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Analysis of the works by twentieth-century composers
Edino Krieger, Igor Stravinsky, and Toru Takemitsu

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Abstract

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This thesis consists of three analyses of works by twentieth century composers of various compositional techniques. The first chapter compares Edino Krieger's *Sonatina* (1957) with previous works of his neoclassical period and its deviations in tonality and hybridization of form. The second chapter demonstrates the connection between the passacaglia theme and the free variations in Stravinsky's *Septet* and examines some of the unique properties of theme. The third chapter examines the Superset/Subset networks of various set collections in Toru Takemitsu's *Rain Tree Sketch* and reassesses the relationship of the octatonic collection on the work.

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Chapter I: Compression of form in Edino Krieger's *Sonatina*

One indication that Brazilian Composer Edino Krieger's *Sonatina* has not received much attention from musicologists is the lack of agreement in the scholarly literature about its date of composition. There are conflicting dates for the piece. Gerard Béhague places the work in 1947, which would make it Krieger's earliest attempt at sonata form within his piano oeuvre.¹ By contrast, Alexander Dossin², a Brazilian pianist who has studied the performance history of Krieger, and Salomêa Gandelman and Ingrid Barancovski, date the work to 1957.³ It is possible that the earlier date reflects an initial draft that Krieger later revised, but there exists no early draft on record.

A later date for the work is plausible. The *Sonatina* would be an outlier if it were composed in 1947. Krieger composed his early works (1945 to 1952) using the twelve-tone technique.⁴ During this time, Hans Koellreutter, who introduced dodecaphonic music to Brazil, was an important influence on Krieger, who regularly performed in Koellreutter's music ensemble, Viva Música.⁵ Krieger composed no sonatas during this period; only three of his piano works use dodecaphonic techniques.

¹ Gerard Béhague, "Krieger, Edino," Grove Music Online, 2001, <https://www-oxfordmusiconline-com.offcampus.lib.washington.edu/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000015537>.

² Alexandre Saggin Dossin, "Edino Krieger's Solo Piano Works from the 1950s: A Dialectical Synthesis in Brazilian Musical Modernism" (PhD diss., The University of Texas at Austin, 2001), 65.

³ Salomêa Gandelman and Ingrid Barancovski, "Edino Krieger - Obras para Piano," *Debates - Cadernos Do Programa De Pós-Graduação Em Música* 3 (1999): 28.

⁴ Gandelman and Barancovski, 25.

⁵ José Wellington dos Santos, "Estudo Intervalar Para Piano N. 2 de Edino Krieger: Um Estudo de Ressonância" (Simpósio Brasileiro de Pós-Graduandos em Música, Rio de Janeiro, 2010), 800.

In 1948 Krieger won first prize in a competition for Latin American composers held by the Berkshire Music Center at Tanglewood.⁶ This prize allowed him to travel abroad and study in the United States. During his time in America, he studied composition with Aaron Copland and Peter Mennin at the Juilliard School until 1949. It is likely that the influence of these two notably conservative composers would be a specific reason for Krieger's style from dodecaphonic towards a neoclassical style. By 1952, Krieger had rejected this technique and moved towards neoclassicism. It was during the 1950s that all the sonatas appeared. The other stylistic differences between the *Sonatina* and the dodecaphonic pieces refute the 1947 date.

The *Sonatina* contains many similarities and differences from the previous sonatas. First, we should note that for Krieger, the use of the title "Sonatina" here only indicates a mini sonata. However, the condensing of form especially interests Krieger in the sonatina. In terms of size, the sonatina is smaller in scale than the two sonatas that came before it. These previous sonatas are large three-movement works with large outer movements. Traditionally, the first movement of a Sonata is in a form called sonata-allegro. However, Krieger's first movements do not encompass all the features of a standard sonata-allegro form. The form is potentially closer to sonata-rondo.⁷ Here, I use the term sonata-rondo loosely, as a realization that either sonata-allegro or sonata-rondo does not adequately explain the formal organization.⁸ A similar process develops in the first movement of the sonatina that I will examine further. Krieger uses the same compositional technique for the *Sonatina* but further hybridizes and miniaturizes the form.

⁶ Béhague, "Krieger, Edino."

⁷ Keisy Peyerl and Guilherme Sauerbronn de Barros, "Sonata n.1 para piano de Edino Krieger," *Revista Vórtex* 5, no. 2 (2017): 18.

⁸ Dossin, "Edino Krieger's Solo Piano Works from the 1950s: A Dialectical Synthesis in Brazilian Musical Modernism," 39.

