Kh	K	K*	0	K	Kh	0	0
6-244	0	0	K*	0	Kh	0	0	K*	K	Kh	Kh	0	K	K	0	0

	5-5	5-6*	5-7*	5-8	5-13	5-15	5-218	5-20*	5-22	5-24	5-29	5-32	5-236	5-237	5-238*
6-5	Kh	Kh	Kh	0	0	0	Kh	0	0	0	0	0	0	0	0
6-26	K	K*	Kh	0	0	0	0	K	0	0	0	0	0	0	0
6-210	0	0	0	K*	K	0	K*	0	0	K*	0	0	0	K	0
6-16	0	Kh	0	0	Kh	0	0	Kh	0	0	0	0	0	0	0
6-217	0	K	K*	0	K*	K	K	K	K*	0	0	0	K*	0	K
6-18	0	0	Kh	0	0	0	0	Kh	0	0	Kh	0	0	0	Kh
6-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-21	0	0	0	Kh	Kh	0	0	0	0	0	0	0	0	0	0
6-22	0	0	0	0	Kh	Kh	0	0	0	Kh	0	0	0	0	0
6-237	K*	K	0	0	K*	0	0	0	0	0	0	0	0	0	0
6-240	K*	0	0	0	0	0	K	0	0	0	0	0	Kh	0	K*
6-243	0	K*	K	0	K	K*	K*	K*	K	0	0	0	K	0	K*
6-244	0	K*	0	0	0	0	K	K	Kh	0	0	K*	0	K*	K*

Example 109 contains the table of set-complex structure for the entire Toys. One of the most significant sets in Toys is set 4-27 which

can be expressed as a half-diminished seventh chord. 4-27 occurs nine times, twice as chords which last a whole measure, six times as components of solo melodic lines, and once in the piano within the statement of 8-Z15. Of the two 4-27 chords, the one in measures 2 has a particularly significant influence in shaping one aspect of melodic and harmonic structures of Toys, that of triadic formation. The 4-27 chord in measure two is immediately followed by the three statements of 4-27 in the voice part. The remaining 4-27 sets also surface as explicit segments, appearing as components of a single melodic line or a melodic line with a chord held from previous beat. Throughout Toys these tertian formations are as important as the formations created by sets with a more atonal character.

Set 4-Z15, its Z-correspondent (4-Z29), and its complement (8-Z15), reflect the less tertian aspects of the melodic and harmonic tendencies of Toys, even though the three sets do not appear as explicitly as the 4-27 motives do. Set 4-Z15 appears five times, always in the piano accompaniment and sometimes with an overlapping note in the voice part. Set 4-Z29 is found in the piano part at the beginning of Toys D, and set 8-Z15 is a composite segment found near the beginning of Toys E. In Toys the three sets, 4-Z15/8-Z15 and 4-Z29, hold the greatest number of set-complex relations (forty-three) and, consequently, the smallest number of null relations (six), whereas set 4-27 holds thirty-five set-complex relations and fourteen null relations. Therefore, the all-interval tetrachords 4-Z15 and 4-Z29 along with set 8-Z15 are the referential sets which best reflect the underlying harmonic structure of Toys.

