AN INNOVATIVE APPROACH TO SERIALISM:
GEORGE ROCHBERG’s TWELVE BAGATELLES FOR PIANO
AND SYMPHONY NO. 2

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the
Graduate School of The Ohio State University

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ABSTRACT

George Rochberg (1918–2005) was a leading American composer who experimented with various musical styles. Influenced by Schoenberg and Dallapiccola, Rochberg started composing serial music in the mid-1950s. However, his serial music contains more traditional elements than Schoenberg’s serial style, and this makes his music more accessible and understandable to the listener. Rochberg blended serialism with traditional styles of melodic presentation, rhythm, and formal structure.

Rochberg is more highly regarded as a composer than as a theorist, but, he did present his own theoretical ideas in a monograph, The Hexachord and Its Relation to the 12-Tone Row, which is based on the symmetric hexachordal structure of the series. It is not a well-known book, and it was criticized as unprofessional by contemporary theorists. Nevertheless it treated the theoretical aspects of music that interested him, and presented ideas that influenced his own music.
Rochberg’s first 12-tone work, *Twelve Bagatelles for Piano* (1952) follows a strict serial style, but, his later Symphony No. 2, shows a more flexible use of the row, and a more traditional sound based on his idiosyncratic construction of the 12-tone series. It focuses on how Rochberg’s serial music is made approachable to audiences because it has close connections to conventional musical idioms.

Rochberg’s music gives prominence to structurally well-organized melody. Even though he does not indicate words, such as *Hauptstimme* and *Nebenstimme*, as shown in Schoenberg’s music, Rochberg’s melodic line presents predictable phrasings and structures. Much of this study deals with exploring Rochberg’s structuring of the 12-tone series and examining his linear and vertical structures in these two representative serial works. It also reevaluates Rochberg’s position as a theorist, a composer, and a critic by examining where Rochberg’s theory comes from and how his theory influenced later composers and theorists.
ACKNOWLEDGMENTS

I wish to express my gratitude and appreciation to Dr. Lora Gingerich Dobos who is my academic advisor and teacher for her guidance, encouragement, and insight throughout my dissertation project. I would also like to thank the other members of my committee, Dr. Burdette Green and Dr. Arved Ashby for their careful reading and the critical suggestions. I owe also my deepest gratitude to my previous advisor, professor Guija Lee who cultivated my musical vision. In addition, I express my sincere thanks to all of my family and colleagues who support and encourage my goal. Finally, I acknowledge my eternal gratitude to God for guiding where I go and what I do for my entire life.
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CHAPTER 1

INTRODUCTION

1.1 An overview of the dissertation

This dissertation analyzes two serial works by George Rochberg (1918–2005) composed during his “Schoenberg period (1952–1956).”¹ During this period, Rochberg started composing serial music using strict classical dodecaphonic techniques and later followed a more independent path, which was more tonally oriented. This is an interesting period because while using 12-tone compositional techniques, Rochberg’s music still reflects some traditional elements in the melodic line, rhythm, and formal structure. Rochberg himself acknowledges the influence of tradition on his modern style, writing that

“the language is contemporary but the adherence to concepts of logic of musical discourse is traditional.”

The works composed during this period included *Twelve Bagatelles for Piano* (1952), Chamber Symphony for Nine Instruments (1953), *Duo Concertante* for violin and cello (1955, revised 1959 for publication), the Second Symphony (1955-56), and the *Sonata-Fantasia* for piano (1956). Several of these serial works include quotations from preexisting sources. In his Chamber Symphony for Nine Instruments (1953), which is known as first large-scale instrumental work using a 12-tone series, Rochberg consciously quoted the Fratello motif from Dallapiccola’s *Il Prigionero*. His *Sonata-Fantasia* (1956) also shows quoted parts from Schoenberg’s *Five Piano Pieces Op. 23*, No. 1.

Of serial works listed above, two of the works that do not include quotations -- *Twelve Bagatelles* for Piano and Symphony No. 2 -- will be thoroughly analyzed in this

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3 Ibid., 64.
dissertation. Since Rochberg employed a complete 12-tone series for the first time in his *Twelve Bagatelles* for Piano, it is a good starting point to investigate his serial music. As one of the most popular pieces of Rochberg, the Bagatelles are regarded as “his first full-fledged dodecaphonic venture.” It combines “Schoenbergian passion and irony with Webernian asceticism and conciseness.” These twelve short pieces also show the influence of Beethoven’s Bagatelles in that they present contrasting characters, moods, and expressionistic images within a short duration. Even though he experimented with the serial idea melodically in his Symphony No. 1 (1948-49, three-movement version), he did not completely utilize a 12-tone series until he wrote the *Bagatelles*. Composed four years later, Rochberg’s Symphony No. 2 was written in a more flexible and mature serial style that Alexander Ringer called “post twelve-tone” composition. The 12-tone technique is less strict, and reflects Rochberg’s own theoretical understanding of 12-tone combinatoriality as well as the influence of Schoenberg’s late serial works. Thus, the *Twelve Bagatelles for Piano*

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[^5]: Ringer, 412.
[^7]: Ibid., 233.
and Symphony No. 2 are representative of two different stages in Rochberg’s serial musical style.

Several existing studies on the two compositions have been investigated; however, these existing studies focus on performance issues. Research that includes analytical or theoretical information is limited. Steven Jones presents a descriptive analysis of Rochberg’s *Twelve Bagatelles for Piano* in the melody, harmony, rhythm, meter, texture, density, and register. He also shows how rows or row segments are used in each piece.\(^8\) Joan Dixon analyzes Rochberg’s two piano works, *Twelve Bagatelles for Piano* and *Sonata-Fantasia*. Her work focuses on the many performance guidelines Rochberg includes by analyzing character indications, articulations, and pedaling.\(^9\) These two works are valuable sources because they include compositional background for the music as revealed in personal interviews with Rochberg. Elmer Kudo analyzed Symphony No. 2 by investigating the structure of the 12-tone series using

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\(^9\) Dixon, “The Twelve Bagatelles and Sonata-Fantasia of George Rochberg: A Performer’s Analysis.”
Allen Forte’s set theory and by showing how each segment of the series is used in the piece.\textsuperscript{10}

However, no one has explored Rochberg’s serial music from the perspective of the relationship with the traditional elements, using modern analytical tools. Even though both pieces were composed using a 12-tone series, they still contain traditional elements in pitch materials as well as in non-pitch materials, such as rhythm, form and melodic structure.

Joseph Straus defines six characteristics, which can be found in traditional tonal music: key, key relations, diatonic scales, triads, functional harmony, and voice leading. He shows how these elements are present in post-tonal music in nontraditional ways. For example, focusing on a particular pitch or harmony in a post-tonal work can create a sense of centricity, which substitutes for key or key relations in traditional music. Even though there is no priority of pitches in atonal music, centering particular pitches can give a sense of tonic function. The use of common pitch collections including diatonic, octatonic, hexatonic, and whole tone scales, without

traditional voice-leading or functional harmony, is also a way of incorporating traditional elements into an atonal work.\textsuperscript{11}

In addition to aspects related to pitch, non-pitch materials of traditional music, such as phrasing, form, and rhythmic structure can be incorporated into post-tonal musical style. Therefore, this study attempts to find traces of these traditional elements in Rochberg’s serial music.

I will utilize several recent analytic techniques in investigating Rochberg’s serial music in this dissertation. The structure of the 12-tone series and the harmonic space will be examined using Allen Forte’s set theory, David Lewin’s transformational theory, and Rochberg’s own unique approach to inversional combinatoriality. Because Rochberg thought that the main difference between his music and that of other serialists was that his 12-tone music had a melodic line, it is important to examine Rochberg’s melodies.\textsuperscript{12} I will analyze the contour structure of representative melodic lines, using the analytical methods

\footnotesize
\textsuperscript{11} Joseph Straus, \textit{Introduction to Post-Tonal Theory} (3\textsuperscript{rd} ed., New Jersey: Prentice Hall, 2005), 130.
developed by Elizabeth Marvin and Robert Morris. This will be a new approach to exploring Rochberg’s serial music.

Chapter one of this dissertation presents a brief biography of the composer, his serial music in the 1950s, and his activities as a critic and a theorist. Chapter two provides an overview of American 12-tone theory, introduces Rochberg’s theoretical idea of “mirror inversion,” discusses his position as a theorist, and evaluates his theory. Chapter three presents basic approaches to the two selected works by investigating the compositional background, the structure of the series, and Rochberg’s treatment of the series. Chapter four examines how Rochberg’s serial music is blended with traditional elements in the form, melodic line, harmony, and texture. Chapter five provides a discussion of how Rochberg’s traditional biases penetrate his serial music. Comparing his serial language in the two compositions, I will determine if different traditional materials are present in these two works.
1. 2 Serial influences in the 1950s

In 1950, Rochberg won the American Rome Prize and was awarded a Fulbright Fellowship. He spent the following year in Italy where he met Dallapiccola, and was attracted by the power of his serial music. During a telephone interview with David Lawrence, recalling Dallapiccola, Rochberg said,

when I had the chance to meet him it corroborated, stimulated the decision I had made while in Rome to go in the direction of twelve-tone. I had been struggling with the question for three years prior. Starting about 1947 I began to realize that I couldn’t go on the way I was going. So that was a period of real soul searching, very intense study, hard work, digging in all kinds of directions, overcoming all kinds of doubt.\textsuperscript{13}

In the mid-1950s, Rochberg focused on investigating the unique construction of a specific collection of hexachords and how these hexachords combine to produce a 12-tone series, which Rochberg calls “mirror inversion.”

\textsuperscript{13} David Alan Lawrence, “A Conductor’s Study of George Rochberg’s Three Psalm Settings” (DMA diss., The Louisiana State University, 2002), 6.
During this period of the middle fifties I was completely preoccupied with unlocking the musical possibilities of the hexachord (a specific structure inherent in the twelve-tone method) in a thoroughly expressive fashion.\textsuperscript{14}

As Schoenberg developed his late serial style based on hexachordal combinatoriality, Rochberg traced a similar trajectory exploring inversional combinatoriality in his own idiosyncratic way. Thus, the evolution of Rochberg’s serial music is similar to Schoenberg’s.

From the late 1940s to the early 1950s, Rochberg seemed destined to be surrounded by serial music. He was a student of Adolph Weiss, who was known as Schoenberg’s first official American student. Moreover, his association with Luigi Dallapiccola (1904–1975) in Italy in 1951 moved him to start composing serial music.

I had begun to study Schoenberg with considerable intensity [ca. 1947] and it was from the very beginning a love-hate relationship (very ambivalent). But I realized that his was a powerful mind and an enormous musical brain, and it didn’t matter to me whether I liked it or not, I had to find out what was there, [and] how it was made (13 November 1982).\textsuperscript{15}

\textsuperscript{14} Dixon, George Rochberg: A Bio-Bibliographic Guide to His Life and Works, 79.
\textsuperscript{15} Ibid., xxiii.
Rochberg stated that the serial music of the generation after Schoenberg was not characterized as lyrical and therefore, not as easily sung as Schoenberg’s 12-tone melody. Indeed, Rochberg’s Symphony No. 2 has long melodic lines which can be easily perceived by the ear, and the phrase structure of his thematic materials is well-organized. At the same time, Rochberg tried to turn back to earlier musical styles for inspiration and searched for new ways to combine seemingly unrelated materials. Thus, Rochberg’s early serial music followed the classic Schoenbergian model, but his late serial music was in a freer format with a more tonal sound.

1. 3 The biography of George Rochberg

George Rochberg was born on July 5, 1918 in Paterson, New Jersey. He attended the Mannes School of Music in New York in 1939 and studied counterpoint and composition with Hans Weisse, Leopold Mannes, and George Szell. He said that the most profound influence on his early career was

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Johannes Brahms until he was about nineteen or twenty.¹⁷ During 1942 to 1944, he served in the military in France as a second lieutenant. His creative activity did not stop during World War II when he served in the army. Rochberg composed the 261st Infantry Song in November 1943 and March of the Halberds in December 1943. After he was discharged from the army in July 1945, he continued studying composition with Rossario Scalero and Gian Carlo Menotti at the Curtis Institute in Philadelphia where he received a bachelor’s degree in 1947. He earned a master’s degree from the University of Pennsylvania in 1948, and joined the faculty of Curtis from 1948 to 1954.¹⁸

Rochberg’s music can be divided into several periods according to his stylistic changes. The first period, which took place from the late 1940s to the very early 1950s, was influenced by Hindemith, Bartok and Stravinsky. He composed the Night Music for orchestra (1949) that led to him winning the George Gershwin Memorial Award in 1952. This piece became the second movement of his First Symphony. He also composed the First String Quartet (1950--------

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52), which Ringer calls post-Bartokian chamber music.\textsuperscript{19}

During an interview with Richard Dufallo, Rochberg said,

one of the most powerful impulses toward twelve-tone, serialism, whatever you want to call it, was my reaction to my war experience which began to take over after the war.\textsuperscript{20}

Rochberg’s second period, which will be examined in this dissertation, began in 1952 with the enthusiasm of trying a new musical language. During this period, Donald Martino at Harvard University, Mel Powell at Yale University and Roger Sessions and Milton Babbitt at Princeton University were distinguished 12-tone composers in academic positions.\textsuperscript{21} Rochberg’s second period was a time to follow the music of the second Viennese composers and at the same time, to start to borrow existing material from works by other composers or himself.

In the early 1960s, Rochberg’s compositional mind was constantly changing. He was not satisfied by the limitations of expressivity of strict 12-tone music. He

found himself composing serial music by day and playing
tonal music, which is obsessed by the past, at night.\(^22\) In
addition, his talented son, Paul, died from brain cancer in
1964. Rochberg struggled to express his personal tragedy
through his music; however, he found that the serialism
that had inspired his early musical career was an “empty
and meaningless” language to depict his sorrow.\(^23\) Rochberg
said that “after Paul died, that absolutely made it
necessary for me to wash my hands of the whole thing
[serialism].”\(^24\) Therefore, he abandoned serialism and
started to experiment with the integration of an atonal
language with tonal practice in his music.

In addition to his personal experience, Rochberg’s
stylistic change is influenced by historical issues in 20\(^{th}\)-
century music. After World War II, the European composers
who were associated with the Darmstadt New Music Summer
School had experimented with a more advanced serial
compositional technique, total serialism. Pierre Boulez
(b. 1925), Karlheinz Stockhausen (b. 1928), and Luciano

\(^{22}\) Steven Linsay Bannerman, “George Rochberg: The Basis
and Evolution of His Aesthetics” (M.M. Thesis, University
of Miami, 1982), 40.

\(^{23}\) Michael Linton, “George Rochberg’s Revolution” First
Things 84 (June/July 1998)
http://www.firstthings.com/ftissues/ft9806/opinion/linton.html
(accessed October 18, 2005).

\(^{24}\) Dixon, George Rochberg: A Bio-Bibliographic Guide to
His Life and Works, xxiv.
Berio (1925-2003) were active composers who were associated with the Darmstadt School. The development of serial music in America started with Babbitt’s *Three Compositions for Piano* (1947), which is known as the earliest work exhibiting total serialism. European influences accelerated the development of serial music in America, and Rochberg naturally joined other American composers in exploring this new language.

However, disillusioned with serialism and its difficulty for performers in the 1960s, Rochberg developed a new compositional style that connected with existing musical materials. As a result, Rochberg’s third period started in the mid-1960s.

In 1965, Rochberg composed the chamber work *Contra Mortem et Tempus*, which used a collage procedure borrowing fragments of earlier music. In *Nach Bach*, a fantasia for Harpsichord or Piano, written in 1966, Rochberg used sources from Bach’s *Partita* No. 6 in e minor and other works, establishing his new musical style, collage technique.²⁵

Rochberg’s music of the 1970s is regarded as “multiple-gesture,” involving juxtaposition of various

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sections. His Third String Quartet (1973), known as the first work of “the time of turning,” was written in the styles of Beethoven and Mahler juxtaposed with sections of atonal music.\textsuperscript{26}

In 1974, Rochberg composed his Violin Concerto, premiered by Isaac Stern with the Pittsburgh Symphony. He mentions that he tried to work out of the tradition of the violin concerto, which began with Mozart and continued through Bartok and Schoenberg.\textsuperscript{27}

Rochberg’s music appealed to a large variety of listeners and performers in the 1970s and 80s. His violin concerto was performed 47 times between 1975 and 1977, and in 1986, his symphony No. 5 was premiered by the Chicago Symphony Orchestra under Sir Georg Solti.\textsuperscript{28} In his subsequent works, Rochberg continued to combine tonal and atonal languages with quotations and collage techniques.

He published approximately 100 works including 6 symphonies and 7 string quartets. In particular, his seven string quartets occupy an important position in the American chamber music repertoire. He also worked as a

\textsuperscript{26} Ibid., 141-42.
\textsuperscript{27} Ibid., 69.
director of publications as well as an editor for Theodore Presser Co., and served at the University of Pennsylvania as chairman of the music department in 1960–1968. He was invited to be a guest composer at many music colleges until he retired in 1983. He died in Bryn Mawr Hospital, Philadelphia, on May 29, 2005, at the age of 86.