Another prominent feature shared amongst the works is the use of perfect fourths and fifths.⁹ Krieger has a fondness for melodic and harmonic uses of these perfect intervals. The frequent use of fourths produces an angular melody found in all the neoclassical works. Harmonically, quartal chords appear often throughout this period. Krieger rarely relies on whole musical sections built on quartal harmony; instead, he supplants them for conventional tertian harmonies. Gandelman and Barancovski argue that Krieger's initial training as a violinist explains his obsession with these intervals. However, an interview with Krieger by Dossin indicates Hindemith had a bigger influence on his quartal and quintal harmony usage.¹⁰

The last major feature from this period is the use of modes and keys. Krieger utilizes modes alone or combines multiple modes simultaneously.¹¹ These combinations of modes arise from either using two different modes in different voices against each other or synthesizing a mode from two modes. Krieger does not limit himself to conventional church modes and frequently creates new seven-note modes. Modes usually apply to the keys of a given passage or work or are reinterpreted as another mode for modulatory purposes.

The works of his neoclassical period are tonal, in a modern sense of the word. Standard conventions for establishing tonality are frequently abandoned or weakened. One of the common features exhibited in the sonatas is the change of key which never ends in the opening key.¹² For example, the first piano sonata begins in C and ends in B^b, while the second piano sonata begins

⁹ Gandelman and Barancovski, "Edino Krieger - Obras para Piano," 48.

¹⁰ Dossin, "Edino Krieger's Solo Piano Works from the 1950s: A Dialectical Synthesis in Brazilian Musical Modernism," 67.

¹¹ Gandelman and Barancovski, "Edino Krieger - Obras para Piano"; dos Santos, "Estudo Intervalar Para Piano N. 2 de Edino Krieger: Um Estudo de Ressonância." Dos Santos spends an extensive amount of time on the various mode usages of the second sonata.

¹² Gandelman and Barancovski, "Edino Krieger - Obras para Piano," 48.

in C[#] and ends in F. The precise location of these modulations varies by piece. The first sonata remains centered on C until the final movement, whereas the second sonata moves to F by the start of the movement. The *Sonatina* is unique in this respect as it alludes to moving from keys but is firmly in one key throughout.

There are two reasons I wish to examine the work. The first is to examine Krieger's condensing and hybridization of form. The *Sonatina* gives Krieger the freedom to explore various techniques in condensing the form. On the surface, it seems that the two movements are straightforward: the first movement in sonata form and a second movement in a binary form. However, further examination will show that is not entirely the case. The second is to take a second look at the harmonic structure of the work. Krieger's sonatas modulate away from the starting key and end in a foreign key. Gandelman and Barancovski claim that the *Sonatina* begins in A minor and ends in E minor. However, I believe that structurally the work is in the key of E minor and the ambiguities of Krieger's first theme can be resolved quite easily.

The first movement begins with the exposition in the first theme. The first theme presents the first theme with a simple structure; a melody accompanied by Alberti-type figuration in A minor opens the first two measures before the melody appears on measure three. Instantly, we see that the metric organization of the two parts does not align. Despite being in 3/4, Krieger creates a hypermeter of 3/2 with the left hands Alberti-like figure. This rhythmic feature does not seem important as Krieger does not use it outside the first theme. Krieger repeats the melody once, the first iteration starting on B6 and the second iteration a perfect fourth down to F[#]5. Arriving at measure 14, a trill in the melody is supported by introducing quartal harmony moving

in a parallel descending manner by major seconds.



Figure 1. Measures 1 through 5 of the first movement.

This first theme lacks clarity as to which pitch is the tonic. Ambiguity arises from the different implications the harmonization and the melody provide. The Alberti-style figuration in the bass outlines an A minor chord implying A minor as the tonic. The melody derives from the E minor scale. It highlights important structural components of E minor: E and B. Gandelman and Barancovski believe that the solo appearance of the A minor triad in the first two measures believe Krieger considers the movement in A minor.¹³ Dossin's assessment of the sonata agrees but does not discount E minor as the tonic.¹⁴

Assuming Krieger begins in A minor, it would imply that the melodic content derives from the Dorian mode, and the second appearance would be E Dorian. Harmonically, we have $i - V/V - v$ and would leave the first theme ending in the minor dominant rather than the tonic before the transition. However, if we assume E minor is the tonic, both the melodic and harmonic content are easier to explain. The melody would natively belong to E minor, with the second statement being in the dominant minor. The harmonic relationship is smoother in E minor

¹³ Gandelman and Barancovski, 48.

¹⁴ Dossin, "Edino Krieger's Solo Piano Works from the 1950s: A Dialectical Synthesis in Brazilian Musical Modernism," 66.

as well. Krieger's harmonic progression would indicate iv - V - i and cadencing on E minor before moving to the second theme.



Figure 2. Summary of the melodic and harmonic content of the first theme area.

The arrival on measure 17 begins the second theme and the second key area. Krieger does not write a transition between these two sections; he simply outlines the B minor triad multiple times to reinforce it as the tonic for the second key area. It seems more plausible that B minor's function is the minor V of E minor rather than a chromatic function in A minor. The predominant feature of the second theme is the use of perfect fourths. Krieger uses perfect fourths and fifths as the building blocks for the melodic and harmonic content in the second theme. Melodically and rhythmically, a new motive appears: two sixteenth notes followed by an accented half note a perfect fourth above, and Krieger will continuously use this motive throughout the rest of the piece.