EXAMPLE 109.--Toys

	4-1	4-2	4-3	4-4	4-5	4-6	4-7	4-8	4-10	4-11	4-12	4-13	4-14	4-215	8-16
5-1	Kh	Kh	Kh	K	K	O	K	K	K	K	K	K	O	K	O
5-2	Kh	Kh	K	Kh	K	K	K	O	Kh	Kh	K	K	K	K	K
7-3	K	Kh	Kh	Kh	K	K	Kh	O	K	Kh	K	K	K	O	O
5-4	Kh	K	K	Kh	Kh	K	K	K	K	K	Kh	Kh	K	K	K
5-5	Kh	K	K	K	Kh	Kh	K	K	K	K	K	K	Kh	K	K
5-6	K	K	K	Kh	Kh	K	Kh	Kh	O	O	K	K	K	Kh	K
5-7	K	O	O	K	Kh	Kh	K	Kh	O	O	K	K	K	K	Kh
5-10	K	K	Kh	K	K	K	O	O	Kh	K	Kh	Kh	K	Kh	O
5-11	K	Kh	K	Kh	K	O	K	K	K	K	K	K	Kh	K	K
5-15	O	K	O	O	Kh	K	O	K	O	K	O	K	O	K	Kh
5-210	K	K	O	K	K	K	Kh	K	K	K	Kh	K	Kh	K	Kh
5-19	K	O	O	K	K	K	K	K	O	O	K	Kh	K	Kh	K
7-20	O	K	O	K	K	K	K	Kh	O	O	O	K	Kh	K	Kh
7-21	O	K	K	K	K	O	Kh	K	O	K	K	O	K	K	K
5-23	K	K	O	K	K	K	O	O	Kh	Kh	O	K	Kh	K	K
5-24	K	K	O	K	K	K	O	O	K	Kh	K	K	K	K	Kh
7-25	O	K	K	K	O	K	K	O	Kh	K	K	Kh	K	K	K
5-26	O	K	K	K	K	O	K	O	O	Kh	Kh	O	K	K	K
7-27	O	K	K	K	O	K	K	O	K	Kh	K	K	Kh	K	K
5-29	O	K	O	K	K	K	O	K	K	K	O	Kh	Kh	K	Kh
7-30	O	K	O	K	K	O	K	K	O	K	K	O	K	Kh	Kh
5-31	O	O	K	O	O	O	O	O	K	O	Kh	Kh	O	K	O
5-33	O	K	O	O	K	O	O	O	O	K	K	O	O	K	K
5-34	O	O	K	O	O	O	O	O	K	K	K	K	K	K	K
5-237	O	K	K	Kh	O	O	K	K	O	K	K	O	K	O	K
5-238	O	K	K	Kh	Kh	K	K	K	K	K	K	K	K	K	K
6-1	Kh	Kh	Kh	Kh	O	O	Kh	O	Kh	Kh	O	O	O	O	O
6-23	Kh	Kh	Kh	Kh	Kh	K	K*	K*	K*	K*	Kh	Kh	K	K*	O
6-5	Kh	O	O	Kh	Kh	Kh	Kh	Kh	O	O	Kh	Kh	Kh	Kh	Kh
6-9	Kh	Kh	O	Kh	Kh	Kh	O	O	Kh	Kh	O	O	Kh	Kh	Kh
6-210	K	Kh	K*	Kh	K	O	K*	O	K	Kh	Kh	K	K*	O	K
6-211	K	Kh	K*	Kh	K	Kh	K*	O	Kh	Kh	K*	Kh	Kh	K*	K
6-14	O	Kh	Kh	Kh	O	O	Kh	O	O	Kh	O	O	Kh	O	O
6-16	O	Kh	O	Kh	Kh	O	Kh	Kh	O	O	O	O	Kh	Kh	K*
6-18	O	O	O	Kh	Kh	Kh	O	Kh	O	O	O	Kh	Kh	Kh	K*
6-219	O	O	K*	K	K	O	Kh	Kh	O	O	K*	O	K*	K	K
6-21	O	Kh	O	O	Kh	O	O	O	O	Kh	Kh	O	O	Kh	O
6-22	O	Kh	O	O	Kh	O	O	O	O	Kh	O	O	O	Kh	Kh
6-224	O	K	K*	K	K	O	O	O	K*	Kh	K*	K*	Kh	Kh	K
6-229	O	O	O	O	O	O	K*	O	K	O	K*	Kh	K*	K	K
6-30	O	O	O	O	O	O	O	O	O	O	Kh	Kh	O	Kh	O
6-33	O	O	O	O	O	O	O	O	Kh	Kh	O	Kh	Kh	O	Kh
6-34	O	O	O	O	O	O	O	O	O	Kh	Kh	O	O	Kh	Kh
6-240	K*	Kh	K	Kh	K*	Kh	K	O	Kh	Kh	K	Kh	Kh	K	K*
6-241	K*	K	O	K*	Kh	Kh	O	K	O	K	K*	Kh	K*	Kh	Kh
6-244	O	O	K	K*	K*	O	Kh	Kh	O	O	K	O	K	K*	K*
6-245	O	K*	K	O	O	K*	O	O	K	O	Kh	Kh	O	K	O
6-246	O	K*	K	K*	K*	O	O	O	K	Kh	K	K	Kh	Kh	K*
6-247	O	K*	O	K*	O	K*	O	K	K	K	O	Kh	Kh	K*	Kh