1.4 Rochberg as a music theorist and critic

Rochberg established his reputation as a writer as well as a composer, publishing numerous articles and reviews. He addressed a variety of topics including aesthetics, reviews of other composers’ works, theory, and criticism. He is the author of The Hexachord and Its Relation to the 12-tone Row (1955). This book deals with his own construction, which he calls a “hexachordal mirror inversion.” The concept of this book will be discussed in detail later. Rochberg wrote other articles, such as, “The Harmonic Tendency of the Hexachord”\(^{29}\) and “Webern’s Search

for Harmonic Identity."³⁰ Thus, he was involved with 12-tone music both as composer and theorist.

Even though the 12-tone language occupied a big part of his compositional career in the 1950s, Rochberg pointed out some of the problems associated with serial music during a 1976 interview with Guy Freedman. According to Rochberg, music which cannot be remembered is not accessible to a listener’s consciousness and is against nature.³¹

The music after 1900 grows more and more difficult – if not impossible – to remember: Schoenberg, Webern, Berg. I doubt, with the exception of a few musicians, that very many people can sing the first two measures of any aria from Wozzeck, let alone the opening of Schoenberg’s Violin Concerto or 4th Quartet. Finally, there is a last category which I call “forgettable” music – more recent music which is so impossible to remember that even if you spend hours at it nothing leaps from the score into the ear. It may leap to the eye, but never the ear.³²

William Bolcom collected selected essays written by Rochberg and published a book titled The Aesthetics of Survival: A Composer’s View of Twentieth-Century Music in

³² Ibid., 14.
In this book, Rochberg describes the notion of pluralism combining gestures, language, and style -- as used in his Third String Quartet, and says that “pluralism does not mean a simplistic array of different things somehow stuck together in arbitrary fashion but a way of seeing new possibilities of relationships; of discovering and uncovering hidden connections and working with them structurally.” Thus, Rochberg advocates a stylistic pluralism in music and labels this new approach *ars combinatoria*, and believes that “music can be renewed by regaining contact with the tradition and means of the past.”

The term, “postmodernism” is impossible to define in one sentence because it has several meanings depending on which area of art is applied. Jonathan Kramer summarizes the characteristics of postmodern music: “it is not simply repudiation of modernism or its continuation, but has aspects of both a break and an extension.” It includes quotations from many traditions, fragmentations, and discontinuities, presenting multiple meanings. Thus, it

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34 Ibid., 241.
ignores boundaries between sonorities of the past and of the present.\footnote{36}

In the 1960s, after Rochberg turned his compositional style away from serialism toward a multi-gesture style incorporating quotations and collage technique, many American composers such as David Del Tredici, John Corigliano, William Bolcom, and Jacob Druckman followed his lead and also started to compose using pre-existing materials.

Even though this revolution was not exclusively Rochberg’s, he showed leadership in turning away from the dominant academic compositional technique, serialism, to pursue a new, more independent direction, despite many arguments and critics. His musical style was divided into several periods by researchers; however, his music was not tied up with one particular style during each period. As an open-minded and an imaginative composer, Rochberg was always ready to move on to something new in his mind, and unconsciously reflected his experimental nature in his music.

CHAPTER 2

ROCHBERG’S THEORY OF 12-TONE MUSIC

After Schoenberg came to the United States in 1933, his teaching and compositional activities caused an increase in the performance and composition of 12-tone music. Before World War II, American 12-tone composers included George Perle (b. 1915), Ben Weber (1916–1979), and Milton Babbitt (b. 1916). After the war, young composers, such as Robert Erickson (1917–1997), Richard Maxfield (1927–1969), and George Rochberg joined this community. Many young American composers were influenced by Schoenberg’s music and thought, and often experimented with composing 12-tone music.

Rochberg also wrote a theoretical book about the hexachordal construction of 12-tone series, whose content

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is not well recognized publicly. However, his interest in 12-tone music goes beyond a curious attempt to compose in a new language, because his theoretical ideas are directly reflected in his later music.

In this Chapter, I will provide an overview of American 12-tone theory and will investigate where Rochberg’s theoretical understanding came from and what led to the next generation of theorists. I will also discuss Rochberg’s theory book and evaluate how influential his theory was in the history of American 12-tone theory.

2. 1 An overview of American 12-tone theory

Many influential documents on 12-tone music were written by American composers and theorists both before and after Schoenberg presented the essay, “Composition with Twelve-tones.” Before Schoenberg’s article, a pioneering English-language study, Richard Hill’s article “Schoenberg’s tone-rows and the tonal system of the

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38 This essay was given in a lecture at Princeton University in 1941, but it was published in English version in 1950, titled Style and Idea.
future," was published in 1936. Rochberg seems to be influenced by this article because Hill used the same terminology, "mirror inversion," but Hill also called an inverted series "crab inversion." Even though Hill did not extend his idea any further, his article deals with the hexachordal construction of Schoenberg’s music in the 1930s.

<table>
<thead>
<tr>
<th>Prime</th>
<th>d#</th>
<th>g</th>
<th>f#</th>
<th>a#</th>
<th>d</th>
<th>b</th>
<th>c</th>
<th>a</th>
<th>g#</th>
<th>e</th>
<th>f</th>
<th>c#</th>
</tr>
</thead>
<tbody>
<tr>
<td>up 1 step</td>
<td>e</td>
<td>g#</td>
<td>g</td>
<td>b</td>
<td>d#</td>
<td>c</td>
<td>c#</td>
<td>a#</td>
<td>a</td>
<td>f</td>
<td>f#</td>
<td>d</td>
</tr>
<tr>
<td>up 2 steps</td>
<td>f</td>
<td>a</td>
<td>g#</td>
<td>c</td>
<td>e</td>
<td>c#</td>
<td>d</td>
<td>b</td>
<td>a#</td>
<td>f#</td>
<td>g</td>
<td>d#</td>
</tr>
<tr>
<td>up 3 steps</td>
<td>f#</td>
<td>a#</td>
<td>a</td>
<td>c#</td>
<td>f</td>
<td>d</td>
<td>d#</td>
<td>c</td>
<td>b</td>
<td>g</td>
<td>g#</td>
<td>e</td>
</tr>
<tr>
<td>up 4 steps</td>
<td>g</td>
<td>b</td>
<td>a#</td>
<td>d</td>
<td>f#</td>
<td>d#</td>
<td>e</td>
<td>c#</td>
<td>c</td>
<td>g#</td>
<td>a</td>
<td>f</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mirror</th>
<th>a#</th>
<th>f#</th>
<th>g</th>
<th>d#</th>
<th>b</th>
<th>d</th>
<th>c#</th>
<th>e</th>
<th>f</th>
<th>a</th>
<th>g#</th>
<th>c</th>
</tr>
</thead>
</table>

Figure 2.1. Richard Hill’s description of the mirror and transpositions.

Figure 2.1 shows several transpositions of the series, and the numbers above and below letters indicate the number of half steps between two pitches. Hill shows the pitch

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40 Ibid., 25.
41 Ibid., 26.
intervals using brackets, instead of + or – signs, to explain the shape of inverted form. The numbers in brackets present ascending intervals, and unbracketed numbers are descending. The Prime row and Mirror are retrograde combinatorial, that is, the first hexachord of the prime and the first hexachord of the mirror inversion share the same pitch content, but in a different order. He understood the concept of retrograde-relate combinatoriality because he used a terminology, a “cross-related hexachord.” Hill gave no information about an aggregate between the first hexachord of the prime and the second hexachord of the inversion. However, he understood how Schoenberg utilized the row melodically as well as harmonically in his music from Op. 23 to Op. 35. Hill organized Schoenberg’s music into several categories based on the treatment of contrapuntal and harmonic groupings in the rows. According to Hill, Schoenberg’s row is not a theme; instead, it contains many motivic and rhythmic configurations, so it is important to understand the

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segmentation and combination of the series in the melody and harmony.\footnote{Hill, “Schoenberg’s Tone-rows and the Tonal System of the Future,” 27-8.}

This is a very early stage of serial theory, and it does not use any sophisticated numeric notation. However, Hill analyzes the treatment of rows in Schoenberg’s music composed from 1923 to 1930, which includes a hexachordal division. For his part, Rochberg mainly selects Schoenberg’s late serial works (Op. 25, Op. 42, Op. 45, and Op. 47) in order to explain the hexachordal construction of the series in his book.

Ernest Krenek was next to publish a work about the 12-tone system in his book, \textit{Studies in Counterpoint: Based on the Twelve-Tone Technique} in 1940. As an Austrian-American composer, Krenek mentions that Schoenberg wants to show a \textit{unifying idea}, which produces all the other ideas and regulates their accompaniment and the chords, the ‘harmonies’ in his 12-tone music.\footnote{Ernest Krenek, \textit{Studies in Counterpoint: Based on the Twelve-Tone Technique} (New York: G. Schirmer, Inc., 1940), vii.}

As a way of approaching a 12-tone technique, Krenek uses counterpoint in both two-parts and three-parts, using all forms of the series. He starts with the classification of consonances, mild dissonances, and sharp dissonances
based on the degree of the tension, and introduces how to compose using two-parts. It is interesting that he regulates the second voice with specific rules, such as avoiding parallel motion or the octave as in the 16th-century counterpoint. In addition, when he discusses three-part writing, he also divides the vertical sounds into consonant (cons.), mild (m.), and sharp (sh.) chords according to the tension-degrees of chords. Example 2.1 is Krenek’s way of presenting all possible chords which contain perfect fourths. Each chord can have various nuances according to its spacing and position. Krenek classifies the chord qualities based on his interval classifications. For example, the first chord in Example 2.1, contains a sharp dissonance (C-D⁵) and the second chord contains a mild dissonance (C-D) within the intervals of five semitones (perfect fourth).

![Example 2.1. Krenek’s classification based on the tension-degrees of chords.](image)

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46 Ibid., 20.
Krenek presents a symmetrical arrangement of the aggregate shown in Example 2.2. Rochberg will show the same symmetrical arrangement of the aggregate later, but with a totally different meaning.

Example 2.2. Krenek’s symmetric arrangement of 12-tone aggregate in *Variations for Piano*, Op. 79.  

Example 2.2 presents how Krenek uses this 12-tone series in his *Variations for Piano*, Op. 79. In the first variation, he selects two original series beginning on F# and G, and the second variation is based on the series beginning on G# and F. That is, the original series in the first variation, P_{11} and P_0 are transposed to P_{10} and P_1. This diagram shows the symmetric arrangement of the series according to the order used in each variation. It is uncertain if this formal idea was influential in Rochberg’s symmetric design of hexachordal construction. However,

\[47\] Ibid., 34.
Krenek shows the same diagram in his book as Rochberg did later, and Rochberg very likely studied Krenek’s work.

Krenek approaches a 12-tone compositional technique in a different way from Schoenberg because he still keeps the boundary of traditional compositional restrictions. In the presentation of a 12-tone harmony, he did not show different collections beyond trichords, only presenting methods for 2-part and 3-part writing.

Milton Babbitt is a critical figure in the history of American serial music. He introduces new terminology, using prime, combinatoriality, and aggregate. His article “Some Aspects of Twelve-tone Composition” (1955) deals with the six “all-combinatorial” source sets as shown in Figure 2.2.

1) C-C#-D-D#-E-F  F#-G-G#-A-A#-B
2) C-D-D#-E-F-G  F#-G#-A-A#-B-C#
3) C-D-E-F-G-A  F#-G#-A#-B-C#-D#
4) C-C#-D-F#-G-G#  D#-E-F-A-A#-B
5) C-C#-E-F-G#-A  D-D#-F#-G-A#-B
6) C-D-E-F#-G#-A#  C#-D#-F-G-A-B

Figure 2.2. Babbitt’s six source sets. 48

48 Babbitt, 57.
Babbitt mentions that the first three sets are termed “first order” sets because they have only one transpositional interval. The fourth set, regarded as the “second order,” has two transpositional intervals. The fifth set and the sixth set are called the third and the fourth order, respectively. The hexachord, used in Rochberg’s Symphony No. 2, is the same set type as Babbitt’s fourth order set.

In addition to many theoretical achievements explaining 12-tone compositional techniques, Babbitt also composed many serial pieces, showing mathematically integrated techniques. Thus, various musical parameters such as rhythm, articulation, dynamics as well as pitch materials are controlled in his music. In his song cycle Du, composed in 1951, Babbitt presents a new compositional idea. Instead of using the 12-tone series in order, Babbitt focuses on trichordal arrays, manipulating the trichords serially rather than the individual pitch-classes. Straus says this idea represents “a synthesis of Schoenберgian combinatoriality and Webernian derivation.”

49 Ibid., 58.
50 Straus, *Introduction to Post-tonal Theory*, 204.
Therefore, Babbitt introduces an idea of serialism that extends beyond the music of Schoenberg and Webern.

George Perle examines the harmonic aspect of 12-tone music more specifically. He discusses weaknesses in Schoenberg’s 12-tone harmony, because the original numbering becomes unclear when the pitches are verticalized. In addition, the chords with nonadjacent pitches are not necessarily related to the original row. Perle also includes a table, as shown in Figure 2.3, which shows the number of chords of every cardinality. It shows many more chords than Forte’s pitch-class set list created in 1973,\(^{51}\) because Perle included zero-note, one-note, two-note, 10-note, 11-note, and 12-note chords in his 12-tone chord list. He added these collections in order to show a “mathematical completeness.”\(^{52}\) It is interesting that Perle used terminologies of three-note chord or four-note chord because he did not use terminologies of trichord or tetrachord yet. In addition, Perle’s list of pitch-class collections does not yet include prime forms or interval vectors of the collections.


<table>
<thead>
<tr>
<th>1 zero-note &quot;chord&quot;</th>
<th>1 twelve-note chord</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 one-note &quot;chord&quot;</td>
<td>1 eleven-note chord</td>
</tr>
<tr>
<td>6 two-note chords</td>
<td>6 ten-note chords</td>
</tr>
<tr>
<td>12 three-note chords</td>
<td>12 nine-note chords</td>
</tr>
<tr>
<td>29 four-note chords</td>
<td>29 eight-note chords</td>
</tr>
<tr>
<td>38 five-note chords</td>
<td>38 seven-note chords</td>
</tr>
<tr>
<td><strong>50 six-note chords</strong></td>
<td></td>
</tr>
</tbody>
</table>

Figure 2.3. Perle’s possible chords in 12-tone music.\(^{53}\)

In 1955 Rochberg wrote a short textbook, *The Hexachord and Its Relation to the Twelve-Tone Row*, which is dedicated to the memory of Schoenberg. It is the first book on 12-tone music published by an American firm since G. Schirmer issued Krenek’s *Studies in Counterpoint* in 1940.\(^{54}\) It was written from a composer’s perspective rather than a theorist’s perspective, because he did not follow the standard terminologies of a majority of theorists. Rochberg did not refer to any textbooks or journal articles written by other theorists, and independently described his

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\(^{53}\) Ibid., 110.

own thinking about the hexachordal construction of the 12-tone series. The book is not well-known to later American theorists when we look for any quotations or references in their works. Although Rochberg’s work seems to be outside the mainstream, it is a valuable starting point for dealing with a specific kind of symmetric structure in the 12-tone series in the book and in his compositions.

2.2 Rochberg’s 12-tone theory

In *The Hexachord and Its Relation to the Twelve-Tone Row*, Rochberg discusses the row constructions in four of Schoenberg’s 12-tone compositions: *Suite for Piano* Op. 25, *Phantasy for Violin and Piano*, Op. 47, *String Quartet* No. 4, Op. 37, and *Piano Concerto*, Op. 42, and explains his concept of mirror inversion. He follows the essential ideas of Schoenberg, but, he does not use the same terminology. For example, Rochberg starts by examining the “interchangeability of hexachordal groups and invertibility of hexachords resulting in the production of six new
notes," which are the basic principles to create what he calls "mirror inversion."

According to Rochberg, a mirror inversion is a uniquely arranged type of 12-tone row. As shown in Example 2.3, the second hexachord of the original (O) will be arranged with mirror form in the first hexachord of inversion (I). There are no duplicating notes between the first hexachords of each series.

Example 2.3. Rochberg's interchangeability and invertibility of two hexachords.

In order to make a mirror inversion, Rochberg makes three observations:

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1. The I occurs at the enharmonic fourth above the O (could be fifth below without changing character of I) and produces six new notes.
2. O (a) and I (b) contain identical tones but express them in different order.
3. I (a) and O (b) contain identical tones also expressing them in different order.\textsuperscript{56}

Example 2.4 shows the process of creating a mirror inversion. The fourth note, G in hexachord O(b) becomes the first pitch in hexachord I(a), which is at the perfect fifth below. The six notes in hexachord I(a) are arranged by a mirror form.