Figure 3. Second theme motive.

Krieger also avoids traditional reinforcements of harmonic progressions in this section. Rather than using the conventional dominant-tonic relationship, Krieger uses voice-leading in contrary motion by step to reach harmonic destinations.

After completing the two themes of the exposition in measure 30, Krieger does not immediately go into the development section. Instead, he restates the first theme in the original key, and this restatement is identical to its first appearance. Though form has yet to be discussed, the reappearance of the first theme after the second theme would imply that Krieger is framing the movement in sonata-rondo. The reappearance of the first theme before the development is a common feature in Krieger's sonata form writing, and Krieger uses it for both previous piano sonatas.

Measure 42 marks the true beginning of the development section, replacing the previous trill and finishing the first theme, with a scale leading to C# on measure 43. We may interpret the scale in two ways; the scale begins on the 5th scale degree of the E Mixolydian that Krieger reinterprets as C# Phrygian. Measure 44 through 52, Krieger takes the scale passage from the primary theme and repeats it through several transpositions. Throughout the eight measures here, there are two sets of transpositions that are divided by measure 48, where Krieger briefly ceases on D#. Krieger's final goal is an open fifth on C and G, leaving ambiguity on the current tonality.

Krieger returns to the second theme now in G minor. The approach is novel and, like the original presentation of the second theme. Krieger prefers voice leading in contrary motion to reach harmonic goals. On measure 53, the harmony on the downbeat is quartal and resolves the

Krieger uses tritone root movements for the first time, the motion from E-flat to A on measure 77. Krieger enhances the destabilization further with a bimodal scale on A.

The motion leads us to D minor and the return of the Alberti-like figuration in the bass and the shortened version of the first theme. The descending bass arpeggiation coupled with the soprano's trill alludes to the entrance of the recapitulation. In mapping the trajectory of these voices, the outer voices should converge on A in the bass and B in the soprano, which is the opening voice leading for the exposition. However, what transpires is not the recapitulation but a section of the development.



Figure 5. Voice leading for measures 79 through 82.

The *Animado* at measure 82 introduces a contrasting section within the development. Krieger continues with the voice leading as predicted above, A in the bass and B in the soprano, and engages with the first theme. Krieger presents this new segment of the first theme twice in two six-measure phrases. Each presentation differs by perfect fourth and mimics the harmonic motion of the exposition. The first six measures are harmonized in A minor, and the second six in E minor. Krieger continues through brief new material that moves from tonal centers of F# to

B. At measure 99, this new material moves back to a similar harmonic scheme as the introduction to the *Animado* that finally returns to the opening of the *Animado*. The material is roughly the same, except for the new descending figurations on measures 110 and 111. These figures are one of the few where Krieger uses transpositions in the second.

Measures 112 through 114 continue to destabilize the harmony while simultaneously contracting the length of the first theme. The harmonic motion continues by step until we find a return to the *Poco meno mosso* at measure 118. Krieger mirrors measures 75 through 81 and now utilizes these measures to fulfill the role of a retransition into the recapitulation.

The recapitulation only presents the first theme and the first key area. Krieger writes the music precisely as it was in the exposition, with discrepancies in the last few measures. A small codetta is introduced on measure 141, alluding to the first theme. This time, Krieger quickly moves to a complete E minor triad just before the final cadence on the two sixteenth half note motive on E minor.

This leaves a final question regarding the overall form. The movement contains elements of both the sonata-allegro form and the sonata-rondo. Krieger fulfills much of the format for the sonata-allegro. Krieger presents the exposition in two keys whose relationship is tonic-dominant; the development functions as intended, providing a thematic expansion of the themes presented in the exposition; and the recapitulation returns the first theme in the tonic key. There are obvious issues here. The first theme repeats after the second theme and is in the original key, while the recapitulation contains no second theme.

Considering the sonata-rondo, Krieger presents the exposition as A-B-A. The development fulfills the middle C section of the form, with the final A section coming afterward. However, this too presents an issue. This format leaves the overall structure as A-B-A-C-A and is closer to a five-part rondo rather than a sonata-rondo. This movement seems to be a loosely hybrid application of aspects of both formal models, resulting in something that does not really resemble either closely.

The second movement contrasts with the first movement in several ways. First, Krieger introduces an ostinato that dominates the entire texture. Second, the second movement is harmonically static. Krieger seldom tonicizes keys outside of E minor and implies any references through melody rather than vertical alignment. Third, the phrase structure is far more regular when compared to the first movement. The first movement's phrases appear in various lengths, while Krieger opts for a four-measure structure in the second movement. Krieger also does not change meters throughout the second movement to further the support of consistent phrases. Fourth, the development of themes is nearly nonexistent. Fifth, the use of the perfect fourth, and its inversion, serves a melodic function rather than a harmonic function. The second movement contains no chords built on fourths.

In the second movement's opening bars, Krieger introduces the ostinato that will remain throughout most of the movement. The ostinato comprises two segments of four notes, with each segment on either beat one or beat two. These two segments, notably the first, will become an important material for Krieger throughout the movement.