EXAMPLE 109.--Toys continued

	4-17	4-18	4-19	4-20	4-21	4-22	4-23	4-24	4-27	4-229					
5-1	0	0	0	0	K	0	0	0	0	0					
5-2	K	K	0	0	K	K	K	0	0	K					
7-3	K	K	K	K	0	K	0	K	K	K					
5-4	K	K	0	0	K	K	0	0	0	K					
5-5	0	K	0	0	K	K	K	0	0	Kh					
5-6	K	K	K	K	0	K	0	K	0	K					
5-7	0	K	0	K	0	0	K	0	K	K					
5-10	K	K	0	K	K	K	0	0	K	K					
5-11	Kh	0	K	K	0	Kh	K	K	K	K					
5-15	0	K	K	0	K	K	0	K	0	K					
5-210	K	Kh	K	K	0	K	0	K	K	K					
5-19	0	Kh	0	K	0	0	K	0	K	Kh					
7-20	K	K	K	Kh	0	K	K	K	K	Kh					
7-21	Kh	K	Kh	Kh	0	K	0	K	K	K					
5-23	K	K	0	K	K	Kh	Kh	0	K	K					
5-24	0	0	K	0	Kh	Kh	K	K	K	Kh					
7-25	K	K	0	0	K	K	K	0	Kh	Kh					
5-26	K	K	Kh	K	K	K	0	Kh	Kh	K					
7-27	K	K	K	Kh	0	Kh	K	K	K	0					
5-29	K	K	0	K	K	K	Kh	0	Kh	K					
7-30	K	K	Kh	K	K	Kh	0	Kh	K	K					
5-31	K	Kh	0	0	0	0	0	0	Kh	K					
5-33	0	0	K	0	Kh	K	0	Kh	K	K					
5-34	0	0	K	0	Kh	Kh	K	K	Kh	K					
5-237	K	K	Kh	K	K	K	0	0	0	K					
5-238	K	Kh	K	Kh	0	K	K	K	Kh	K	5-1	5-2	7-3	5-5	5-6
6-1	0	0	0	0	0	0	0	0	0	0	Kh	Kh	Kh	0	0
6-23	K	K	0	0	0	K	0	0	0	K	K	K	K	K	K
6-5	0	Kh	0	0	0	0	0	0	0	Kh	0	0	0	Kh	Kh
6-9	0	0	0	0	Kh	Kh	Kh	0	0	Kh	0	Kh	0	Kh	0
6-210	K	K	K	0	K	K	0	K	K	Kh	0	K	K	0	0
6-211	0	Kh	0	K	0	Kh	K	0	K	K	0	K	K	K	0
6-14	Kh	0	Kh	Kh	0	Kh	0	0	0	0	0	0	Kh	0	0
6-16	Kh	0	Kh	Kh	0	Kh	0	Kh	0	Kh	0	0	0	0	Kh
6-18	0	Kh	0	Kh	0	0	Kh	0	Kh	Kh	0	0	0	0	0
6-219	Kh	Kh	Kh	Kh	0	0	0	0	K	K	0	0	0	0	K
6-21	0	0	Kh	0	Kh	0	0	Kh	Kh	Kh	0	0	0	0	0
6-22	0	0	Kh	0	Kh	Kh	0	Kh	0	Kh	0	0	0	0	0
6-224	K	K	K	K	K	Kh	K	K	Kh	0	0	0	0	0	0
6-229	K	Kh	0	0	0	0	K	0	Kh	K	0	0	0	0	0
6-30	0	Kh	0	0	0	0	0	0	Kh	Kh	0	0	0	0	0
6-33	0	0	0	0	Kh	Kh	Kh	0	Kh	Kh	0	0	0	0	0
6-34	0	0	Kh	0	Kh	Kh	0	Kh	Kh	Kh	0	0	0	0	0
6-240	0	Kh	0	K	0	Kh	K	0	K	K	0	K	K	K	0
6-241	0	K	0	0	K	K	K	0	K	Kh	0	0	0	K	0
6-244	Kh	Kh	Kh	Kh	0	0	0	0	K	K	0	0	0	0	K
6-245	0	K	0	0	K	K	0	0	Kh	K	0	0	0	0	0
6-246	K	K	K	K	K	Kh	K	K	Kh	0	0	0	0	0	0
6-247	K	K	0	K	0	Kh	Kh	0	Kh	K	0	0	0	0	0