Example 2.4. The process of making mirror inversion.

Thus, O (a) and I (a) will create an aggregate and at the same time, are related by inversion. This is the same

\textsuperscript{56} Ibid., 2.
concept of Schonberg’s inversionsal *combinatoriality* in that O (b) and I (a) have different orderings but share the same content of notes; however, Rochberg does not mention this word. When we examine Forte’s list of set classes, the set class 6-5 (012367), which is the hexachordal segmentation of the 12-tone series in Example 2.4, has one R-combinatorial (all hexachords are R-combinatorial) and one I-combinatorial hexachord. That is, any hexachord, which has an I-combinatorial hexachord, can create a mirror inversion. In Forte’s list, there are 19 hexachords that are I-combinatorial, and in particular, set class 6-7 (012678) and set class 6-30 (013679) are I-combinatorial in two different ways and allow two different inversionsal centers. Additionally, set class 6-20 (014589), which is the basis of Rochberg’s Symphony No. 2, has three I-combinatorial inversionsal centers, and set class 6-35 (02468T), which is a whole-tone scale, has six I-combinatorial inversionsal centers.\(^{57}\)

According to Rochberg’s explanation, a mirror inversion is made when each of the opposite hexachordal groups is interchangeable and invertible without duplicating notes. He observes that the mirror inversion occurs at a perfect fourth above or a perfect fifth below

\(^{57}\) Forte, 179-81.
the original, which is somehow related to Hill, so he tries to find any other intervals for creating a mirror inversion. In order to check this hypothesis, Rochberg suggests that we examine the vertical sonority and melodic aspects of the hexachord.

Example 2.5. Vertical arrangement of the first hexachordal groups.\textsuperscript{58}

Rochberg instructs us to arrange the six pairs of notes from each hexachord vertically (See Example 2.5), so that six different kinds of intervals appear. Arranging the intervals from minor second to major seventh, a series of expanding intervals emerges. Melodically one line is ascending (B–E) and the other is descending (A#–F) as shown in Example 2.6.

\textsuperscript{58} Ibid., 5.
Example 2.6. Melodic arrangement of hexachordal groups.\(^{59}\)

The two diverging lines each span the interval of a fourth (he permits the enharmonic equivalent) as shown in Example 2.7.\(^{60}\)

Example 2.7. Diverging lines each spanning an interval of a fourth.

\(^{59}\) Ibid., 5.  
\(^{60}\) Ibid., 6.
Rochberg refers to these chromatic series as *chromatic tetrachords* which have six notes, and to the expanding interval series as the *tetrachordal series*. However, Rochberg’s terminology has not influenced modern understanding. In modern understanding, a tetrachord is known as a series or collection of four notes, and not as a chromatically filed fourth. Clearly, Rochberg’s terminology is outside of the mainstream.

From the observation of the tetrachordal series, Rochberg posits two possible hypotheses:

(1) Mirror inversion is operative in any hexachord provided each tone of 0 is one member of each of the intervals of an expanding tetrachordal series.
(2) Mirror inversion will result only when the selected point of inversion does not produce duplications of notes. \(^{61}\)

It is easy to construct rows that will exhibit a mirror inversion if you start with Rochberg’s tetrachordal series. However, the construction of mirror inversion using a random hexachord without reference to the tetrachordal series is much more complicated. Rochberg said that only trial and error can enable us to find the point of

\(^{61}\) Ibid., pp. 6-8.
inversion and this is the method that composers used who did not know the series of expanding intervals.\textsuperscript{62}

Rochberg makes an interval chart to build a mirror inversion in random hexachords. First, Rochberg examines intervals that allow mirror inversion to take place. Minor second, minor third, fourth (octave inversion of fifth), fifth (octave inversion of fourth), major sixth (octave inversion of minor third), major seventh (octave inversion of minor second), and minor ninth (extension by an octave of minor second) are intervals able to create mirror inversion. On the other hand, major second, major third, augmented fourth (tritone), diminished fifth (tritone), minor sixth (octave inversion of major third), minor seventh (octave inversion of major second), and major ninth (extension by an octave of major second) are intervals that do not allow mirror inversion to take place.\textsuperscript{63}

Then, Rochberg classifies the traditional intervals in pitch-class space according to the number of semitones contained in these intervals. In conclusion, only odd numbered pitch-class intervals \((1, 3, 5, 7, 9, 11)\), which are points of inversion, can create the mirror inversion, which seems obvious to present-day theorists. Figure 2.4

\textsuperscript{62} Ibid., 17.
\textsuperscript{63} Ibid., 13-14.
shows the classification of intervals created by the number of semitones.

<table>
<thead>
<tr>
<th>Classification of Traditional Interval</th>
<th>Semitone Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>unison (or prime)</td>
<td>0 (zero)</td>
</tr>
<tr>
<td>minor second</td>
<td>1</td>
</tr>
<tr>
<td>major second</td>
<td>2</td>
</tr>
<tr>
<td>minor third</td>
<td>3</td>
</tr>
<tr>
<td>major third</td>
<td>4</td>
</tr>
<tr>
<td>perfect (?) fourth</td>
<td>5</td>
</tr>
<tr>
<td>augmented fourth</td>
<td>6</td>
</tr>
<tr>
<td>diminished fifth</td>
<td>6</td>
</tr>
<tr>
<td>perfect fifth</td>
<td>7</td>
</tr>
<tr>
<td>augmented fifth</td>
<td>8</td>
</tr>
<tr>
<td>minor sixth</td>
<td>8</td>
</tr>
<tr>
<td>major sixth</td>
<td>9</td>
</tr>
<tr>
<td>minor seventh</td>
<td>10</td>
</tr>
<tr>
<td>major seventh</td>
<td>11</td>
</tr>
<tr>
<td>octave</td>
<td>12</td>
</tr>
</tbody>
</table>

Figure 2.4. Rochberg’s semitone classification.\textsuperscript{64}

When Rochberg explains the intervals in the hexachord, he mentions the numerical notation with + or – signs; that is, the first note of the hexachord is a reference whose interval number is always 0. Upward from the reference notes presents a positive interval, downward a negative

\textsuperscript{64} Ibid., p. 23.
This concept of interval is the same as ordered pitch intervals, which shows the contour of the line in our current understanding.

In his review of Rochberg’s book, George Perle mentioned that Rochberg thought he was the first to use this numerical notation; however, Babbitt used this notation in his unpublished study, *The Function of Set Structure in the Twelve-Tone System* (1946). Perle also criticized Rochberg for not mentioning the compositional function of the hexachordal row, the possibility of other partitioning in the 12-tone row, or operations other than mirror inversion in connection with the hexachordal row.  

Richard Hill also mentioned that Rochberg’s “funnel-like schema” presents the underlying phenomena in designing the 12-tone series; however, it is meaningless if he does not show some musical significance. Hill uses a term, cross-related hexachord, so he too might have been unaware of Babbitt’s concept of combinatoriality.

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65 Ibid., p. 24.
Rochberg specifically focused on mirror inversion and 12-tone hexachordal construction. However, in spite of its limited subject matter, Rochberg’s *The Hexachord and Its Relation to the Twelve-Tone Row* is meaningful in that the idea of mirror inversion directly influenced his next composition, Symphony No. 2. Moreover, Rochberg already had an idea of mirror inversion in *Three Psalms for a cappella Mixed Chorus*, composed in 1954. In this piece, Rochberg used a whole-tone collection, the set class 6-35 (02468T), reordering some pitches of each hexachord instead of using a new row derived from mirror inversion. Even though Rochberg did not mention the concept of mirror inversion in this piece, a symmetric design in the construction of the row was already in his mind. He mentions that this symmetric construction existed in nature as well as in music as a “high form of integration,” so it is a natural phenomenon, which can be perceived outside of music.

In his article written in 1959, “The Harmonic Tendency of the Hexachord,” Rochberg mentioned that Babbitt’s complete theory of set-structure and “combinatoriality” was unfortunately not in a published form, even though Babbitt

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68 David Alan Lawrence, “A Conductor’s Study of George Rochberg’s Three Psalm Settings,” 19.

69 George Rochberg, vii.
referred to the an unpublished article in his "Some Aspects of Twelve-Tone Composition" in 1955. Rochberg also compared Hauer’s 44 tropes with Babbitt’s source sets, and mentioned that “in my monograph on the hexachord I stated laws of row-construction, in terms other than Babbitt’s, which apparently form only a part of the theory of set structure.”

During the interview with Richard Dufallo, Rochberg explained that he only published the basic data in manual format instead of a whole set of other harmonic ideas, because it was the issue he was interested in at that time:

Of course, it [The Hexachord and Its Relation to the Twelve-Tone Method] was reviewed as a clumsy, unsubtle way of explaining something. It wasn’t sophisticated, it wasn’t mathematically elegant. Well, how can you expect someone who isn’t mathematically oriented to be mathematically elegant?! In those years, I started to write to George Perle and Milton Babbitt. I didn’t know either of them at the time; I’d never met them. But I couldn’t get anything from them, not a word. They were very tight-lipped. As it turned out later, Babbitt has made some sort of a mathematically oriented theory of the whole thing. Which was just a different way of saying the same thing I had said in my simpler, more blunt way. But that didn’t bother me, because it served my purposes completely. The point is ... take for example my Second Symphony... It’s a strictly hexachordal work, and I think that’s where it

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70 Rochberg, "Harmonic Tendency of The Hexachord," 209.

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derives a lot of its strength; because the harmonic relationships in the Second Symphony are right out of the interlocking world of the hexachords and how they multiply.\textsuperscript{71}

Regardless of the issue of originality, Rochberg said that he was satisfied with his writing, which reflected his musical interest.\textsuperscript{72} Rochberg’s mirror inversion was not influential and remained outside of the mainstream because he was focused on a very specific subject without any references to contemporary theorists, and because his interest was in writing music, not theorizing.

2. 3 Extension of Rochberg’s Mirror Inversion

Rochberg uses his concept of “mirror inversion” in the construction of his 12-tone series. However, it works only when the hexachord is self-complementary; that is, the hexachord and its complement are included in the same set class. If two hexachords are $Z$-related, it is impossible to create the mirror inversion in spite of the same interval content. In order to prove the above hypothesis,

\textsuperscript{71} Dufallo, Trackings: Composers Speak with Richard Dufallo, 67.
\textsuperscript{72} Ibid., 68.
I examined the relationship between all Z-related hexachords from Forte’s list.

Figure 2.5 shows the number of semitones contained between two overlapping Z-related hexachords. The result of this investigation reveals that the mirror inversion cannot occur between Z-related hexachords.

<table>
<thead>
<tr>
<th>Z-related hexachords</th>
<th>No. of semitones of overlapped hexachords</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-236, 6-23</td>
<td>1, 3, 5, 7, 10, 10 (11, 9, 7, 5, 2, 2)</td>
</tr>
<tr>
<td>6-237, 6-24</td>
<td>1, 3, 5, 8, 9, 10 (11, 9, 7, 4, 3, 2)</td>
</tr>
<tr>
<td>6-240, 6-211</td>
<td>1, 3, 5, 8, 8, 11 (11, 9, 7, 4, 4, 1)</td>
</tr>
<tr>
<td>6-241, 6-212</td>
<td>1, 3, 5, 8, 8, 11 (11, 9, 7, 4, 4, 1)</td>
</tr>
<tr>
<td>6-242, 6-213</td>
<td>1, 3, 6, 7, 8, 11 (11, 9, 6, 5, 4, 1)</td>
</tr>
<tr>
<td>6-238, 6-26</td>
<td>1, 3, 5, 8, 9, 10 (11, 9, 7, 4, 3, 2)</td>
</tr>
<tr>
<td>6-246, 6-224</td>
<td>1, 3, 6, 6, 9, 11 (11, 9, 6, 6, 3, 1)</td>
</tr>
<tr>
<td>6-217, 6-243</td>
<td>1, 3, 5, 7, 10, 10 (11, 9, 7, 5, 2, 2)</td>
</tr>
<tr>
<td>6-247, 6-225</td>
<td>1, 3, 6, 6, 10, 10 (11, 9, 6, 6, 2, 2)</td>
</tr>
<tr>
<td>6-244, 6-219</td>
<td>1, 3, 6, 6, 10, 10 (11, 9, 6, 6, 2, 2)</td>
</tr>
<tr>
<td>6-248, 6-226</td>
<td>1, 3, 6, 6, 9, 10 (11, 9, 6, 6, 3, 2)</td>
</tr>
<tr>
<td>6-210, 6-239</td>
<td>5, 5, 6, 6, 6, 6 (7, 7, 6, 6, 6, 6)</td>
</tr>
<tr>
<td>6-249, 6-228</td>
<td>1, 3, 5, 7, 10, 10 (11, 9, 7, 5, 2, 2)</td>
</tr>
<tr>
<td>6-229, 6-250</td>
<td>3, 5, 7, 10, 10, 11 (9, 7, 5, 2, 2, 2)</td>
</tr>
<tr>
<td>6-245, 6-223</td>
<td>1, 3, 5, 8, 8, 11 (11, 9, 7, 4, 4, 1)</td>
</tr>
</tbody>
</table>

Figure 2.5. Number of semitones of overlapped Z-related hexachords.

In the first column, I randomly selected six notes from each of 6-Z36 (012347) and 6-Z3 (012356) without
duplication, C, C#, D, D#, E, G and B, Bb, A, G#, F#, F.

When the two hexachords are overlapped, the collection of semitones (1, 3, 5, 7, 10, 10) contains at least one even number, as shown in Example 2.8. We can get the same result when we invert those intervals (11, 9, 7, 5, 2, 2). Thus, Z-related hexachords do not form the tetrachordal series.

Example 2.8. Vertical arrangement of Z-related hexachords, 6-Z36 and 6-Z3.

Using trial and error, like Rochberg, I make a random hexachord with those pitches and invert the intervals at the point of inversion where mirror inversion might take place. There is at least one duplicating note between the hexachords, so combinatoriality exists.

Finally, when I checked all Z-related hexachords in Forte’s list, I found that they did not have I-combinatorial hexachords. Rochberg explained at length how to construct the mirror inversion both based on the
tetrachordal series and on the random hexachord in his monograph. In Rochberg’s time, using the “tetrachordal series” to construct I-combinatorial hexachords was a convenient method. At the present time, we can easily recognize whether two hexachords are related by I-combinatoriality from Forte’s list of set classes.

The following chapters examine how Rochberg’s idiosyncratic theoretical ideas influenced his composition and explain the kind of traditional elements that still exist in Rochberg’s serial music.
CHAPTER 3

BASIC APPROACHES TO ROCHBERG’S SERIAL MUSIC: 
TWELVE BAGATELLES AND SYMPHONY NO. 2

3. 1 Compositional background

The Twelve Bagatelles for Piano was composed during
June and August 1952, and premiered at the MacMillan
Theater, Columbia University in 1953. Rochberg transcribed
it for orchestra in 1964, titled Zodiac. He explained the
influence of his friendship with Dallapiccola in writing
this composition:

The first eight came in one burst - within the
space of a week. I broke off work to take a trip
to Tanglewood, where I played what I had just
written for Luigi Dallapiccola, teaching there
that summer. Dallapiccola’s enthusiastic
response confirmed by own feelings about what I
was doing, so much so that when I returned home I
was able to complete the remaining four pieces in
fairly short order.  

73 Dixon, Ibid., 182.
This piece is short in duration, performed in eleven minutes; however, each piece presents contrasting moods, based on specific indications of dynamic and tempo.

Rochberg did not create titles for the music, but his detailed descriptions of expression for the performer are comparable to those found in 19th-century character pieces.

<table>
<thead>
<tr>
<th>Bagatelles</th>
<th>Expression and Tempo Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td>Drammaticamente e con un tempo libero (♩ = ca. 60)</td>
</tr>
<tr>
<td>No. 2</td>
<td>Scherzoso e tempo giusto (♩ = 208)</td>
</tr>
<tr>
<td>No. 3</td>
<td>Con brio (♩ = ca. 138)</td>
</tr>
<tr>
<td>No. 4</td>
<td>Tempo di marcia (♩ = ca. 96)</td>
</tr>
<tr>
<td>No. 5</td>
<td>Quasi parlando (♩ = ca. 60)</td>
</tr>
<tr>
<td>No. 6</td>
<td>Satirico (♩ = ca. 72)</td>
</tr>
<tr>
<td>No. 7</td>
<td>Teneramente e liricamente (♩ = ca. 96)</td>
</tr>
<tr>
<td>No. 8</td>
<td>Giocoso (♩ = ca. 132)</td>
</tr>
<tr>
<td>No. 9</td>
<td>Intenso, con un sentimento di destino (♩ = ca. 60)</td>
</tr>
<tr>
<td>No. 10</td>
<td>(♩ = ca. 88)</td>
</tr>
<tr>
<td>No. 11</td>
<td>Con moto, passionatamente (♩ = 52-54)</td>
</tr>
<tr>
<td>No. 12</td>
<td>Burlesca (♩ = 66-72)</td>
</tr>
</tbody>
</table>

Figure 3.1. Characters of Twelve Bagatelles for Piano.
As shown in Figure 3.1, Rochberg indicated the expression and tempo markings except for No. 10. Influenced by Dallapiccola, Rochberg wrote the expression markings in Italian instead of English. Dallapiccola indicated specific titles, such as "Simbolo," or "Accenti" in his *Quaderno Musicale de Annalibera* (1952), which is a similar set of eleven short pieces.