Figure 6. Ostinato figure.

Krieger transposes the ostinato for five consecutive measures, each time by a perfect fifth. Upon reaching the B-flat on measure seven, he moves down by a perfect fifth on the following measure. Afterward, Krieger only uses the first segment of the ostinato from measures nine through thirteen. The segments move down by minor thirds until reaching measure ten. Krieger compresses the first segment further at measure 11, comprising only the first pitch classes rather than four. Instead of using four notes of the figure, he truncates the final note and further transposes the three-note figure down by semitone until reaching E2 on measure 14.



Figure 7. Compression of the first segment of the ostinato.

Measure 16 begins the second theme of the movement while the ostinato continues underneath it. While the ostinato theme presents a rhythmic aspect, the second theme is purely melodic. The melodic features most characteristic of the second theme are the perfect fourth and fifth. Harmonically speaking, one could draw an equivalence between the perfect fourth and the fifth. Melodically, however, they are distinct. The structure of the first eight measures, measures

16 through 23, is a period that further divides into conventional four-measure phrases. These four-measure phrases fulfill the roles of antecedent and consequent, with the antecedent ending on a half-cadence on B and the consequent ending on E. These harmonic changes occur through melodic implication because the ostinato forces the harmony to remain fixed in E minor.

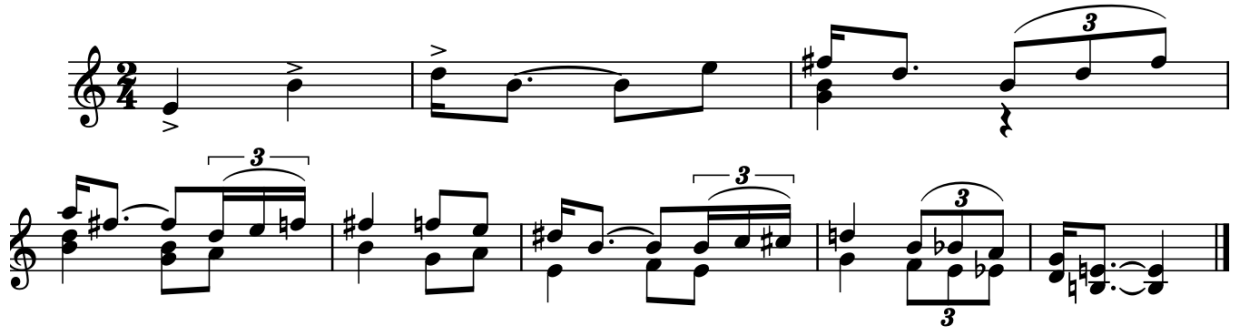


Figure 8. The melodic line of the second theme.

Measures 25 through 32 contain two four-measure phrases where Krieger develops the theme slightly. The development here is small and amounts to truncated versions of the second theme, first in A minor and the second in E minor. The ostinato transposes to A minor and then E minor along with the melody. Measures 29 and 31 also contain variations on the ostinato. Krieger applies only the pitch classes from the ostinato's second segment and transposes it down by a minor third. Krieger also places the descending chromatic figure from the second segment into the alto voice. The inversion of this figuration appears on measure 31. In each eight-measure section, Krieger cadences firmly melodically in E minor.

After the repeat sign on measure 33, we arrive at the second half of the movement. The first 12 measures of this new section are an exact repeat of measures one through twelve. Krieger continues to use the three-note figure from the first segment of the ostinato by transposition of a major second to avoid arriving at E early. Upon reaching measure 51, Krieger places a pedal E in

the bass that will continue until the end of the movement. Above this pedal, Krieger takes the two segments of the ostinato and repeats them several times through transpositions of a perfect fourth. The first segment is in the inversion of the original configuration. Krieger raises one pitch class by a major second to produce the new varied segment. On measure 54, Krieger raises one pitch class in the first segment by a major second to produce a new variation on segment one.



Figure 9. Various transformations of the two segments of the ostinato over mm. 51 through 57.

Measure 58 reaches the apex of the moment. The texture divides into three parts: the pedal bass on E, the ostinato with its original pitch classes, and an altered version of the second theme's melody. Krieger inverts the melody and the ostinato, placing the ostinato above the melody. The phrase structure for the melody continues to conform to a four-measure phrase structure.

Measures 66 through 69 resemble the descending figure from the first theme area. However, Krieger chooses the content from the second segment of the ostinato and alternates with the first segment on the first beat of measures 67 and 69. What is similar between the two descending figures is the transposition of the minor third. Krieger inverts the ostinato and the melody again at measure 71, with the second theme truncated further and only encompassing two measures of the original theme. The piece ends with a traditional V - i cadence and provides a firm E minor triad.