EXAMPLE 109.--Toys continued

	5-7*	5-10*	5-11	5-15	5-218	5-19*	7-20	7-21	5-23	5-24	7-25	5-26*	7-27	5-29	7-30	5-31*	5-33*	5-34	5-237	5-238*
6-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-23	0	K*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-5	Kh	0	0	0	Kh	Kh	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-9	0	0	0	0	0	0	0	0	Kh	Kh	0	0	0	0	0	0	0	0	0	0
6-210	0	0	K*	0	0	0	0	0	0	K*	0	K	0	0	0	0	0	0	K	0
6-211	0	K*	0	0	K*	0	0	0	K*	0	K*	0	K*	0	0	0	0	0	0	K
6-14	0	0	Kh	0	0	0	0	Kh	0	0	0	0	Kh	0	0	0	0	0	Kh	0
6-16	0	0	Kh	0	0	0	Kh	Kh	0	0	0	0	0	0	Kh	0	0	0	0	0
6-18	Kh	0	0	0	0	Kh	Kh	0	0	0	0	0	0	0	0	0	0	0	0	Kh
6-219	0	0	0	0	K*	0	K	Kh	0	0	0	0	0	0	0	0	0	0	K	K
6-21	0	0	0	0	0	0	0	0	0	0	0	Kh	0	0	0	0	Kh	0	0	0
6-22	0	0	0	Kh	0	0	0	0	0	Kh	0	0	0	0	Kh	0	Kh	0	0	0
6-224	0	K*	0	0	0	0	0	0	K*	0	0	K*	K*	K*	K	0	0	K	0	K
6-229	0	0	0	0	K*	0	0	0	0	0	K*	0	0	K*	0	K*	0	0	0	0
6-30	0	0	0	0	0	Kh	0	0	0	0	0	0	0	0	0	Kh	0	0	0	0
6-33	0	0	0	0	0	0	0	0	Kh	Kh	Kh	0	0	Kh	0	0	0	Kh	0	0
6-34	0	0	0	0	0	0	0	0	0	Kh	0	Kh	0	0	Kh	0	Kh	Kh	0	0
6-240	0	K	0	0	K	0	0	0	K	0	K	0	K	0	0	0	0	0	0	K*
6-241	K	0	0	K*	0	K	0	0	0	K	0	0	0	K*	0	0	0	0	0	0
6-244	0	0	0	0	K	0	K*	Kh	0	0	0	0	0	0	0	0	0	0	K*	K*
6-245	0	K	0	0	0	0	0	0	0	0	K*	0	0	0	0	K*	0	K*	0	0
6-246	0	K	K*	0	0	0	0	0	0	K	0	K	K	K	K*	0	0	K*	0	K*
6-247	0	0	K*	0	0	0	K*	0	K	0	K*	0	K*	Kh	0	0	0	0	0	0

Sets 4-Z15 and 4-Z29 play unifying roles both in Toys (with 8-Z15) and in Evocation No.1 (with 8-Z15 and 8-Z29). In both pieces the two tetrachords best reveal the fundamental harmonic structure, and these findings can be applied to most of Ruggles' works. Tetrachords 4-Z15 and 4-Z29, often together and sometimes with their complements, occur in all of Ruggles' compositions except one, Evocation No.3. More importantly, tetrachords 4-Z15 and 4-Z29 are either the nexus or the referential set in every piece.

In several compositions 4-Z15 and 4-Z29 are used as the principal motives as well. For example, in Angels the 4-Z15 motive accompanies the 4-11 motive at the beginning of the piece. These two motives are the resource of much of the pitch material used in the piece. Furthermore, set 8-Z29 appears in the highest voice at the end of the first section. In Angels sets 4-Z15 and 8-Z29 are the sets with the greatest number of set-complex relation. Set 4-11, the principal motive, has ten null relations whereas 4-Z15 has seven null relations, and 8-Z29 has six null relations. In Portals and Organum, set 4-Z15 displays a far greater number of set-complex relations than any other set. Also, in Organum set 4-Z29 appears twice as an important motive and again holds the greatest number of set-complex relations, the same number as 4-Z15. In Evocation No.4 set 4-Z29, the lower four notes of the cadential chord, unifies the entire piece in the same way that the 4-Z29 motive unifies Evocation No.1.

According to Forte, set 4-Z15 has "a very special place in atonal music."²¹ Forte explains that "It [4-Z15] could occur in a tonal

²¹Forte, The Structure of Atonal Music, 1.

composition only under extraordinary conditions, and even then its meaning would be determined by harmonic-contrapuntal constraints."²² These all-interval tetrachords, one of the most characteristic sets of atonal repertory, are also found in the atonal compositions of Schoenberg, Webern, Berg, Stravinsky, and Scriabin.

²²Ibid., 1.