Symphony No. 2 was composed from 1955 to 1956, but Rochberg had already sketched the idea for the piece three years earlier. It is a large-scale 12-tone work with four movements that are played without interruption: I. *Declamando* (mm. 1-255), II. *Allegro Scherzoso* (mm. 256-572), III. *Molto Tranquillo* (mm. 573-636), and IV. *Tempo Primo, ma incalzando* (mm. 637-795). In this piece, Rochberg’s eccentric theoretical approach to 12-tone compositional technique is directly reflected in the music because it is based on his own concept of mirror inversion. He uses various combinations of the original row and its mirror inversions for vertical sonorities, and consequently, the harmony does not follow the order of the 12-tone series. Rochberg explains how the structure of the 12-tone series is based on his concept of mirror inversion in the following notes:
The *Second Symphony* is based on a single twelve-tone row which is symmetrical; for example, the row is divided into two groups of six (or hexachords), the second group being a rearrangement of the mirror inversion of the first group. . . . This provides ample opportunity for continually new melodic formations as well as a harmonic structure existing between row and mirror (or mirrors). This also means that it is not always necessary to use the entire 12-tone row in its original form. It is also possible to achieve all the 12 notes by combining, for example, the first group of 6 of the original with the corresponding group of one of the mirrors; or the second group of the original with the corresponding group of the mirror. Although the basic pitch material is completely determined in advance, in no way does this hinder the free activity of the imagination.  

Translating Rochberg’s unorthodox prose to the language of modern theory, one would say that Rochberg uses combinatorial hexachords related by inversion. Straus explains that combinatoriality allows serial music to “modulate from area to area.” The areas function as the keys in a tonal piece. In this work, by combining series to make an aggregate, the initial melodic idea in the 12-tone series creates large-scale harmonic areas. Rochberg specifically displays harmonic areas in the presentation of

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74 Dixon, Ibid., 156.
a developmental theme (theme H), which will be examined later.

My initial discussion of these two pieces begins with analyses of the segments and their structure in the 12-tone series, a discussion of the tonal implications of the row used, and an investigation of Rochberg’s treatment of the series. It is important to examine the pre-compositional sources because they become the basis of the melodic line and the harmony of the music. It is also important to understand how Rochberg manages the large-scale structure of the music by using combinations of the original row with its mirror inversions. Thus, the basic 12-tone series of each work will be investigated in various ways. I will start by describing the general shape of the series, based on the number of interval classes. Then each series will be explored with three different analytical tools, Forte’s set theory, Rochberg’s concept of mirror inversion, and Lewin’s transformation theory.
3. 2 The structure of 12-tone series

Example 3.1. The basic 12-tone series in *Twelve Bagatelles for Piano.*

![Example 3.1: Basic 12-tone series](image)

As shown in Example 3.1, the series for the *Bagatelles* contains three occurrences each of interval class 1 (ic 1), ic 4, and ic 6, and one occurrence each of ic 3 and ic 5. This array of interval classes imparts a special quality to the overall sound of the actual music. The series presents a balance between the dissonance of ic 1 and ic 6 and the consonance of ic 4. These pitch classes appear in a unique design in the series as shown in Figure 3.2. The difference between pairs of interval classes increases from 0 to 3, starting with the difference between the first and last ic, and working inward. Except for the pair of interval classes that differ by 3 near the middle of the row, the second hexachord generally includes smaller

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*76 I label the series in a “fixed-do” system (C is always 0).*
interval classes than the first hexachord. The ic content of the first part of the series contains more dissonant interval classes than the second part. It is striking that all ic 6s are concentrated in the first seven pitches and the second five pitches are all consonant ic’s except for the last ic 1.

Figure 3.2. The shape of the 12-tone series.

Example 3.2. Trichordal segmentations in the series.
Example 3.2 shows all possible contiguous trichordal segmentations in the Bagatelles series. The series contains four occurrences of set class 3-5 (016), three occurrences of 3-8 (026), one occurrence each of 3-3 (014), 3-7 (025), and 3-12 (048). In this series, the only familiar sonority is the augmented triad, set class 3-12 (048). Thus, trichord segments do not generate very characteristic traditional sounds. Instead, they only contain the potential for unfamiliar dissonances. It is interesting to find traditional elements in this piece, because most of the basic trichordal pitch resources are not familiar.

In this example, when the series is divided into four discrete trichords (presented in a straight line), there are three 3-5 (016)s and one 3-12 (048). Set class 3-5 (016) can be arranged vertically to form a quartal chord, consisting of a perfect 4th and a tritone. This particular chord, known as the Viennese fourth chord, occurs four times in the series. When Rochberg uses this construction, he follows the tradition of the second Viennese school composers.
Figure 3.3 shows the transpositional pattern among the four possible forms of 3-5 (016) heard in the row. Three trichords of set classes 3-5 are related at T₄. Each set class 3-5 (016) from the first trichord to the last trichord is transposed up four semitones (T₄). When we examine the first pitches (C#, F, A), underlined in Figure 3.3, they create the set class 3-12 (048). That is, the transposition of 4+4 is a composing out of set-class 3-12 (048), heard within the row as order numbers seven, eight, and nine. Thus, the transpositions of the first, second, and fourth discrete trichords, set class 3-5 (016), have an
ic relationship with the third discrete trichord 3-12 (048).

The inversional relationships among the 3-5 trichords shown on Figure 3.3 are also interesting. The trichord, F#, F, and B, which is not a discrete trichord in the series, has an inversional relationship with the discrete 3-5 trichords. In particular, the second discrete trichord and the trichord F#, F, and B are related at $I_{F^\#}$ which shares two notes, $F^\#$ and $F$, an example of Lewin’s RICH transformation.77

Example 3.3. Tetrachordal segmentations in the series.

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77 David Lewin, *Generalized Musical Intervals and Transformations* (New Haven: Yale University Press, 1987), 180–81. Lewin proposes that RICH-transformation is retrograde–inverted form of the previous elements overlapping two pitches or pitch-classes. For example, if $s = C-F^\#-F$, then RICH $(s)$ is $F^\#-F-B$. 

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In Example 3.3, when the series is divided into three discrete tetrachords, we find set class 4-5 (0126), set class 4-Z29 (0137), and set class 4-13 (0136). There is a RICH transformation between two overlapping tetrachords of set class 4-Z29 (0137), which is the same as in the trichords, that is to say, between s=Ab-C-F#-F, and RICH (s)= F#-F-B-Eb. There is a symmetric design of trichords in the overall structure of the series (See Figure 3. 2); however, in the tetrachordal division, the symmetry is off center, and the RICH –transformation reveals a different kind of symmetry in the row. That is, the RICH-transformation occurs between the set classes 4-Z29 (0137).

The series also consists of two hexachords which are Z-related, 6-Z43 (012568) and 6-Z17 (012478). Example 3.4 shows the two hexachords, rearranged into normal order; the second hexachord is rearranged into normal order listed backwards.

![Example 3.4. Hexachordal segmentations in the series.](image)
As we discussed in Chapter 2, Z-related hexachords cannot create a mirror inversion. When we arrange the second hexachord, 6-Z17 (012478), there are no duplicating notes between the two hexachords, but they are not related by inversion. In order to try to make a tetrachordal series, following Rochberg’s lead, we can overlap the two hexachords, to make the six dyads shown on Example 3.5 (a). In fact, this piece was written before Rochberg wrote the theory book, *The Hexachord and Its Relation to the 12-Tone Row*. Thus, it shows an early version of the concept of “mirror inversion.”

Example 3.5. Partial mirror inversion of the series
When they are rearranged from major seventh to major second as in Example 3.5 (b), we can see a series of diminishing intervals. One line is descending, and the other line is ascending chromatically. In addition, the horizontal range of each line is a perfect fourth. However, the pattern in these hexachords does not exactly follow Rochberg’s concept of mirror inversion as he talked about it in Schoenberg’s music because there are two major seconds. If the notes f and e (the last two notes of the lower voice) were exchanged, these two hexachordal groups would show the perfect invertibility. When we examine Forte’s list of set classes, the set class 6-Z17 (012478) and the set class 6-Z43 (012568) are only R-combinatorial. So, it is easy to know that two hexachords are not related by the mirror inversion. According to Rochberg’s definitions, the two hexachords are interchangeable, but not invertible.

In comparison to the Bagatelles, the Symphony No. 2 shows a very different structure of its series. Example 3.6 is the basic 12-tone series for the symphony. It is made up of four occurrences of interval class 4 (ic 4), three occurrences of ic 1 and ic 5, and one occurrence of ic 3. There are no ic 2’s or ic 6’s in this series; that
is, if we locate 12 pitches in pitch space, we do not hear any tritones, major 2\textsuperscript{nd}s, or minor 7\textsuperscript{th}s.

Example 3.6. The 12-tone series for Symphony, No. 2.

Figure 3.4 shows the symmetric design of the interval classes in the two hexachords. Even though the two structures have different interval classes on the surface of the music, each hexachord is built symmetrically around the central ic. 3 and ic. 5 respectively. The symmetry of this row is not the same as in the Bagatelles, but the row for the Bagatelles also shows a quirky symmetry, as discussed in Figure 3. 2.
As shown in Example 3.7, when the series is divided into four discrete trichords, there are 3-4 (015), 3-4 (015), 3-3 (014), and 3-3 (014). The first two trichords, set classes 3-4 (015) are related at I \(_F^F\) and the second two trichords, set classes 3-3 (014) are related at I \(_E^{nb}\) (See Figure 3.5). The series also contains 3-11 (037), 3-3, and 3-4 among overlapping trichords. The set class 3-11 (037), the major or minor traid, gives Rochberg the possibility of using traditional vertical sonorities. Thus, this series is composed of various forms of set classes 3-3, 3-4 and 3-11.

Example 3.7. Trichordal segmentations in the series
Figure 3.5. Relationship of set classes 3-3 (014) and set classes 3-4 (015)

As shown in Example 3.8, the 12-tone series also contains three discrete tetrachords: 4-19 (0148), 4-17 (0347), and 4-19 (0148). The first and the last tetrachords are inversionally related at $I^{ab}_A$. Set class 4-19 contains both set class 3-12 (048), an augmented triad, and set class 3-11 (037), a major or minor triad. The second tetrachord, 4-17 containing both a major and a minor triad, is an important pitch source for the harmony in the symphony. The series also generates 4-3, 4-4, 4-7, 4-20, and other versions of 4-19 among adjacent pitches.

Example 3.8. Tetrachordal segmentations in the series.
Figure 3.6 shows a transformation graph of the set class 4-19 (0148) which is the most characteristic sonority of the row. The first two and the last two tetrachords are related by Lewin's RICH transformations as mentioned in Example 3.3. While there is a RICH transformation in the middle of the series in Bagatelles, Symphony No. 2 has two RICH transformations, one at the beginning and another at the end of the row. This set class plays an important role in the construction of melodic line and harmony of this composition.

Example 3.9 illustrates how Rochberg uses the set class 4-19 (0148) in two dimensions. In this piece, the original row, P₉ and its three combinatorial inversions, I₁, I₀, and I₈ are used. The first four pitches (A-F-B♭-D♭) in P₉, set class 4-19 (0148) is important harmonically as well as melodically because the first pitches of the four series
Rochberg uses in the symphony also create 4-19 (0148), A-E-C-G\(^\#\).\(^78\)

Example 3.9. The original and its mirror combinatorial inversions.

As shown in Example 3.10, when the series is divided into two hexachords, there are two sets of 6-20 (014589), which is an all-combinatorial set. This hexachord, also called the hexatonic collection by Straus\(^79\), presents a unique structure containing limited subsets. The second


\(^{79}\) Straus, 149.
hexachord is transposed at $T_2$, $T_6$, or $T_{10}$, and is also related by an inversion at $T_{3I}$, $T_{7I}$, and $T_{11I}$. Each hexachord itself is inversionally symmetric around the central ic 1 and transpositionally symmetric at $T_4$ in three ways.

Example 3.10. Three transpositions of set class 6-20.

Straus explains this hexachord as "a combination of two augmented triads related by semitone," so the set class 6-20 always contains two of the four different augmented triads that occur in the 12-tone series.\(^{80}\)

In addition, this hexachord can be described as a chain of RICH-transformations as shown in Figure 3.7. This example shows that the last two pitch-classes and the first two pitch-classes in the set classes 3-3 (014) are

\(^{80}\) Straus, 149.
overlapped and they are all inversionally related. Thus, this hexachord consists of five consecutive RICH-transformations of the trichords.

![Diagram of RICH-Transformations](image)

**Figure 3.7.** A Chain of RICH-Transformations in set class 6–20 (014589).

A symmetric hexachord is the prerequisite to create Rochberg’s mirror inversion. As mentioned earlier in Rochberg’s quote, in the hexachordal construction of the 12-tone series in this work, the second hexachord is a rearrangement of the inversion of the first hexachord (See Example 3.11 (a)). Thus, reorganized hexachord 2 shows an inversion against hexachord 1 as shown in Example 3.11 (b).
Example 3.11. Rearrangement of hexachord 2.

According to Rochberg’s description, when we arrange the mirrored pitches vertically and change the order from smallest to largest intervals, each voice is chromatically either ascending or descending, filling in a horizontal interval of a fourth. The harmonic structure of the expanding dyads, indicated by odd numbers of ordered interval class, shows that the hexachordal structure of 12-
tone series is based on his idea of "mirror inversion." (See Example 3.12 (a) and (b)).


As pre-compositional sources, Rochberg uses $P_5$, whose two hexachords are related by mirroring when we rearrange the orders of the second hexachord. The rearrangement of the second hexachord became the first hexachord of $I_4$ (See Example 3.9). Since Rochberg used three mirror inversions in his symphony, we can get other forms of mirroring when we rearrange the orders of the second hexachord in different ways, and they become the first hexachords of $I_0$ and $I_8$. However, as modern theorists know, set class 6-20 is both transpositionally and inversionally symmetric in
three ways, so it is possible to make the three inversions without constructing Rochberg’s tetrachordal series.

3. 3 Rochberg’s treatment of the 12-tone series

In *Twelve Bagatelles*, Rochberg only uses two forms of the series, $P_1$ and $I_8$, and their retrogrades, $R_1$ and $RI_8$, of the forty-eight possible series shown in Figure 3.8.

![Figure 3.8. A matrix of Twelve Bagatelles for Piano.](image-url)
Rochberg does not use as many different series as Dallapiccola in *Quaderno Musicale Di Annalibera*. However, the two composers both choose to highlight a pair of series that exhibit a kind of tonic-dominant relationship. In Rochberg’s piece, the first note, $A^b$, of $I_8$ is ic 5 from the first note, $C^s$, of $P_1$. In pitch space, $A^b$ is a perfect fifth higher or a perfect fourth lower than $C^s$, so two pitches are in a tonic-dominant relationship. In pitch-class space, all 12-pitches have an equal function, so this tonal relationship is not applied in a traditional manner; however, it is still noticeable that Rochberg selects two series related by a perfect fifth in pitch space.

Dallapiccola’s two series also exhibit the same relationship. Two series chosen by Rochberg, $P_1$ and $I_8$, are not combinatorial each other, whereas Dallapiccola’s series are combinatorial as shown in Example 3.14. Dallapiccola uses two series simultaneously to create an aggregate, but Rochberg always presents only one series at a time.
Example 3.13 presents the 12-tone series that Dallapiccola used in his *Quaderno Musicale di Annalibera*, which he composed in the same year, 1952. Unlike Rochberg’s series in *Bagatelles*, the series, $P_{10}$, contains a major triad (pitch numbers 2 to 4) and a minor triad (pitch numbers 10 to 12). In addition, two rows, $P_{10}$ and $I_5$ are inversional-combinatorial because the first hexachords of $P_{10}$ and $I_5$ create an aggregate. Dallapiccola’s series has a structure similar to the series of Rochberg’s Symphony No. 2 which will be discussed in the following chapter. Therefore, Rochberg starts to compose serial music as a result of Dallapiccola’s inspiration; however, we see that his *Bagatelles* are influenced by Schoenberg’s early serial works rather than Dallapiccola’s. When Rochberg was focusing on the symmetric structure to the series in the
mid-1950s, Dallapiccola already utilized a combinatoriality in his music whether he knew this terminology or not.