As hinted by the repeat sign after the two themes, the formal structure would be binary. However, that would be an oversimplification of the form. The large A section contains two unique themes that are treated separately. The large B section does not function as a traditional complement to binary form. It begins like the A section but develops parts of the first theme until we reach the ending, which functions as a coda. Krieger has compressed the binary form into a binary plus a coda. The large A section serves as a complete binary form. The large B allows for some development to transpire but ultimately serves the role of a coda.

Chapter II: Stravinsky's *Septet*: Row Qualities and Free Variations

After completing *The Rake's Progress* in 1951, Stravinsky embarked on a new compositional direction, eventually embracing an idiosyncratic variety of dodecaphony. Other works from this period show Stravinsky's various applications of dodecaphony and serialism, such as *Cantata* (1952), *Septet* (1953), *In Memoriam Dylan Thomas* (1954), *Agon* (1954-7), and *A Sermon, a Narrative and a Prayer* (1960-1). The *Septet* comes relatively early in this revision of the method and has some characteristics of a transitional work. The first movement is in sonata form and resembles Stravinsky's neoclassic style. However, the second and third movements take a different approach and apply a row derived by extension from the first five pitches of the opening theme in the first movement. For the second movement, a Passacaglia, the row repeats through a theme and variations, while the third movement, a Gigue, uses the row in a quasi-fugue manner.

Stravinsky builds a row of sixteen notes in length but only uses eight different pitch classes. Repetition of pitch classes allows for exploring something other than the absolute atonality of a "classical 12-tone row." The row does not conform readily to any harmonic center, but it could be argued that the first half of the row begins in E minor and "modulates" to A. The term "modulation" is used loosely here; however, there is a movement in the second half of the row towards a harmonic goal in A. Stravinsky acknowledges this harmonic motion by ending some variations with a clear A major triad. This harmonic motion implies that either E minor or A major is the "key" of the work and fits into the larger harmonic scheme of the three movements. With the first movement in A major, it is logical for the second and third movements to be in related keys.

P4	E	B	A	G	F#	G#	C#	B	G	F#	G#	G	A	C	G#	A	R4
P5	F	C	A#	G#	G	A	D	C	G#	G	A	G#	A#	C#	A	A#	R5
P6	F#	C#	B	A	G#	A#	D#	C#	A	G#	A#	A	B	D	A#	B	R6
P7	G	D	C	A#	A	B	E	D	A#	A	B	A#	C	D#	B	C	R7
P8	G#	D#	C#	B	A#	C	F	D#	B	A#	C	B	C#	E	C	C#	R8
P9	A	E	D	C	B	C#	F#	E	C	B	C#	C	D	F	C#	D	R9
P10	A#	F	D#	C#	C	D	G	F	C#	C	D	C#	D#	F#	D	D#	R10
P11	B	F#	E	D	C#	D#	G#	F#	D	C#	D#	D	E	G	D#	E	R11
P0	C	G	F	D#	D	E	A	G	D#	D	E	D#	F	G#	E	F	R0
P1	C#	G#	F#	E	D#	F	A#	G#	E	D#	F	E	F#	A	F	F#	R1
P3	D	A	G	F	E	F#	B	A	F	E	F#	F	G	A#	F#	G	R2
P4	D#	A#	G#	F#	F	G	C	A#	F#	F	G	F#	G#	B	G	G#	R3

I4	E	A	B	C#	D	C	G	A	C#	D	C	C#	B	G#	C	B	RI4
I5	F	A#	C	D	D#	C#	G#	A#	D	D#	C#	D	C	A	C#	C	RI5
I6	F#	B	C#	D#	E	D	A	B	D#	E	D	D#	C#	A#	D	C#	RI6
I7	G	C	D	E	F	D#	A#	C	E	F	D#	E	D	B	D#	D	RI7
I8	G#	C#	D#	F	F#	E	B	C#	F	F#	E	F	D#	C	E	D#	RI8
I9	A	D	E	F#	G	F	C	D	F#	G	F	F#	E	C#	F	E	RI9
I ₁₀	A#	D#	F	G	G#	F#	C#	D#	G	G#	F#	G	F	D	F#	F	RI ₁₀
I ₁₁	B	E	F#	G#	A	G	D	E	G#	A	G	G#	F#	D#	G	F#	RI ₁₁
I0	C	F	G	A	A#	G#	D#	F	A	A#	G#	A	G	E	G#	G	RI0
I1	C#	F#	G#	A#	B	A	E	F#	A#	B	A	A#	G#	F	A	G#	RI1
I2	D	G	A	B	C	A#	F	G	B	C	A#	B	A	F#	A#	A	RI2
I3	D#	G#	A#	C	C#	B	F#	G#	C	C#	B	C	A#	G	B	A#	RI3

Figure 10. Two 16 x 16 matrices of all four-row forms of the row in the Septet.