CHAPTER 6

CONCLUSION

At the turn of the twentieth century, music was undergoing one of the most rapid changes in its history. Most European composers were evolving from their great musical tradition, while American composers had little musical heritage to guide them. Thus, in America it was easier for composers to break away from the Western musical tradition than it was for their European colleagues. Two New Englanders, Charles Ives (1874-1951) and Carl Ruggles (1876-1971), were among the first generation of American composers who were struggling to explore new possibilities of expanding their musical horizons. In America atonality is first seen in isolated works of Ives such as Soliloquy, A Study in 7th and Other Things (1907), and The Unanswered Question (1908). George Perle states:

In the United States, atonality originally occurs as one of a number of experimental tendencies, no more exclusive in its aims or techniques than any of the others. . . . That Ives's innovations neither influenced any followers nor inaugurated any 'movements' was not merely because he was 'ahead of the times' or isolated from the professional world of music. His innovations did not represent any integrated approach to the material of music and so did not create a basis for stylistic evolution. They remained bound--so many individual empirical discoveries--to whatever immediate

compositional purpose had evoked each of them.¹

In contrast to Ives who wrote several hundred compositions (most of them in the first two decades of the twentieth century), Ruggles "gradually evolved the principles of a consistent and personal type of atonal expression,"² and produced only a handful of works over forty years. An eccentric individualist and perfectionist, Ruggles firmly resisted any outside influences, even from his close friends Ives and Varèse.

Ruggles is one of the few composers who wrote atonal music throughout his career. While Schoenberg and his students were constantly seeking means to provide a certain order to their atonal compositions, and finally found the solution in serialism, Ruggles continued to compose "free" atonal music. While Schoenberg and Webern relied on texts and programs as one of the structural devices in their atonal music, Ruggles mostly wrote abstract instrumental music. Ruggles produced only two short vocal compositions, Toys and Vox Clamans in Deserto, both early in his career. According to John Kirkpatrick, "He [Ruggles] recently confessed 'It finally dawned on me that I couldn't write opera.' Apparently the growing, concentrated self-reliance of his music precluded any ease of literary collaboration."³

Ruggles rejected the idea of adopting any kind of formula in his music. In an interview with Newsweek, he said "Formulas are made to be

¹George Perle, "Atonality and the Twelve-Note System in the United States," Score 27 (July 1960): 54-55.

²Ibid., 55.

³John Kirkpatrick, "The Evolution of Carl Ruggles: A Chronicle Largely in His Own Words," Perspectives of New Music 6 (Spring-Summer 1968): 155.

busted. Twelve-tone music is a worn-out formula. They sound alike because it comes from the head, and not from the heart. They forget that the line must sing, always sing."⁴ Ruggles never described his compositional method, but there is one recognizable, but freely imposed principle: a pc may not repeat in a melodic line until eight to ten other pc's have intervened. Perle discusses how Ruggles achieved atonality without using serial techniques:

Ruggles employs a fairly constant circulation of all the notes of the semitonal scale. After Angels there is the self-imposed rule, applied freely and with exceptions that have their own evident logic, that within the melodic line no note is to be repeated until eight or nine have intervened. . . . Schoenberg himself has suggested that this principle of non-repetition is the source of his concept of twelve-note serial composition. Since Ruggles often tends to avoid literal motivic repetitions and, within a phrase, sometimes even the return of pairs of adjacent notes, it is impossible for a single pitch element to remain in a constant ordered relation to the remaining eleven notes.⁵

As has been discussed in the previous chapters, Ruggles's works are unified by referential cells and motivic ideas, but literal transformations of these short ideas seldom occur. Instead, these short ideas recur in ways that early linear repetitions of pc's are avoided. Thus, a combination of two elements--frequent appearances of referential ideas and the avoidance of early repetition of pc's--provides a high degree of consistency in Ruggles' music. In the conclusion of his article, Steven Gilbert states that "it was this very consistency (advantages to the analyst notwithstanding) which limited the scope and,

⁴"Season in the Sun," Newsweek, 7 February 1966, 80.

⁵Perle, "Atonality and the Twelve-Note System in the United States," 56.

in turn, the quantity of Ruggles' work."⁶

As Charles Seeger pointed out, Ruggles' music shows "a curious ratio between organization and fantasy."⁷ While unified pitch and motivic structures in Ruggles' compositions demonstrate elements of organization, the titles with visual and verbal imagery show element of fantasy. Ruggles' works bear titles such as Angels, Men and Mountains, Portals, Evocations, and Sun-treader. Men and Mountains contains a motto from the poet William Blake: "Great things are done when Men and Mountains meet." The middle movement, "Lilacs," according to Eric Salzman, "evokes Ruggles' favorite image of flowers as a creative image halfway between human aspiration and the sublimity of nature."⁸ The motto for Portals is from Walt Whitman: "What are those of the known but to ascend and enter the unknown." The title Sun-treader comes from Robert Browning's tribute to Shelley in the poem Pauline: "Sun-treader, Light and Life be thine forever."