The 12-tone series itself of Rochberg’s *Bagatelles* is more dissonant than Dallapiccola’s, and does not display any triadic outlines. With very limited materials and a straightforward compositional method, Rochberg shows remarkable diversity and contrasting harmonies, melodies, textural arrangements, and rhythms in each piece. In addition, each piece still possesses traditional associations through his use of non-pitch materials.

As shown in Example 3.14, the inversion occurs at $I_8$. In traditional terms, the inversion starts a perfect fourth below or a perfect fifth above the prime. There are two duplicating notes, $C^*$ and $A^b$, between the first hexachords of each series.

Even though Rochberg does not ever use the two series at the same time and every series is presented in a straightforward manner, he occasionally overlaps the beginning of one series with the end of another to make a new sonority. As shown in Figure 3.9, the overlapping of two series shows an interesting pattern of tetrachords. The first two dyads between them create the set class 4-9 (0167), and it is related at T_3 with another 4-9 in the middle of the overlapped series. The second tetrachord made between the two series, the set class 4-7 (0145) is related at T_6 with another set class 4-7. The rest of tetrachords are all set classes 4-1 (0123), and they are also related at T_6.
In Bagatelle No. 10, shown on Example 3.15, Rochberg overlaps the last two notes of RIₘ with the first two notes of P₁ to make 4-0, as shown on Figure 3.9. The notes that actually sound together at this point make a literal subset of 4–9, set class 3–5 (016).

Rochberg sometimes omits or reorders some notes; however, he mostly uses one series at once instead of overlapping two series in music. In Bagatelle No. 7, Rochberg slightly reorders the series, pitch number 1 and 2, 4 and 5, and 10 and 12, in order to make the set class 3–5 (016), as shown in Example 3.16, the subset of 4–19 heard in Bagatelle No. 10 as shown in Example 3.15.
Set class 3-5 is a critical part of the row itself and plays an important role melodically as well as harmonically as will be discussed further later. Thus, Rochberg intentionally tried to make different versions of this sonority by using of overlapping and reordering.

In Rochberg’s Symphony, he uses the 12-tone series in a very different way. Figure 3.10 is a matrix of the 12-tone series in Rochberg’s Symphony No. 2. It presents how the 6-20 hexachord has all-combinatorial relationships with prime, inversion, retrograde, and retrograde-inversion. When we examine the first hexachord of I₄, the order is the same as order of the inversion, because the second
hexachord in $P_9$ is rearranged to be mirrored with the first hexachord, and $I_4$ is a mirror inversion of $P_9$.

As mentioned earlier, there are three different levels of transposition and three different inverted forms of the hexachord that are combinatorial with the original form. Thus, $P_9$ can be combined with $P_{11}$, $P_3$, $P_7$, $I_0$, $I_4$, or $I_8$ to produce hexachordal complementation. These series are the main sources for this composition. However, it is often hard to tell exactly which series he is using in the piece.
In addition, this matrix shows how many hexachords are preserved through various transformations. The second hexachord of $P_9$ is exactly the same as the first hexachord of $RI_{10}$ and the second one of $P_1$ is the same as the first one of $RI_2$. Reversely, the first hexachord of $P_3$ is the same as the second hexachord of $RI_9$ and the first one of $P_7$ is the same as the second one of $RI_0$, and so forth. That is, there are many possibilities to make combinatoriality between hexachords, making it hard to follow the order of the 12-tone series. Moreover, $P_9$ and $I_4$, the most frequently used in this piece are related by an ic. 7 for a dominant-tonic relationship. This is the same relationship Rochberg chose in his Bagatelles. Consequently, Rochberg focuses $P_9$ and its three inversionally combinatorial series, $I_4$, $I_0$, and $I_8$ in this piece.

The structure of the 12-tone series in each work shows totally different shapes, interval classes, and segmentations. The series of Symphony No. 2 contains more consonant sonorities because of the limited subsets and symmetric design of the series, based on Rochberg’s concept of mirror inversion. Rochberg uses a relatively small number of forms of the series in Bagatelles; however, his treatment of these limited sources shows various melodic line, harmony, texture, and rhythm. In the following
chapter, the influence of tradition on his compositional techniques will be investigated in several categories.
The two selected works in this dissertation imply many traditional elements in spite of the use of a contemporary compositional language. In the Bagatelles, some sound like neo-classical music and others sound more dissonant. Even in the symphony, there is no specific passages that contain traditional functional harmony and voice-leading. However, the general sound is very Romantic, which is influenced by the incorporation of techniques from 19th-century music. Therefore, in this chapter, Rochberg’s melodic lines, his chosen harmonies, the rhythm, and the texture of the music will be examined to see which elements of traditional musical style are present.
4.1. Form

Since Rochberg’s Bagatelle is influenced by Beethoven’s Bagatelles, the formal structure also shows traditional elements. The formal structure of each Bagatelle can be classified as two-part, three-part, or rondo. The sectional structure is indicated by repetitive melodic or rhythmic patterns, the use of fermatas, tempo changes, and dynamic levels. Thus, the sectional divisions of each piece are quite clear, and are summarized on Figure 4.1.

It is interesting how Rochberg introduces each row systematically in each piece. As shown in Figure 4.1, he presents \( P_1 \) and \( I_8 \) in No. 1 and No. 2 respectively. Then he uses both series in No. 3. The formal structure of No. 3 is in an arch form because the subsection b’ comes earlier than the subsection a in Section A’. In the same way, he introduces \( R_1 \) and \( RI_8 \) in No. 4 and No. 5 respectively, and presents both series in No. 6. From No. 7 to No. 10, Rochberg displays the other four possibilities for combining two series from among the four series Rochberg uses. In No. 7 and No. 8, he uses the series with its retrograde, and in No. 9 and No. 10, two series are related
by a retrograde-inversion. In No. 10, Rochberg presents two kinds of melodic patterns, playing alternatively, to create many sections. In No. 11 and No. 12, a five part rondo and a seven-part rondo form respectively, Rochberg finally displays all four series.

<table>
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<tr>
<th>Bagatelles</th>
<th>Section</th>
<th>Phrase</th>
<th>Series used</th>
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<td>a (mm. 1-5)</td>
<td>P₁</td>
</tr>
<tr>
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<td>b (mm. 5-8)</td>
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<tr>
<td></td>
<td>A' (mm. 8-18)</td>
<td>a' (mm. 8-13)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>b (mm. 13-18)</td>
<td></td>
</tr>
<tr>
<td>No. 2</td>
<td>A (mm. 1-10)</td>
<td>a (mm. 1-6)</td>
<td>I₈</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b (mm. 6-10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A' (mm. 11-21)</td>
<td>a' (mm. 11-15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>c (mm. 15-18)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>a'' (mm. 18-21)</td>
<td></td>
</tr>
<tr>
<td>No. 3</td>
<td>A (mm. 1-13)</td>
<td>a (mm. 1-7)</td>
<td>P₁, I₈</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>B (mm. 14-28)</td>
<td>c (mm. 14-27)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A' (mm. 29-37)</td>
<td>b' (mm. 28-31)</td>
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</tr>
<tr>
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<td>Coda</td>
<td>mm. 38-40</td>
<td></td>
</tr>
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<td>a (mm. 1-8)</td>
<td>R₁</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a' (mm. 8-17)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B (mm. 18-34)</td>
<td>b (mm. 18-25)</td>
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</tr>
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<td></td>
<td></td>
<td>a''' (mm. 39-50)</td>
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</tr>
<tr>
<td>No. 5</td>
<td>A (mm. 1-9)</td>
<td>a (mm. 1-5)</td>
<td>R₁₈</td>
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<tr>
<td></td>
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<td>b (mm. 6-9)</td>
<td></td>
</tr>
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<td>B (mm. 10-14)</td>
<td>mm. 10-14</td>
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</tr>
<tr>
<td></td>
<td>A' (mm. 15-19)</td>
<td>a' (mm. 15-19)</td>
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Continued

Figure 4.1. The overall structure of the Bagatelles.
Figure 4.1 Continued

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<th>a (mm. 1-8)</th>
<th>R₁, RI₈</th>
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<td>B (mm. 9-18)</td>
<td>b (mm. 9-13)</td>
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<td>Transition</td>
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<td>RI₈, I₈</td>
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<tr>
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<td>A (mm. 26-31)</td>
<td>a (mm. 26-31)</td>
<td>RI₈, P₁</td>
</tr>
<tr>
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<td>A</td>
<td>mm. 1-8</td>
<td>P₁, R₁</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>mm. 9-15</td>
<td>P₁, R₁</td>
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<td></td>
<td>C</td>
<td>mm. 15-21</td>
<td>P₁, R₁</td>
</tr>
<tr>
<td></td>
<td>A'</td>
<td>mm. 22-27</td>
<td>P₁, R₁</td>
</tr>
<tr>
<td>No. 8</td>
<td>A (mm. 1-9)</td>
<td>a (mm. 1-5)</td>
<td>RI₈, I₈</td>
</tr>
<tr>
<td></td>
<td>A' (mm. 10-19)</td>
<td>a' (mm. 10-14)</td>
<td>RI₈, I₈</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c (mm. 14-19)</td>
<td>RI₈, I₈</td>
</tr>
<tr>
<td>No. 9</td>
<td>A (mm. 1-8)</td>
<td>a (mm. 1-8)</td>
<td>R₁, I₈</td>
</tr>
<tr>
<td></td>
<td>B (mm. 8-17)</td>
<td>b (mm. 8-13)</td>
<td>R₁, I₈</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c (mm. 13-17)</td>
<td>R₁, I₈</td>
</tr>
<tr>
<td></td>
<td>A' (mm. 17-24)</td>
<td>a (mm. 17-24)</td>
<td>R₁, I₈</td>
</tr>
<tr>
<td>No. 10</td>
<td>A</td>
<td>mm. 1-9</td>
<td>RI₈, P₁</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>mm. 9-13</td>
<td>RI₈, P₁</td>
</tr>
<tr>
<td></td>
<td>A'</td>
<td>mm. 14-18</td>
<td>RI₈, P₁</td>
</tr>
<tr>
<td></td>
<td>B'</td>
<td>mm. 18-27</td>
<td>RI₈, P₁</td>
</tr>
<tr>
<td></td>
<td>A''</td>
<td>mm. 28-30</td>
<td>RI₈, P₁</td>
</tr>
<tr>
<td></td>
<td>B'''</td>
<td>mm. 31-34</td>
<td>RI₈, P₁</td>
</tr>
<tr>
<td></td>
<td>A''''</td>
<td>mm. 35-42</td>
<td>RI₈, P₁</td>
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<tr>
<td></td>
<td>B''''</td>
<td>mm. 43-48</td>
<td>RI₈, P₁</td>
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<tr>
<td></td>
<td>A'''''</td>
<td>mm. 48-52</td>
<td>RI₈, P₁</td>
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<td>Coda</td>
<td>mm. 52-56</td>
<td>RI₈, P₁</td>
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<tr>
<td>No. 11</td>
<td>A</td>
<td>mm. 1-9</td>
<td>P₁, I₈, R₁, RI₈</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>mm. 9-18</td>
<td>P₁, I₈, R₁, RI₈</td>
</tr>
<tr>
<td></td>
<td>A'</td>
<td>mm. 19-25</td>
<td>P₁, I₈, R₁, RI₈</td>
</tr>
<tr>
<td></td>
<td>B'</td>
<td>mm. 25-32</td>
<td>P₁, I₈, R₁, RI₈</td>
</tr>
<tr>
<td></td>
<td>A''</td>
<td>mm. 33-40</td>
<td>P₁, I₈, R₁, RI₈</td>
</tr>
<tr>
<td>No. 12</td>
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<td>mm. 1-4</td>
<td>P₁, I₈, R₁, RI₈</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>mm. 5-8</td>
<td>P₁, I₈, R₁, RI₈</td>
</tr>
<tr>
<td></td>
<td>A'</td>
<td>mm. 9-12</td>
<td>P₁, I₈, R₁, RI₈</td>
</tr>
<tr>
<td></td>
<td>C</td>
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<td></td>
<td>A''</td>
<td>mm. 21-24</td>
<td>P₁, I₈, R₁, RI₈</td>
</tr>
<tr>
<td></td>
<td>B'</td>
<td>mm. 25-28</td>
<td>P₁, I₈, R₁, RI₈</td>
</tr>
<tr>
<td></td>
<td>A'''</td>
<td>mm. 29-34</td>
<td>P₁, I₈, R₁, RI₈</td>
</tr>
</tbody>
</table>
As shown in Figure 4.2, the total number of row statements used in this composition is 138. Rochberg uses the four series fairly equally from 31 to 38 times.

<table>
<thead>
<tr>
<th>Bagatelles</th>
<th>Series (No. of row statements)</th>
<th>Total No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td>$P_1 (8)$</td>
<td>8</td>
</tr>
<tr>
<td>No. 2</td>
<td>$I_8 (8)$</td>
<td>8</td>
</tr>
<tr>
<td>No. 3</td>
<td>$P_1(6), I_8 (5)$</td>
<td>11</td>
</tr>
<tr>
<td>No. 4</td>
<td>$R_1 (8)$</td>
<td>8</td>
</tr>
<tr>
<td>No. 5</td>
<td>$RI_8 (13)$</td>
<td>13</td>
</tr>
<tr>
<td>No. 6</td>
<td>$R_1 (7), RI_8 (6)$</td>
<td>13</td>
</tr>
<tr>
<td>No. 7</td>
<td>$P_1 (5), R_1 (5)$</td>
<td>10</td>
</tr>
<tr>
<td>No. 8</td>
<td>$RI_8 (4), I_8 (4)$</td>
<td>8</td>
</tr>
<tr>
<td>No. 9</td>
<td>$R_1 (8), I_8 (5)$</td>
<td>13</td>
</tr>
<tr>
<td>No. 10</td>
<td>$RI_8 (5), P_1 (4)$</td>
<td>9</td>
</tr>
<tr>
<td>No. 11</td>
<td>$P_1 (4), I_8 (4), R_1 (4), RI_8 (4)$</td>
<td>16</td>
</tr>
<tr>
<td>No. 12</td>
<td>$P_1 (4), I_8 (6), R_1 (6), RI_8 (5)$</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>$P_1 (31), I_8 (32), R_1 (38), RI_8 (37)$</td>
<td>138</td>
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</table>

Figure 4.2. Total number of row statements.

The number of row statements heard in each Bagatelle is closely related to the texture of music. For example, Rochberg used 21 row forms in No. 12, which consists of 34 measures and is in a seven-part rondo form (ABA'CA''B'A''''). Except for part C (mm. 13-20) and the
last three measures, he used one row each for one or two measures. In particular, since the texture of the refrain is chordal along with showing a moving inner voice, there is one row per measure (See Example 4.1).

Example 4.1. Use of the series in Bagatelle No. 12, mm. 1-3.
Used by permission of Carl Fischer, LLC.

In the contrast, No. 4 consists of 50 measures, but $R_1$ is stated eight times. The texture is quite melodic compared to No. 12, and Rochberg uses a pedal point to extend the sonority.

When Rochberg transcribed this composition for the orchestra in 1964, he divided his twelve movements into five groups, and the movements within each group are played without a pause. Figure 4.3 illustrates Rochberg's new grouping of the piece as presented in a note to the conductor at the beginning of the score. He indicated that
the pause and non-pause between movements should be carefully managed in order to achieve the desired continuity. Group A is composed of the series $P_1$ and $I_8$, and Group B consists of the series $R_1$ and $RI_8$. However, in the reconstruction of the structure in *Zodiac*, Rochberg did not divide groups exactly based on the usage of the series. Group C, consisting of No. 7, No. 8, and No. 9 is controlled by two series, based on Rochberg’s selection, and Group D is composed of the two series of No. 10 and the four series of No. 11. The last Group E represents No. 12 itself.

In the duration of each group, the middle Group C is the longest section (ca. 4’25’’) and the duration gets shorter as each group goes outward. Section B lasts for 3’25’’, and section D lasts for 2’10’’. The first sections A is played for 2’35’’ and the last section, which is the shortest, is played for 1’20’’. Thus, Rochberg reconstructs the overall structure according to the series used, presenting the symmetric design in duration around the center, Group C.