The row's intervallic content features predominantly ic1 and ic2. All other intervals under ic6 appear once, apart from ic5 appearing twice. The high degree of ic1 and ic2, and their inversions, allows Stravinsky great freedom in realizing a row form. The original statement of the row as the

passacaglia theme uses ic1 and ic2 in wide leaps, while variations based on the row prefer stepwise motion in contrast. Because of the arrangement of these intervals, we find some symmetries within the row. The notes at order positions 6 and 11, respectively, six notes from the beginning and six from the end, are the same pitch class. Other invariances in the row appear in set classes that recur in the row. The pitch classes of order positions 3, 4, 5, and 6 form the tetrachord (0123) and appears in positions 10, 11, 12, and 13 but not in the same order as 3, 4, 5, and 6. We can expand this set to include order position 2 to the first group of notes to create (01235). We can also form this pentachord by an expansion of the second (0123) to include the notes in order positions 8 and 9. Other prominent sets are (012) and (02357).¹⁵

No row contains all twelve pitches, but it is possible to produce chromatic harmonic textures when row forms are combined and used simultaneously. Each form shares at least four pitch classes with any other row form, with the inversion of that form having the highest number of common pitch classes, sharing all but one pitch. Any P_n will be most divergent with row P_{n+6} , I_{n+1} , I_{n+3} , and I_{n+6} , where I_n is the inversion of P_n . Since the primary row form of the Septet is P_4 , we have row forms P_{10} , I_5 , I_7 , and I_{10} as containing the fewest common tones and I_4 containing the most. The relationship with I_5 becomes important in two variations, as it allows Stravinsky to maximize all twelve pitches to sound throughout a variation by using only two row forms simultaneously. This combination of row forms is not the only option for the formation of all twelve pitches to appear. Selecting three row forms can achieve a similar effect if the row forms have the appropriate missing pitch classes to complete all twelve pitch classes. For example, selecting P_4 , I_4 , and P_1 would create a complete aggregate.

¹⁵ The set (02357) derives from the first five notes of the row and first appears in the opening theme in the first movement. This set can also be built from a free arrangement of notes from the row. For example, taking notes 3, 5, 6, 7, and 8 produces the same pentachord. Already mentioned sets can be formed through free use of the row as well.

Another form of symmetry consists in how row forms are combined. Since there are several invariants within a given row, certain combinations can be useful to exploit and create symmetrical vertical structures. Such symmetrical structures appear in various places in the Passacaglia. One such combination is the simultaneous presentation of P and I forms that begin with the same pitch class, together with their retrograde forms. This vertical combination of P_n , R_n , I_n , and RI_n produces eight symmetrical pairs starting from the ends of the rows towards the middle for some row n .

P_4	E	B	A	G	F [#]	G [#]	C [#]	B	G	F [#]	G [#]	G	A	C	G [#]	A
I_4	E	A	B	C [#]	D	C	G	A	C [#]	C	D	C [#]	B	G [#]	C	B
R_4	A	G [#]	C	A	G	G [#]	F [#]	G	B	C [#]	G [#]	F [#]	G	A	B	E
RI_4	B	C	G [#]	B	C [#]	C	D	C [#]	A	G	C	D	C [#]	B	A	E

Figure 11. A symmetrical combination of all four-row forms based on the pitch class E.¹⁶

Other row form combinations can produce vertical symmetries with repeated patterns. Although not used by Stravinsky, combining P_1 , P_4 , I_4 , and I_4 reveals repeated patterns throughout their usage.

P_4	E	B	A	G	F [#]	G [#]	C [#]	B	G	F [#]	G [#]	G	A	C	G [#]	A
I_4	E	A	B	C [#]	D	C	G	A	C [#]	C	D	C [#]	B	G [#]	C	B
P_1	C [#]	G [#]	F [#]	E	D [#]	F	A [#]	G [#]	E	D [#]	F	E	F [#]	A	F	F [#]
I_1	C [#]	F [#]	G [#]	A [#]	B	A	E	F [#]	A [#]	B	A	A [#]	G [#]	F	A	G [#]

Figure 12. Combination P_1 , P_4 , I_4 , and I_4 and their repeated vertical structures.

The original presentation of the passacaglia appears in *Klangfarbenmelodie* throughout the ensemble. The rhythm used in the second movement's opening is the rhythm that the

¹⁶ The colors in these charts allow for easier identification of combinations that are the same.

passacaglia takes throughout much of the work, through Stravinsky deviates from it in some variations. The passacaglia theme will either manifest in the lowest voice, standard for the conventional bass-ostinato passacaglia, or appear distributed amongst the rest of the ensemble in *Klangfarbenmelodie*. Stravinsky chooses larger interval classes for the presentation of the theme, which becomes contrasted by smaller intervals throughout the variations.

Scholarship on serialism of the second movement has focused on the passacaglia theme and its appearance throughout the variations. Among the components most neglected in the second movement are the free counterpoints that appear in some variations. Erwin Stein's initial analysis asserted that the free counterpoints were not directly derived from the row.¹⁷ Frank Hoogerwerf, in his writing on the *Septet*, also concluded that certain variations contained free counterpoint, through he does acknowledge some of the invariant possibilities found within the row.¹⁸ However, these "free" counterpoints extract their qualities from the row itself and are worth reexamining. There are nine variations, three of which (I, VI, and VII) use "free" counterpoint as a method of variation. These free counterpoints are written in a similar style and use similar sets in their appearance. The remaining six variations deploy various row forms throughout their variations and strictly follow the row forms' order. For this reason, it will be best to divide the analysis of these variations into two groups: those that are written in free counterpoint and those that are not.