Although Ruggles never enjoyed great public success, he always had support from his peers and patrons. Most of Ruggles' works were published with the help of his friends, including Cowell and Ives. His works were presented in ICG concerts during the 1920's, but other public performances were rare in the United States. Avant-garde music was almost neglected in 1930's until mid-1940's due to the impact of the Great Depression, conservatism, and the "American Wave" in music. The

⁶Steven Gilbert, "Carl Ruggles (1876-1971): An Appreciation," Perspectives of New Music 11 (Fall-Winter 1972): 232.

⁷Charles Seeger, "Carl Ruggles," Musical Quarterly 18 (October 1932): 589.

⁸Eric Salzman, "Carl Ruggles," HiFi Stereo Review (September 1966): 58.

renewed interest in atonal and serial music after World War II brought performances of Ruggles' as well as other avant-garde music. Organum was first performed in 1950 with the New York Philharmonic Orchestra under Leopold Stokowski. A few years later, Leonard Bernstein conducted Men and Mountains also with New York Philharmonic. Sun-treader, which was first performed in Paris in 1932, had its American premiere thirty-five years after its completion, in 1966, with the Boston Symphony Orchestra on tour in Portland, Maine.

Throughout his long musical career, Ruggles was able to achieve a steady "progression" in his music. Although there are no significant stylistic differences between his early and later works, there is a gradual decrease in the number of triadic formations in Ruggles' oeuvres, and, consequently, an increase in atonal formations culminating with Sun-treader. Sun-treader sums up the technical and stylistic development of Ruggles' music from Toys onwards. The compositional procedures used in Sun-treader are similar to those employed in the earlier works, and the handling of the main themes and motives in Sun-treader is a further extension of the techniques of motivic and thematic transformation employed in Ruggles' previous compositions. Each of the three mature works, Sun-treader, Evocations, and Organum, demonstrates a greater consistency in interval content and a more unified thematic and motivic design than any of the earlier five works. In the three mature works motivic and thematic ideas presented later in the pieces often result from transformation and variation of the ideas introduced earlier. However, the general tendency toward the more complex and dissonant music came to an end in Ruggles' last two compositions, Evocations and Organum. Evocations resembles Sun-treader in pitch

organization, motivic structure, and form, but is on a much smaller scale. In Organum, Ruggles also incorporates a simpler language of less dissonant sonorities and more step-wise melodic intervals, occasionally outlining triads in both dimensions.

Most research indicates that the innovations of the Schoenberg School had little direct influence on Ruggles' music. Whereas the atonality of the Schoenberg School launched a continuing endeavor toward "new music," Ruggles' atonal music remains an isolated occurrence in American composition. Salzman explains:

In spite of rather superficial similarities to Schoenberg, this is music that is almost impossible to locate in terms of any historical progression of influences and relationships. . . . In any case, there can be no question that Ruggles arrived at his own mode of speech independently and essentially in isolation. Ruggles' music is, of course, of his times but, in particular, it comes from no one and nowhere; further, it leads to no one.⁹

The innovations made by Schoenberg, Berg, and Webern in their atonal periods are much more profound and extensive than those of Ruggles'. For example, in Berg's Wozzeck, the technique of recurring themes at specific pitch levels affects the entire composition at the structural level as well as at the foreground level. According to Douglas Jarman, in Berg's free atonal music, as well as in his later twelve-tone music, "almost every musical parameter is affected by some kind of precompositionally determined scheme."¹⁰

In Ruggles' music, there is no elevation of the integrative

⁹Ibid., 62-63.

¹⁰Douglas Jarman, The Music of Alban Berg (Berkeley: University of California Press, 1979), 71.

element to the structural level or expansion of organizational procedures to include any musical element other than the pitch material. Ruggles' compositional approach was constant throughout his career; all of Ruggles' music manifests the principle of "organic" development of motivic and thematic ideas. Ruggles' long, jagged, and chromatic melodic lines with irregular rhythm combine to form a flexible, freely unfolding, and dissonant contrapuntal texture. This principle of development is suggested by Ruggles himself when he dismisses any "straight lines" in music saying that they are "against nature."

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