---

<table>
<thead>
<tr>
<th>GROUP</th>
<th>No.</th>
<th>Time</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>I</td>
<td>ca.1'30''</td>
<td>Proceed to No. II without pause</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>30''</td>
<td>Proceed to No. III without pause</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>35''</td>
<td>Pause ca. 8 seconds before proceeding to No. IV</td>
</tr>
<tr>
<td>B</td>
<td>IV</td>
<td>ca 40''</td>
<td>Proceed to No. V without pause</td>
</tr>
<tr>
<td></td>
<td>V</td>
<td>ca 1'55''</td>
<td>Proceed to No. VI without pause</td>
</tr>
<tr>
<td></td>
<td>VI</td>
<td>50''</td>
<td>Pause ca. 5 seconds before proceeding to No. VII</td>
</tr>
<tr>
<td>C</td>
<td>VII</td>
<td>ca 1'45''</td>
<td>Proceed to No. VIII without pause</td>
</tr>
<tr>
<td></td>
<td>VIII</td>
<td>30''</td>
<td>Proceed to No. IX without pause</td>
</tr>
<tr>
<td></td>
<td>IX</td>
<td>ca 2'10''</td>
<td>Pause ca. 3-4 seconds before proceeding to No. X</td>
</tr>
<tr>
<td>D</td>
<td>X</td>
<td>ca 1'15''</td>
<td>Proceed to No. XI without pause</td>
</tr>
<tr>
<td></td>
<td>XI</td>
<td>55''</td>
<td>Pause ca. 3 seconds before proceeding to No. XII</td>
</tr>
<tr>
<td>E</td>
<td>XII</td>
<td>ca 1'20''</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 4.3.** Rochberg’s new grouping in *Zodiac.*

In contrast to the much shorter and clearly organized Bagatelles, Symphony No. 2 has a larger scale in the formal structure, containing many themes as shown in Figure 4.4.

---

82 Ibid., 4.
<table>
<thead>
<tr>
<th>Mvt</th>
<th>Section</th>
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<th>Subsection</th>
<th>Measures</th>
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<td>mm. 1-4</td>
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<td>(frag.)</td>
<td>mm. 155-166</td>
<td>R₁₈, R₄, R₉</td>
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<td>Recapitulation</td>
<td>mm. 206-255</td>
<td>Intro. and Theme B</td>
<td>mm. 206-221</td>
<td>P₉, I₄</td>
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<td>Transition</td>
<td>mm. 249-255</td>
<td>I₁₀</td>
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**Figure 4.4.** The formal structure of Symphony No. 2

87
Figure 4.4 Continued

<table>
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<th>mm. 256-362</th>
<th>mm. 363-416</th>
<th>mm. 417-572</th>
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<td>B</td>
<td>mm. 363-416</td>
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<td>mm. 388-393</td>
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<td>mm. 394-397</td>
<td>Theme N'</td>
<td>mm. 394-397</td>
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<td>mm. 398-404</td>
<td>Theme M'</td>
<td>mm. 398-404</td>
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<td>mm. 417-437</td>
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<td>mm. 560-572</td>
<td>Transition</td>
<td>mm. 560-572</td>
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The formal structure of the entire piece follows the traditional design as shown in Figure 4.4. The first movement is in a sonata form with seven themes in the

<table>
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<th>Theme Q</th>
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<td>mm. 632-635</td>
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<td>mm. 636-640</td>
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<td>mm. 640-646</td>
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<td>mm. 647-656</td>
<td>Theme E'</td>
<td>mm. 647-653</td>
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exposition, which is relatively long. However, only two themes -- theme A and B -- occur in the recapitulation, functioning as the first and the second theme. The second and the third movements, which are in ABA' form, develop the ideas of trichordal or tetrachordal segmentation of the series. In the fourth movement, Rochberg uses various motivic transformations with the same contour for the melody. This is a recapitulation of the first movement because Rochberg employs the same introduction, first (theme A) and development theme (theme H) of the first movement. Thus, the whole work can be divided into three parts: first movement as an exposition, second and third movement as a development that presents several new themes and various developmental ideas of the beginning section, and the last movement as a recapitulation that returns to the opening materials.

According to Rochberg’s description of the formal design of this work, each movement is connected by brief “interludes.” The first movement is in a sonata-form structure and the second is a Scherzo with a contrasting Trio. The third movement sounds like a chamber ensemble whose themes are played by solo instruments, and the final
section restates the beginning of the work with a fantasia-like mood.\(^8\)\(^3\)

For Rochberg, the problem in managing this work within the traditional sonata principle, was:

to find a way to employ a total chromatic palette, melodic and harmonic, on a large scale true to what the term “Symphony” has come to mean after Beethoven, without losing a sense of proportion, continuity, growth.\(^8\)\(^4\)

4.2. Melodic line

A melodic line in 12-tone music is presented as a complete use of a 12-tone series or a small segmentation of the series. It can be distinguished from a theme in that the melodic line is simply a horizontal presentation of pitches in a more general way. However, the theme contains melodic ideas that can be repeated or developed in the piece later. In the presentation of the theme, Rochberg uses sequence and rhythmic or motivic variations, or develops it by repeating the same contour segments. These techniques are similar to traditional approaches in

\(^8\)\(^3\) Dixon, George Rochberg: A Bio-Bibliographic Guide to His Life and Works, 155.
\(^8\)\(^4\) Ibid., 156.
composing a melodic line. Even though his Bagatelles are not known as a quotation work, we can find some examples that imply pre-existing ingredients.

In addition, Rochberg’s Symphony No. 2 presents 20 themes including an introductory one. It is important to examine Rochberg’s presentation of melodic ideas because the piece is managed by various themes whose melodic shapes are controlled by certain contour segments and are transformed with contrasting characters. The themes are sometimes stated simultaneously in a contrapuntal texture. For the investigation of the characteristic melodic line in the two works, the contour theory, developed by Elizabeth Marvin and Robert Morris and Lewin’s transformation theory will be utilized.

4.2.1 Motivic transformations

A motive, as a significant segment of the theme, is the basis for the growth of the melodic line. By changing the rhythm, contour, or pitches, the motive is extended to be a complete theme. It is sometimes the theme itself.

At the beginning of his Bagatelle No. 11, Rochberg employs the set class 4-7 (0145), which is the motive of
the piece, four times with different contours. It is not one of the discrete tetrachords in the 12-tone series. Instead, it appears when two series are overlapped as shown in Figure 3.9 (See page 73), or among non-adjacent pitches of the series. Rochberg also presents a rhythmic sequence, marked by slurs, which implies the traditional phrase structure. Thus, this passage shows a typical structure, consisting of antecedent (mm. 1-4) and consequent (mm. 5-8) phrase.

Example 4.2. Bagatelle No. 11, mm. 1-8.
Used by permission of Carl Fischer, LLC.
As shown in Example 4.2, the melody presents tetrachords extracted from RI₈, P₁, I₈, and R₁. He puts set classes 4-7 (0145) in the top line, and the rest of 12-tone series is in the left hand. The first two pitches of each tetrachord correspond to the first two pitches of each series and the other two pitches are selected from the middle of the series (fifth and sixth pitches in P₁ and I₈ and seventh and eighth pitches in R₁ and RI₈). Since the 12-tone series of this piece contains three occurrences of interval class 1, the first two pitches of the first and the third tetrachords come from the first two pitches of RI₈ and I₈, and the other dyad Eᵇ-E is located in the middle of those series.

The left hand, consisting of eighth notes, functions as an accompaniment to the melody. It is interesting that ic. 1 of the melody is presented in wide spacing in the left hand. This change to wide spacing makes music more consonant because a harmonic interval of a major seventh sounds more consonant than that of a minor second. Thus, Rochberg emphasizes an interval of a major seventh melodically as well as harmonically in the left hand.

In the right hand, the two tetrachords that share two pitches are related at Iᵇₑ. The second and the fourth
tetrachords in this example come from $P_1$ and $R_1$ that are related at $I_{F_\#}$.

![Diagram of RICH-transformations between tetrachords.](image)

**Figure 4.5.** RICH-transformations between tetrachords.

When we put these tetrachords in a normal order, each pair of tetrachord shows RICH-transformation sharing two pitches. In addition, RICH-transformation at $I_{F_\#}$ already occurred in the basic 12-tone series between the set class 4-Z29 (0137). Thus, Rochberg extracts ic.1s from the series and combines them to create RICH-transformations between the series and its retrograde form (See Figure 4.5).
As shown in Example 4.3, this melody shows both transposition and inversions of the set classes. The second and the fourth tetrachords are $T_2$ of the first and the third tetrachords respectively, and the outer tetrachords and the inner tetrachords are related at $I_{EF}$, as expected given the relationship of $I_8$ and $P_1$. Thus, Rochberg selected a unique set class, 4-7 (0145) which is not heard among adjacent pitches of the 12-tone series, and developed the melody with motivic transformation.
Figure 4.6. Transformation graph of the motive in *Bagatelle* No. 11, mm. 1-8.

Figure 4.6 shows a transformation graph of this motive. Since the basic component of the melodic line is an interval class 1, I present all relationships between ic.1s. Measures 1-4 and 5-8 are inversionally related.

In *Bagatelle* No. 3, Rochberg also employs the motivic transformation of a quasi-sequential progression as shown in Example 4.4. Each unit consists of two measures, in two different time signatures, 7/8 and 3/8, and is based on P₁ and I₈ respectively. The texture of each unit displays the thick sonorities of pentachord and tetrachord, following a
melodic line of trichord; however, the specific arrangement of the pitches within this structure is not strictly sequential.

Example 4.4. Sequence in *Bagatelle* No. 3, mm. 29-32. Used by permission of Carl Fischer, LLC.

Example 4.5. Transformations of sequence.
Example 4.5 illustrates the transformations that are heard in the sequence. Rochberg divides the segmentations of the 12-tone series into pentachord, tetrachord, and trichord, 5-15 (01268), 4-24 (0248), and 3-5 (016). These set classes are transformed in the next statement. The first set class 5-15 (01268) is transposed up at $T_{11}$, and set classes 4-24 (0248) are related at $T_{11}$. The set classes 3-5 (016) are related at $I_{F}^{E}$ with the opposite contour. Or all can be considered $I_{F}^{E}$. By using a rhythmic sequence containing the same texture and opposite contour at the end, the music has a sequential structure.

Rochberg often employs motivic transformations to extend a melodic line in a way that recalls traditional melodic structure. The process of motivic transformation is shown in the theme G of his Symphony No. 2. The first three-note figure, 3-3 (014) has an ascending contour $R_{A1}$: <012>. As shown on Example 4.6, the figure is transformed by $T_{4}$, so the first pitches of each figure comprise the set class 3-12 (048). Thus, the set class 3-12 (048), which is one of elements of the 12-tone series is composed out over five measures. The second trichord, which has an opposite contour with other trichords, shows the inversional relationship at $I_{E}^{Ab}$. This section does not follow the
exact 12-tone series; instead, it shows the motivic transformations of trichords.

Example 4.6. Trichordal transformations in theme G of Symphony No. 2.
Used by permission of Carl Fischer, LLC.

Figure 4.7. Transformation graph of Theme G.
Figure 4.7 illustrates the transformation graph of theme G. The first two notes of each set class 3-3 (014) are related at $T_4$, and this relationship is also applied to the larger melodic lines which outlines the set class 3-12 (048).

As shown in Example 4.7, Rochberg continues to use the motivic transformations with the set class 3-4 (015) in mm. 100-103 and 3-3 (014) in m. 102. In mm. 100-102, Rochberg presents the transpositions of the set class 3-4 (015) at $T_{10}$ and $T_8$, and then presents the set classes 3-3 (014) related at $I_{Eb}$ and $I^f_{F#}$.

In general, the melodic contour of the set class 3-4 (015) is <102> and in mm. 102-103, the contour is changed to the contour <012>, and the relationship between trichords are inverted. These relationships, $I_{Eb}$ and $I^f_{F#}$, are the most characteristic feature in the basic 12-tone series.
4.2.2 Rhythmic variation

Rochberg also develops melodic lines using rhythmic variation, again showing Rochberg’s traditional sensibilities. *Bagatelle* No. 12 follows the most traditional formal description of the entire set, ABACABA form. Whenever a refrain appears, Rochberg slightly changes the rhythm and the texture. This is almost like Baroque rhythmic ornamentation. In addition, the end of the phrases corresponds with the end of rows.
Example 4.8 shows the rhythmic variations of the motive in *Bagatelle* No. 12. Each measure is composed of $P_1$; however, Rochberg repeats specific notes to highlight a pattern of chromatic voice leading.

As shown in Example 4.9, there are two chromatic voice-exchanges between right and left hands. Since the series contains three occurrences of interval class 1, Rochberg chooses to emphasize interval class 1 in each voice in this Bagatelle. Thus, based on this melodic framework, Rochberg presents various rhythmic variations.
Rochberg uses rhythmic variation between two different pieces as well as within one movement. Example 4.10 and Example 4.11 show the beginning parts of Bagatelle No. 1 and No. 3 respectively. Both based on $P_1$, the two pieces have totally different rhythms, moods, and tempos; however, Rochberg does not change the contour of the melody, repeating the last note, $B^b$. Thus, the beginning of Bagatelle No. 3 is a rhythmic variation of the beginning of Bagatelle No. 1.

Example 4.9. Two voice-exchanges in Bagatelle No. 12, m. 1.
Even though the two pieces share the same contour and pitches, their performances reveal very different techniques. According to the personal interview with Dixon, Rochberg described that the first piece is played as
a performer is speaking declamatorily. In the third piece, the performer should recognize the direction that he or she is going in the fast tempo.

In Symphony No. 2, when Rochberg restates a theme, he often uses a rhythmic variation. Rochberg slightly extends or shortens the thematic materials to provide variety. Example 4.12 shows the extended theme A, modified by rhythmic augmentation in the fourth movement. This melody finally returns after a big climax, and this is the first restatement of Theme A since the first movement. The various figures based on contour A, which will be shown on Example 4.18, prepare for the return of the melody, giving the extended first theme a more powerful and dramatic sound.


Used by permission of Carl Fischer, LLC.

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85 Dixon, "The Twelve Bagatelles and Sonata-Fantasia of George Rochberg: A Performer's Analysis", 44.
86 Ibid., 58.
4.2.3 Contour segments (C-seg)

In expanding a melodic idea, Rochberg uses both the same and opposite melodic shapes. A regularly developing melody with a specific, recognizable contour gives music the comprehensibility of structure, and it can be a criterion for understanding the phrase in a traditional way. Examining the contour space of a piece as developed by Robert Morris and Elizabeth Marvin in the 1980s, provides another interesting analytical approach to Rochberg’s music.

Rochberg uses the same contour segments to unite his melodic phrases. In Bagatelle No. 1, the first statement of $P_1$ in mm. 1-4 can be divided into four trichords that present the same short contour segment (CSEG) as shown in Example 4.13. If CSEG $<120>$ is the prime form of the contour, a retrograde-related CSEG $<021>$ follows to develop the melodic line afterwards. Two of the segments are contiguous notes, and all of the segments sit within a common register. The sustained lowest notes, C#, Eb, and A in the bass also create the prime form. I exclude another sustained note from that segment, the C3 in m. 1, because
it is played with C# at the same time. Instead, C3 completes the form, D3, A♭3, C3 in m. 1.

Example 4.13. Contour segments in Bagatelle No. 1, mm. 1-4.

This contour is also presented in mm. 14-6 with a reduced rhythmic pattern in Example 4.14. The use of a similarly shaped melody can give more unity in music even though the segments are derived from different set classes. Thus, Rochberg develops the initial melodic idea <120> throughout the piece.
Rochberg commonly presents the melodic line in opposite contour for the sake of variety when it is restated. In Bagatelles No. 3, the contour of the melodic line is ascending in section A, but its restatement in section A’ shows the opposite contour. Besides the contour, the grouping of pitches changes from a three-note figure to a four-note figure (See Example 4.15).
In Bagatelle No. 8, the recurring section also starts with the opposite contour. Section A starts with an ascending melodic line based on RI₈ and section A’ occurs with the opposite contour in I₈ (See Example 4.16). The use of similar rhythmic pattern with opposite contour provides the balance of unity and variety, which is Rochberg’s typical way of presenting melodic ideas.

Example 4.16. Opposite contour of theme in Bagatelle No. 8, m. 1 and m. 10.
Used by permission of Carl Fischer, LLC.

Rochberg frequently uses similar contours in his Symphony No. 2 as well. In particular, he selects various segments of the series to develop a complete theme. For example, he sometimes composes a theme consisting of only
one trichord; however, it does not sound monotonous because the use of repetition or unique timbre and orchestration gives a totally unfamiliar and unexpected sound to the listener. In addition, Rochberg uses a particular contour at the beginning of the theme and duplicates it in the general shape of the complete theme. As shown in Example 4.17, the introductory theme of Symphony No. 2, composed of the complete 12-tone series, is divided into three phrases by the fermatas, 4-19 (0148), 4-4 (0125), and 6-20 (014589), and the last note of each phrase is repeated as the first note of the next.

Example 4.17. The Introductory theme in Symphony No. 2. mm. 1-4. Used by permission of Carl Fischer, LLC.
The first two phrases share the same CSEG <3201>, and the third phrase has the CSEG <045231>. I will call CSEG <3201> Contour A and Cseg <045231> Contour B. The introductory theme consists of two Contour A’s that contain a quintuplet rhythm and a Contour B that contains triplet rhythmic figure. The goal of motion in this theme is from A5 to E4, the departure and the arrival; however, the fermatas between phrases seem to interrupt this long descending motion. If I select the first and the last pitches of each phrase, the general melodic Cseg is also <3201>.