Variations II, III, V, IV, VIII, and IX all strictly follow the order of their row forms. The second variation places the theme in the lowest voice, while the upper voices appear in transpositions of the theme in canon. The passacaglia theme is divided in half, with each half

¹⁷ Erwin Stein, "Stravinsky's Septet (1953): 'For Clarinet, Horn, Bassoon, Piano, Violin, Viola & Violoncello: An Analysis,'" *Tempo*, no. 31 (1954): 7.

¹⁸ Frank W. Hoogerwerf, "Tonal and Referential Aspects of the Set in Stravinsky's Septet," *Journal of Musicological Research* 4, no. 1–2 (January 1, 1982): 78.

containing three voices in canon above the passacaglia. Aside from being in canon, these three voices are shorter in duration; this diminution allows them to fit into a four-bar phrase. There are two sets of three-voice canons over the span of eight bars of the passacaglia theme. There are three transpositions used throughout the variation: P₄, P₁₁, and P₂, and one retrograde, R₇. Each row form contains similar rhythmic components of the passacaglia theme, but Stravinsky treats their total rhythmic patterns and intervallic directions more freely to distinguish between them and the main theme. The violin, viola, and clarinet enter above the cello in canon using the row forms P₄, P₁₁, and P₂. The second half of the variation features the clarinet, the bassoon, and the horn using row forms P₄, P₂, and P₇, respectively. Stravinsky does deviate from P₁₁ in the third measure of the variation. Instead of a D[#] at position 11, Stravinsky wrote a C[#]. Joseph Straus considers this a simple mistake on Stravinsky's part.¹⁹ Nowhere else does Stravinsky reproduce this error in any other row form in the Passacaglia.

The third variation dramatically differs from the previous two variations. At first glance, Stravinsky appears to have abandoned the passacaglia bass theme used in the first pair of variations. He returns to the use of *Klangfarbenmelodie* from the original statement of the passacaglia theme for its presentation in the third variation and splits up the theme between the clarinet, bassoon, violin, and cello. The main distinguishing features of the third variation are the solo role taken by the piano and the implementation of all four row forms. The first two row forms encountered are P₄ and I₄. Stravinsky is strategic in his use of these two forms. Rather than displaying both forms simultaneously, he gives one form to each hand of the pianist and alternates between the forms, producing the effect of a two-part invention. Thus, the first five pitches of P₄ appear in the right hand, to which the left hand answers with the first ten notes of I₄.

¹⁹ Joseph N. Straus, "Stravinsky's Serial 'Mistakes,'" *The Journal of Musicology* 17, no. 2 (1999): 259.

The treatment of the two forms continues until the second bar of the variation, where both forms appear together contrapuntally. After completing the previous forms, Stravinsky places RI₄ in the left hand and R₄ in the right. The next row forms come further in the same measure as RI₂ and R₄ and finally I₂ and P₄ in the seventh and eighth measures. Stravinsky's choices for the row forms come from the ease of connecting two forms whose first note would be the last note of the previous form. The clearest observation is seen between P₄ and R₄, ending and beginning with A, respectively. This procedure works between all row forms except for the succession RI₄-R₄ in the left hand of the fourth measure of the variation. The pitch classes between two row forms are E to B, possibly implying the opening interval of all P row forms.

The horn and viola are given the sole task of doubling various segments of row forms, either in the piano or in the other four instruments. These doublings tend to have longer durations than the given pitch they double. The most involved doubling takes place in the viola during the RI₄ presentation in the piano. The viola plays the notes 8 through 16 in order, skipping notes 13 and 14 of RI₄.

The passacaglia theme is placed in the remaining instruments. Stravinsky begins with the violin and cello at the octave and passes the theme to the bassoon and clarinet, beginning at the unison and separating to an octave apart. This alternation continues throughout the rest of the variation. Order positions 9 and 10 appear in the bassoon and the clarinet and are doubled by the horn. The viola doubles the violin and cello for notes 11 through 14, and the final notes appear in the upper winds.

Stravinsky does make use of some of the invariant segments of the row. One section is the viola doubling of RI₄. The eighth position of the row form, the first pitch the viola plays, corresponds to the seventh position in P₄, which is heard just after the viola enters. As stated

earlier, positions 13 and 14 are missing from the viola doubling, but they can be found in the violin and cello, which are still playing the seventh and eighth notes from P₄. These pitches are C[#] and B. Here they are performing a triple function. We hear the C[#] as the seventh note from P₄ and the eighth note of RI₄. The motion from the C[#] to B also fulfills the 13th and 14th positions of RI₄ and the seventh and eighth positions of P₄. Other, smaller connections can be found throughout this variation. The ninth note of P₄ also corresponds to the piano's fifth position of RI₂ in the fourth measure of the variation. Due to the inversional symmetry of the row, position 11 of P₄ and R₄ is the same and is found in the strings and the piano in measure five of the variation. Another instance occurs where position 15 of P₄, G[#], appears as the second note of R₄ near the end of the variation with the winds and the piano.