Contour A < 3201> plays an important role in generating melodic lines throughout the piece. Rochberg creates many different themes or figures based on this contour.
Example 4.18. Various figures based on the contour <3201>.
Used by permission of Carl Fischer, LLC.

As shown in Example 4.18, the last movement presents various gestures based on Contour A <3201>. In particular, the contour <3201> is extended, combining the motive with fragments. It is a traditional plan of motivic development. Example 4.19 presents how the contour <3201> is extended.
Example 4.19. Overlapping of the Contour A.

Like Lewin's RICH-operation, which shows two overlapping pitches between the prime and the retrograde-inversion, the contour A and its retrograde-inversion, RIₜ, share two pitches, and as a result, the motive is extended. In addition, we can think of this extension as a sequence of the contour <210>, which is a subset of the contour A, because each quintuplet shows the contour <210>.

Contour A is a generator to make a complete theme with the use of sequential progression. Theme L in the second movement is composed by sequencing contour A. There are three presentations of the set class 4-19 (0148) with the same contour, CSEG <3201>, and each set class is related at T₄. After the presentation of CSEG <3201>, CSEG <201> follows with a short rhythmic pattern (See Example 4.20).
Example 4.20. Sequence of contour A in Theme L, mm. 348-58.
Used by permission of Carl Fischer, LLC.

Contour A, which is the basis of the thematic ideas, has two kinds of subsegs, A1 and A2 as shown in Figure 4. Each subseg has four different forms, P, I, R, and RI that function as important melodic ideas in many themes. These 3-note C-subsegs can be shown in all music because these are the only contours that one can make with three notes. However, since the first tetrachord 4-19 (0148) and its subsets are important factors in pitch-class space of this work, an investigation of the subsets of CSEG <3201> in contour space is necessary, and it will help us to understand how Rochberg projects many themes with the C-subsegs.
Figure 4.8. C-subseg of contour A.

Example 4.21. Theme A in mm. 4–18.\textsuperscript{87}

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\textsuperscript{87} I put the order numbers of the repeating pitches below the notes with parenthesis.
As shown in Example 4.21, theme A, the first theme of the piece, demonstrates that Rochberg does not at all adhere strictly to serial order in this work. Rochberg uses one series, $P_9$, in strings from m. 5 with anacrusis to m. 18, but repeats notes, so the first theme lasts for fifteen measures. As Rochberg said, his 12-tone music is melodic; theme A consists of two phrases which combine tension and relaxation adequately: mm. 5-11 and mm. 12-16.

Although it is based on the 12-tone series, Rochberg repeats the motivic set, 3-4 (015) in order to develop the melodic line: D, C#, and F#, in m. 8; $E_b$, B, and C in m. 13, and $A_b$, G, and C in m. 14. When we examine the contour of this melody, we see that it starts with the Cseg $P_A$: $<3201>$ and the repeated set class 3-4s are made up of the C-subseg $P_{A1}$: $<210>$ and $R_{A1}$: $<012>$. The alternate use of the descending contour in m. 8 and m. 14, which is influenced by the beginning CSEG $<3201>$, and the ascending contour in mm. 12-13 and mm. 15-16 create a more dramatic and traditional melodic structure. Therefore, the theme A is generated by the Cseg $P_A$ and the repetition of its C-subsegs $P_{A1}$ and $R_{A1}$. This stretching 12-tone theme is supported by free atonal harmonies, which are the result of the
combination of the original row and its mirror inversion as I will discuss later.

Example 4.22. Theme B in mm. 17–33
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Example 4.22 shows a theme B composed with $I_4$, which has even more repeated patterns than theme A. In this theme rhythmic patterns are associated with specific contours. Most of the triplet rhythmic figures have the C-subseg A2 and its transformations. Another similar association between rhythm and contour is the pattern of three eighth-notes following a half tied to an eighth-note. As shown in Example 4.23, in m. 21, m. 27, m. 28, and m. 29, Rochberg uses C-subseg $<102>$, because the use of three
eighth notes with the specific contour gives clarity of the rhythm among many triplets. The contour of Theme B looks unexpected and arbitrary because of the repeated groups of pitches; however, Rochberg controls the melodic line at some places with the same contour.

\[ \text{Example 4.23. C-subseg <102>} \]

Rochberg sometimes extracts short contours and makes a remarkable theme with various rhythmic patterns by using repetition or sustaining pitches. As shown in Example 4.24, Rochberg also creates theme I in the second movement using a single trichord, 3-4 (015), presented with contour \( P_{A_1} \). Since he uses percussion instruments with strong dynamics, this repetition does not sound monotonous. While we can find the 12-tone series in the melody of the first movement with a few exceptions, the second movement is motivic, and a complete series is hard to find. In the
second movement, Rochberg constructs the theme with a short gesture instead of a long melodic line.

![Example 4.24. Short gesture in Theme I](Used by permission of Carl Fischer, LLC.)

Another theme in the second movement is also based on the set class $3-4$ (015), but is composed using a different contour ($R_{a_2}$) and a different procedure as shown on Example 4.25. Instead of the exact repetition, Rochberg makes a new theme based on sustaining and slightly modified rhythm. In particular, this C-subseg $<102>$ is the important contour in theme B. This theme is supported by ostinato in different instruments.

![Example 4.25. Pedal tone in Theme K](Used by permission of Carl Fischer, LLC.)
In composing each theme, Rochberg selects some particular set class from the 12-tone series, and develops an entire theme from the partial melodic idea, changing the contour and using repetition or pedal point. He particularly employs the discrete trichords of the series with various contours, which becomes the theme, so it is hard to recognize the actual 12-tone series in the music.

Example 4.26. Descending figure of Theme C
Used by permission of Carl Fischer, LLC.

In m. 62 as shown on Example 4.26, Rochberg presents a new theme, C, in different mood. Theme C is composed of I_8 and the melodic contour of the theme C contains four consecutive Csegs of P_{AI}: <210>. Thus, the overall melodic shape shows a descending motion. Since this melody, played by the solo bass clarinet, is consistently descending by big leaps, it sounds very different from previous themes,
which have thick textures. Along with the change of the texture, the rhythmic pattern is much simplified in theme C. Instead of fast triplet or quintuplet rhythms, quarter and eighth notes are mainly used. It is interesting that in mm. 63-64, Rochberg still keeps using the contour, C-subseg <102>, and the rhythm as shown in Example 4.14. In spite of various textures and lengths of each theme, he prefers to pair a specific rhythm with the same contour.

The theme C has some relationship both in the contour and the rhythm with theme D. Theme C begins with a quarter rest followed by descending motion. As shown in Example 4.27, the theme D, beginning with a quarter rest followed by ascending motion, consists of two series, P₉ and R₉ over seven measures. The first three notes and the last three notes present the inverted contour since they are retrogrades and are the same pitches in the same register. The middle part of the melody is composed of four consecutive Csegs, Pₐ₂: <201>, which are the basis of the construction of theme B and theme K. Theme D also has a tonal sound due to the Bb major seventh chords at the beginning and the end. In particular, after the presentation of Bb major seventh chord in m. 68, two notes, D-E♭ sound to my ear as a leading tone-tonic relationship. This theme becomes more atonal when R₉ joins in the second
phrase. Thus, the themes C and D show opposite contour shapes in the overall structure.

Example 4.27. Theme D in mm. 67–73
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Theme E consists of two series, $R_9$ and $I_8$. According to the rhythmic regularity, each series is divided into four trichords that are played by different instruments (See Example 4.28). This theme is divided into two phrases that share the same rhythm, but different contours and different timbres.

Example 4.28. Theme E in mm. 76–82
Used by permission of Carl Fischer, LLC.
Example 4.29. Klangfarbenmelodie in Theme E  
Used by permission of Carl Fischer, LLC.

The consecutive rhythmic pattern of three eighth notes following three dotted quarter notes features contrasting articulations, staccato vs. legato. Example 4.29 shows the orchestration of theme E. The segments of the melody are stated by various instruments, using Klangfarbenmelodie, similar to the technique defined by Schoenberg. Rochberg
indicates the serial line with dotted lines, so the presentation of the theme E shows the influence of Schoenberg and Webern.

Rochberg sometimes creates a theme with dyads. In Example 4.30, showing Theme J, there are repeated dyads of C-A\(^b\) and a retrograde-inverted contour B follows with faster gesture.

![Example 4.30. Dyadic construction in Theme J.](image)

Example 4.30. Dyadic construction in Theme J.
Used by permission of Carl Fischer, LLC.

The various themes in the symphony are unified through Rochberg’s use of a specific contour, CSEG <3201>. Rochberg writes themes by using subsets of CSEG <3201>, and repeating or sustaining notes. In particular, C-subseg <102> along with a special rhythmic pattern plays an important role in extending the melodic line. Therefore, the contour A, <3201> functions as an important musical idea, a motive in this piece.
4.2.4 Quotation

In later works, Rochberg starts to use quotes of melodic ideas from other works to create new melodic lines. His first quotation work is known as *Chamber Symphony for Nine Instruments* (1953) as mentioned earlier. Steven Jones mentions that Bagatelle No. 6 is a “satire of the Fifth Symphony of Beethoven” because of the ending motive.\(^{88}\) Even though there is an octave displacement (C–A\(_b\)), this rhythmic and melodic motive is indirectly reminiscent of Beethoven’s famous 4-note motive. When I listened to the music without any reference for the first time, I did not recall Beethoven’s motive. However, the melody, combining ic. 4 and ic. 1 with the specific rhythmic pattern could be a quote of Beethoven’s motive, and since Rochberg’s Bagatelles are influenced by Beethoven’s Bagatelles and the expression marking of No. 7 is “Satirico,” this could be a satire of Beethoven’s work (See Example 4.31).

Example 4.31. Ending motive in Bagatelle No. 6, mm. 25-31.
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In addition, Bagatelle No. 12 sounds like No. 3, Musette of Op. 25 of Schoenberg, which is known as his first complete twelve-tone work based on a single row. Rochberg's Bagatelle No. 12 sounds neo-classical, and has a different mood compared to other bagatelles (See Example 4.1 and Example 4.8). As shown in Example 4.32, Schoenberg's music has a similar texture and chromatic melody, and the use of the series (one series per one unit) is also identical. Therefore, Rochberg's Bagatelle No. 12 shows an indirect influence from Schoenberg's Op. 25.
Schoenberg's excerpt in Example 3.32 also implies traditional elements by using a sequence and repeating a referential center, G in the bass. In Section B of Rochberg's *Bagatelle* No. 10, the A♭ is established as an important pitch center (See Example 4.33) by repetition and registral isolation. Thus, Rochberg shows a sense of centricity in some passages.
Rochberg sometimes moves the centricity in the piece to show a different structure of music, functioning as a modulation of tonal music. As shown in Example 4.34, Bagatelle No. 9 starts with an important pitch center, B♭, which is played loudly with a rhythmic stress. This referential pitch changes to C and then D. This pitch center is stated a major ninth lower in m. 18 of section A′. As each section is often divided by a modulation in traditional music, Rochberg changes the referential pitch to present a clear formal structure.
4.3 Rhythm

In the presentation of rhythmic aspects of music, Rochberg often uses a unique technique. That is, he repeats a specific rhythmic pattern as well as a specific pitches or pitch classes. He might have been influenced by the concept of an isorhythmic motet used in the medieval and early Renaissance periods. Therefore, as a tool of organization for the piece, Rochberg repeats similar rhythmic patterns.
As shown in Example 4.35, in Bagatelle No. 9, Rochberg alternates two rhythmic patterns. The first rhythmic pattern is characterized by a thirty-second note followed by a double dotted eighth note, repeating a referential pitch, $B^\flat$. Rochberg adds $E^\flat$ at the end of the series.
because he wants to show another set class 3-5 (016), D-E♭-A♭.

The second rhythmic pattern is presented in sixty-fourth triplets followed by a group of four hundred-twenty-eighth notes. It still focuses on specific pitches by repeating or sustaining them, and also shows a sequential progression.

By alternating two characteristic rhythmic patterns, Rochberg gives the music a more active mood with the sense of unity. As a result, Rochberg’s use of familiar techniques, such as repetition and sequence, helps make this music more accessible than some other serial compositions.

In Bagatelle No. 4, Rochberg also utilizes two repetitive rhythmic patterns to divide phrases. Example 4.36 shows section A and B of Bagatelle No. 4 where Rochberg reiterates two rhythmic patterns as shown in Example 4.37.
Example 4.36. Bagatelle No. 4, mm. 1-34.
Used by permission of Carl Fischer, LLC.

Example 4.37. Two repeated rhythmic patterns
In sections A and B, $R_1$ is stated three times each with the four occurrences of rhythmic patterns 1 and 2 respectively. That is, the beginnings of a row statement and a rhythmic pattern do not always correspond with each other. For example, in m. 10, a new row is stated in the middle of the rhythmic pattern 1 through mm. 8-13. The rhythmic pattern 1 consists of three short gestures of duration. The first presentation of the pattern 1 is always descending and the second presentation is always ascending by large leaps. The third and the fourth presentations mix the ascending and descending contour with a slight change of the duration.

In spite of the frequent change of time signatures and melodic contour, the consecutive use of the same rhythmic patterns makes the phrasing very clear. In particular, as shown in Example 4.38, Bagatelle No. 2 consists of five phrases. The melodic line of each phrase is played with accompaniment. It sometimes overlaps with the accompaniment and the range of the accompaniment is higher than the melodic line. Since Rochberg does not indicate any phrase markings on the score, the melody looks irregular and unpredictable. However, due to the similar rhythmic pattern of the beginning of each phrase bracketed
on the example, we can determine the division into five phrases.

Example 4.38. Rhythmic patterns in Bagatelle No. 2.
Used by permission of Carl Fischer, LLC.

Bagatelle No. 10 is the only piece without any expression marking at the beginning. In this piece, Rochberg also alternates a melodic phrase containing very large leaps with a repetitive pattern, consisting of two
sixteenth notes and an eighth note, shown on Example 4.39. The first melodic theme is in triple meter and the second theme is in duple meter. Although the second theme is notated in a triple meter, it sounds like duple meter because of the metrical displacement of the beat. Thus, Bagatelle No. 10 uses two themes based on different rhythmic patterns.

Example 4.39. Two themes in Bagatelle No. 10, mm. 1-4 and mm. 9-13.
Used by permission of Carl Fischer, LLC.
Rochberg utilizes the alternating of two rhythmic patterns in many pieces. The frequent use of similar patterns gives the music a clear phrase structure. As a result, the clear phrase structure is associated with traditional musical styles more than with the Second Viennese School serialism.

4.4 Harmony

The sonority of the “Viennese quartal chord” in this piece is predominant. According to the structure of the series, there are four occurrences of the set class 3-5 (016), the set type of this specific quartal chord. It is a chord which combines a tritone with a perfect fourth, mostly employed by the second Viennese school composers. Dixon also called this chord the “Rochberg chord” because of its frequent occurrence in his music. 89

Example 4.40. Viennese quartal chords, Set class 3-5 (016).

89 Dixon., 35.
Example 4.40 shows the Viennese quartal chords occurred in the basic 12-tone series of Rochberg’s Bagatelles, which are the basic vertical sonorities. When we count the numbers of Viennese quartal chords, purely used in trichord without any sustained note, Rochberg used this trichord 74 times in the Bagatelles (including the repeated chords). In Bagatelles No. 5 and No. 8, this chord is played 19 times and 15 times, respectively. When included with sustained notes, the sonority of Viennese quartal chords would be heard more frequently. In addition, other collections containing set class 3-5 (016), set class 4-9 (0167) or set class 4-5 (0126) are also important vertical sonorities.

Rochberg frequently uses chords as cadential markers at the end of each phrase or section. Example 4.41 shows the end of Bagatelle No. 1. It starts with a melodic line as shown in Example 4.10, and ends with three tetrachords, set classes 4-5 (0126), 4-5 (0126), and 4-9 (0167). In particular, he reorders pitch numbers 8 and 9 in order to use set class 4-9 (0167) for the final sonority. The three discrete tetrachords in the original row are 4-5 (0126), 4-229 (0137), and 4-13 (0136) (See Example 3.3). However, Rochberg’s reordering of pitches creates his preferred chord, set class 4-9 (0167) to end Bagatelle No. 1.
Example 4.41. Viennese quartal chord in the ending part of Bagatelle No. 1, mm. 17-18.
Used by permission of Carl Fischer, LLC.

The ending part of Bagatelle No. 9 gives a percussion-like effect because of a strong dynamic marking, *sfffz*. Rochberg also changes pitch numbers between two trichords, producing the set class 3-4 (015), which is not included among adjacent trichords in the 12-tone series (See Example 4.42).
Example 4.42. Ending part of Bagatelle No. 9, m. 24.
Used by permission of Carl Fischer, LLC.

The vertical spacing of the sonority creates a very different effect. In Example 4.43, three presentations of the set class 3-5 (016) show wide spacing over the octave. Along with four repetitive attacks of chords, widely-spaced chords give a climatic and powerful sound to this piece. Therefore, Rochberg uses his preferred chord, the set class 3-5 (016) in various ways.
According to Rochberg’s explanation, the hexachordal structure of the 12-tone series in this piece is based on three forms of mirror inversion. As I mentioned on Example 3.9, the first tetrachord of the 12-tone series, set class 4-19 (0148) plays an important role vertically, because a combination of an original form and three mirrored forms also creates the set class 4-19 (0148).
In the quote from Rochberg at the beginning of this chapter, he said that a combination between the original row and its mirrors can create various harmonic structures. In order to examine the vertical sonority available with this row and three combinatorial inversions, I combine all four series, $P_9$, $I_0$, $I_4$, and $I_8$ vertically as shown in Example 4.44. All of the vertical sonorities form set class 4-19 (0148). The four different trichordal subsets are found in set class 4-19 and shown on Example 4.45. Thus, according to Rochberg, five chords are the basic components in the vertical sonority of the music, one tetrachord and four different trichords. There are many tonal sounds possible with the sonorities because the set class 4-19 (0148) itself is a minor-major seventh chord,
containing a major or minor triad, set class 3-11, and an augmented triad, set class 3-12. Except for the set class 3-12, other trichords are shown in the basic 12-tone series.

Example 4.45. Set class 4-19 and its subsets

Based on the above sonorities, Rochberg makes the melodic line, which follows the order of the series, and uses vertical chords without any order. He freely reorders the pitches from hexachords and makes chords to express his musical ideas. These chords are presented as shown in Example 4.46. When the theme A is stated in Pₙ, in m. 5, three trumpets and trombones 1 and 2 play the set class 3-4 (015) and set class 4-18 (0148). In m. 6, the chords of three trombones exhibit the set class 3-3 (014) and set class 3-4 (015). In m. 8, all trumpets and trombones play
the basic vertical sonority of this work, set class 4-19 (0148).

Example 4.46. Vertical sonorities in theme A

Example 4.47 also illustrates a similar technique. The texture is a melody with an accompaniment, and the vertical chords of the accompaniment follow the basic sonorities, set class 3-3 (014) and set class 3-4 (015). The melody is based on R₉ and I₈ with the trichordal rhythmic division.
Example 4.47. Vertical sonority in mm. 76-81.

In the presentation of theme H, Rochberg uses a chordal texture that introduces a mirroring form of the chords. As shown in Example 4.48, theme H is composed in a totally different texture compared to the previous themes. It consists of set classes 4-17 (0347) and set classes 4-23 (0257). Each voice moves chromatically by step.
Example 4.48. Vertical sonority of theme H, mm. 123-127. Used by permission of Carl Fischer, LLC.

When we examine the voice-leading of each instrument, pairs of english horn vs. bassoon I and oboe vs. bassoon II create mirror forms of each other. The voice-leading of oboe and bassoon II shows a chromatically expanding motion, and its ordered pitch-class intervals are 7, 9, and 11. The voice-leading of english horn and bassoon I reveals the opposite direction of the contour. Thus, oboe and english horn vs. bassoons are in a mirror form (See Example 4.49).
Example 4.49. Two mirror forms in mm. 123-127

Appearing as the first and the last chords of theme H, set class 4-17 (0347) is the middle discrete tetrachord in the basic 12-tone series. It is transformed at $T_6$, passing through the set class 4-23 (0257) in the middle (See Figure 4.9).

Figure 4.9. Transformation graph of set class 4-17 (0347).
This theme is rhythmically changed from m. 184 as shown as Example 4.50. After the presentation of theme H by string instruments, which is rhythmically reduced in m. 184, there are three even more reduced statements of theme H with quintuplets performed by woodwind and brass instruments. They sound like an echo of the theme H by string instruments. The overall voice-leading of each figure shows chromatic stepwise motions in an opposite direction, which shapes a mirror form. The first chord, C-E♭-E-G is transposed at T, from the first chord, F-A♭-A-C in m. 123.
Example 4.50. Rhythmically reduced theme H in mirror form, mm. 184-87. Used by permission of Carl Fischer, LLC.

This theme occurs again in the third movement (m. 64) with more slightly changed rhythm. It is played by woodwind and brass instruments (See Example 4.51).
Example 4.51. Rhythmic variation of theme H. 
Used by permission of Carl Fischer, LLC.

The overall shape of theme H shows $T_6$ of set class 4-17 (0347), passing through set class 4-23 (0257). This theme is restated with varied rhythm, texture, and instrumentation. Figure 4.10 displays the relationship among the first tetrachords of each theme H. The first statement in m. 123, which is the second discrete tetrachord in the 12-tone series, is transposed at $T_7$ in m. 184 and $T_6$ in m. 640. The first and the last tetrachords present RICH transformation. In the analysis of the structure of 12-tone series, set class 4-19 (0148) is the main tetrachord which shows two RICH transformations as shown in Figure 3.6. However, in the music, the
transpositions of theme H also show a RICH transformation between set classes 4-17 (0347).

![Diagram showing RI-transformation between set classes 4-17 (0347).]

Figure 4.10. RI-transformation between set classes 4-17 (0347).

4.5 Texture/Articulation

Rochberg's Twelve Bagatelles provide various characters or moods by changing textures and attacks. Each piece shows a characteristic texture, with suitable expressionistic descriptions on the score.

In Bagatelle No. 5, Rochberg gradually adds attacks of notes, and the texture gets thicker for the dramatic sound. As shown in Example 4.52, the note of single attack becomes a two-note figure in m. 5 and the two-note figure becomes a
basic melodic idea until the end of section A. The general shape of the melodic line is ascending by large leaps. In m. 9, the melodic line presents a four-note figure in a single line, and in m. 10, the four-note figures are continued in dyads. The four-note figures in trichords occurs in m. 11 and after four presentations of this figure in m. 12, it finally becomes hexachords at the end of m. 12. By adding attacks with more voices, Rochberg presents a more percussive sound toward the climax of the piece. The spacing of chords gets wider and the texture gets thicker. Thus, Rochberg develops the melodic line from a single line to agitated chords by adding up the voices and repeating the same pitches twice, three times, and four times.
Example 4.52. Increasing attacks in No. 5.
Used by permission of Carl Fischer, LLC.

Example 4.53 summarizes how Rochberg's four-note figure creates a climax for the piece. Starting with the single note, C in m. 9, an ic 3 dyad emerges, and is followed by the trichord, set class 3-5 (016). Rochberg expands the spacing of the trichord from quartal chord (P4+A4) to quintal chord (d5+P5), and then presents a consecutive use of four-note figures in trichords. As in all other row forms, the set classes 3-5 (016) are consecutively transposed at T4. Throughout this process,
the piece finally arrives at the hexachord, 6-Z17 (012478). The version of the set class 6-Z17 is divided registrally into set class 3-5 (016) in the upper three voices and set class 3-12 (048) in the lower inner voices. Instead of using a dissonant tone cluster, which is highly chromatic, Rochberg spans the hexachord into trichords from the 12-tone series, adding voices gradually. In addition, a wide spacing of chords gives a more consonant sound than chromatically spaced chords. Thus, the number of chord members is increased with a series of 1, 2, 3, and 6.

Example 4.53. Four-note figures with adding voices, mm. 9-13.

In Bagatelle No. 3 as shown in Example 4.54, Rochberg also employs various attacks for the percussive sound in section B. This passage also presents two-note, three-note attacks in dyad, trichord, and pentachord; however, there
is a regular pattern, 2+3, to control the attacks as shown in Example 4.55.

Example 4.54. Various attacks in Bagatelle No. 3. Used by permission of Carl Fischer, LLC.

Example 4.55. Pattern of attacks, 2+3.

In this piece, a rhythmic sequence exists among various articulations, which does not correspond with the
series. Thus, the unity of this rhythmic pattern gives a traditional sense of coherence to the music.

In the presentation of each theme of Symphony No. 2, Rochberg uses a thin texture based on a melody with accompaniment. Each melody, which is supported by free atonal harmony derived from the segmentation of the 12-tone series, is presented in string or woodwind instruments alternatively. Rochberg sometimes presents two themes with different timbres in stretto like fashion. Figure 4.11 shows the texture of the exposition in the first movement from m. 1 to m. 122. The introductory theme is played in unison by the woodwind, the brass, and some of the percussion instruments (excluding the piccolo, flutes, and tuba). Placing this melody in unison is a dramatic way to get the attention of the audience. In mm. 4-18, theme A is played by strings except for the double bass and two horns, and theme B (mm. 17-33) follows played by woodwind instruments. After the restatement of theme A by strings, two themes are juxtaposed in mm. 45-61 where the double bass finally joins to play the themes. From theme C on, the thin texture is dominant, so theme C and theme D are played by solo instruments, bass clarinet and oboe respectively, and string instruments accompany the melody. Theme E is presented as a Klangfarben melodie by woodwind
and brass instruments, supported by accompaniment of strings. From m. 104, two themes are juxtaposed again.

Rochberg used various textures: polyphony, homophony, melody with accompaniment, and unison. They are combined to fit into the general mood of the piece, so each theme is presented in different ways.
Figure 4.11. Texture in each theme, mm. 1-122.
In *Twelve Bagatelles for Piano*, the basic 12-tone series contains many dissonant ingredients, with the shape of a quasi-mirror inversion. However, Rochberg’s treatment of the series shows many traditional features. Melodically, he uses repetition, sequence, and motivic or rhythmic variations of the melodic line. Some melodic lines remind the listener of the pre-existing melodic fragments. In addition, there is a sense of pitch centricity in some passages. Rhythmically, Rochberg alternates repetitive rhythmic patterns, almost like an isorhythmic motet. In spite of complex texture and contour, maintaining the same rhythm makes the music more approachable to listener. Harmonically, Rochberg uses the Viennese quartal chord frequently as an indication of the influence of the second Viennese composers. The wide spacing of this chord makes it sound more consonant than a narrow spacing would. As a result, although this piece is composed of a complete 12-tone series, a contemporary language, Rochberg still adheres to traditional elements in presentations of melodic line, rhythm, harmony, and texture. The influence of tradition on his compositional techniques becomes even clearer in his Symphony No. 2.
Rochberg’s Symphony No. 2 is composed of many themes, based on a 12-tone series. They are sometimes lyrical or dramatic with long phrases, or very simple with a short rhythmic value. He repeats a group of notes to extend the melody or omits some notes, emphasizing a specific subset. Therefore, Rochberg does not follow the order of the series strictly in each theme, and themes are stated freely in a loose sonata form. In particular, the first two themes are restated in the fourth movement, functioning as the first and the second theme. The formal structure follows the traditional design. Although four movements are played without interruption, Rochberg follows a traditional pattern of presentation, digression, and return.

In this piece, in the presentation of the melodic line, Rochberg focuses on one contour segment, <3201>, and develops the theme through the use of sequence, repetition, and rhythmic variation. The harmonic structure is influenced by his symmetric design of the 12-tone series. This unique structure of the series itself generates the specific set class, 4-19 (0148) and its subsets including a minor triad and an augmented triad, and as a result, these chords become the main materials for the harmonic sonority throughout the symphony. Thus, in Symphony No. 2, the row
is a generator for the building blocks of the work rather than the source for each note heard.
CHAPTER 5

CONCLUSION

The goal of this dissertation has been to examine George Rochberg’s 12-tone music, based on his idiosyncratic theoretical thinking and to identify the traditional elements in his serial compositional style. Rochberg started composing strict serial music, influenced by the music of the second Viennese school; however, his strong ties to traditional musical styles are apparent, especially in his later serial music. Based on Chapter 4, it seems as if Bagatelles contain more traditional elements, but because of the unique character of the set class 6–20, the harmonic vocabulary of Symphony No. 2 makes the music sound more traditional. Therefore, Rochberg’s serial music sounds different from other serialists in that it is more easily accessible to the listener.
5. 1 The position of George Rochberg in the history of American serial theory

In Chapter 2, along with a brief overview of American serial theory, I investigated Rochberg’s theoretical concept, “mirror inversion,” which today we would call a specific type of ‘inversional combinatoriality.’ In 1955, he published his idea about the symmetric structure of hexachords in his book, *The Hexachord and its Relation to the 12-tone Row*. He did not develop his theoretical ideas any further in print.

Rochberg’s mirror inversion is not based on disciplined mathematical logic. He merely described his thinking without scholarly rigor, his research formed on preparatory materials for composing music. His work was actually published earlier than Babbitt’s work.

Rochberg was the first to show how to find a mirror inversion easily by using his “tetrachordal series” modeled on a chromatic expansion. His approach was not supported by the next generation of theorists, so his terminology sounds awkward to modern theorists. He also presented how to create a mirror inversion with random hexachords; however, by consulting Forte’s list of set classes, we can
more easily recognize the structure of hexachords that exhibit inversional combinatoriality. The narrow focus of his work and his unskillful or uneconomical explanation of the subject also causes his theory to be located outside the main current of serial theory.

Since there are no specific references in his book, we do not know how much Rochberg was influenced by contemporary theorists; however, it is certain that his theory is a part of Babbitt’s concept of combinatoriality which has become well-known to later theorists. When I investigated theory books written by later theorists including Forte, Straus, and Lewin, I could not find any comments or references about Rochberg.

In spite of Rochberg’s small role in the history of American 12-tone music theory, his music had an important impact on the American serial tradition.

5. 2 Rochberg’s 12-tone music within a tradition.

In Chapter 4, various parameters of music were examined in relation to traditional style. Unlike other serial composers, Rochberg tried to compose serial music with a lyrical melodic line, recognizable harmony, and
predictable phrasing. In general, the structure of the form follows a traditional pattern: presentation of musical ideas, digression, and return to the beginning ideas. Rochberg’s Symphony No. 2 is in sonata form, containing twenty melodic themes. However, the two serial themes A and B, based on $P_9$ and $I_4$, can be considered analogous to the traditional first theme and the second theme that are related by a perfect 5th. By restating two themes in the recapitulation, Rochberg still keeps the framework of a sonata-allegro form in his large-scale work.

Rochberg’s *Twelve Bagatelles for Piano* and Symphony No. 2, written in 1952-56, sound very different even though they use the same musical language, a 12-tone series. The main difference is the structure of 12-tone series. In the symphony, the series is derived from a mirror inversion. In the *Bagatelles*, it is not. Set class 6–20 used in the symphony has more potential to make familiar sounds than the hexachords of *Twelve Bagatelles*. Thus, Rochberg’s *Bagatelles* have more dissonant and conflicting sound, whereas Symphony No. 2 fluctuates between a dodecaphonic and a traditional tonal sound.

In these works, Rochberg deals with the series quite differently. In *Bagatelles*, Rochberg follows the order of the 12-tone collection rigorously. In the symphony,
Rochberg develops the contours of subsets, and does not follow the series rigorously throughout the work. The Bagatelles is clearly a work that represents Schoenbergian classical serial style, which uses many Viennese quartal chords. He also employs various attacks, rhythms, and contours, combining with the limited pitch materials. Each individual bagatelle has its own character with different compositional techniques.

Rochberg’s Symphony No. 2 opens with the 12-tone melody presented as a single line in strict numerical order. Later the series is developed in several voices with segmentation of the series. As Rochberg mentioned earlier, his theme is melodic and is easy to sing. He selects a particular contour segment and composes many relatively long themes based on that CSEG. In addition, the chords do not exactly follow the numerical order. There are countless possibilities of producing chords from the series, but this piece shows continuity and stability in vertical sound because of the unique structure of the 12-tone series and because Rochberg actually chooses a limited vocabulary of vertical chords. The series consists of two 6-20s (014589) that are arrayed symmetrically. It proves that Rochberg’s pitch selection for chords is not a random choice but a planned decision within the series. In
order to present a more traditional sound, he chose a specific type of hexachordal construction in the 12-tone series.

Rochberg’s serial music presents various stylistic changes. His early classical 12-tone music is more rigorous, and the later work shows a more flexible serial style containing a tonal sound. His use of characteristic vertical sonorities, motives, and contours establishes an overall cohesiveness and stability. Additionally, Rochberg’s unique treatment of various segmentations, in particular, hexachords in the 12-tone series of his music expresses his musical ideas and imaginations.

Rochberg’s serial music is meaningful in that he presents a different direction, which is more accessible to the public. His music was accepted not by a few elite musicians but by the community. In her article "Terminal Prestige," Susan McClary attacked the academic thinking of composers like Babbitt, which makes his music seem difficult and prestigious. She asserts that the academic prestige market is even less stable than the commercial
Therefore, the current public wants to listen to music, which is easily accessible to their ears.

Although Rochberg used a contemporary language and contemporary techniques, he did not abandon traditional musical techniques completely and his music still contains elements commonly associated with traditional tonal music. This is Rochberg’s most characteristic feature unlike other doctrinaire serial composers. Therefore, Rochberg’s serial music blends elements of modern musical language with elements that fit within established traditional musical norms, creating an innovative serial style, unlike any other.

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