The fifth variation places the passacaglia theme in the piano and is often doubled by the bassoon and cello. Stravinsky places all row forms in *Klangfarbenmelodie* amongst the strings and winds. The first form used is P₄ and begins in the strings. We find notes 1 through 4 of the row form; next, the clarinet takes 5 through 11. The strings pick up the last notes of the row. This type of passing between the strings and winds will dominate the entire variation. Stravinsky takes the final A of P₄ and begins the next row, RI₂. The following form is R₄ and is not related to the previous row in the same manner as P₄ to RI₂, with the invariant A as the link between rows. Instead, the passacaglia theme has arrived at a B, which serves as the first pitch of this row form. Again, this procedure is similar to the one employed in variation II. The final form found is I₄, which begins with the same pitch that R₄, and ends on, E. Unlike the complete aggregate in variation II, the combination of P₄, I₄, R₄, and RI₂ does not complete the aggregate.

While the four-row forms do not complete an aggregate of the chromatic collection, their harmonic implications are worth noting. The theme passes through four different row forms. P₄

moves from a tonal center of E to A, RI2 from A to D, R4 from A to E, and I4 from E to B. These row forms superimposed over sections of the passacaglia theme imply bitonality, centered on the pitch classes E and A. The first half of the passacaglia theme uses row forms P4 and RI2. These forms either move toward a tonal center of A or begin in A while the theme is still in E. The reverse happens in the second half of the variation. As the passacaglia theme moves towards the tonal center of A, both R4 and I4 imply E.

Variation VI only uses one form of the row, P₄, which appears in all voices. The passacaglia theme itself is found in the winds, with the horn doubling various portions of the row, as we have seen in previous statements. The piano and the strings make use of the row but in a different manner. There is a higher degree of attention focused on the minor seventh. Frequently, Stravinsky takes advantage of the smoothness possible by choosing seconds for the melodic content in the variations. Here, the strings and the piano highlight the sevenths in various ways. Large octave leaps to leaps of a seventh can be seen between order positions 7 and 8, and 9 and 10. Positions 11, 12, and 13 are also grouped and slurred together, bringing attention to the intervals at work here.

The eighth variation is the high point of the second movement. Stravinsky places all four row forms of the passacaglia theme simultaneously in all instruments. P₄ appears in four voices: the clarinet, the bassoon, the piano, and the cello. I₄ is found in the horn, RI₄ in the violin, and R₄ in the viola. The original rhythmic identity of the theme has been varied by all the instruments presenting the theme at P₄ and these rhythms do not resemble the original rhythm. Stravinsky strategically employs the rhythms that allow for all instruments with P₄ to sound their order positions at similar times. This is true for the remaining instruments with the other row forms.

Stravinsky's deliberate usage of the rhythm here allows him to maximize the perfect symmetry present when all four forms of the passacaglia theme are stacked vertically.

The final variation features two forms of the row and is reminiscent of the original presentation of the passacaglia theme with its use of *Klangfarbenmelodie*. Stravinsky divides P₄ amongst the winds while the viola and cello take RI₄. The largest difference from the opening is that Stravinsky deviates from the passacaglia theme rhythm. The combination is placed in a type of note-against-note counterpoint, although there are some exceptions with notes that have longer durations or two parts appear in the winds against the strings. The intervals between the parts create an expansion and compression throughout the eight bars. Intervals begin as small as one semitone, expand towards five semitones, and generally collapse back to smaller intervals before expanding again. The largest expansion occurs on the sixth bar with ic₈, with C and G[#]. The movement's ending leaves the listener with an ic₅ between E and A. here, the reference to ic alludes to the opening interval of P and I forms. Harmonically, a duality is expressed by P₄ moving toward A as a tonal center, while RI₄ moves towards E.

Variations I, IV, and VII are the variations that employ a "free" counterpoint. However, Stravinsky was very much aware of the wealth of musical possibilities when he created the row and how it could be applied more freely. While these counterpoints are free in the sense that they do not strictly follow a row form, it is incorrect to say that no material comes from them whatsoever. The first variation features the passacaglia theme in the lowest voices, the cello, and the piano's lowest register. The horn enters with P₄ when the passacaglia theme enters but does not follow the rhythmic durations of the cello and piano. Instead, the horn's rhythm durations are augmented in the first four measures, while in the last four measures, the rhythm is compressed into quarter and eighth notes.

The fourth variation returns the passacaglia to the cello and doubles it with the violin and the piano. The piano's representation of the prime form is rhythmically altered, referencing the horn's presentation against the actual passacaglia theme. Stravinsky adds one more row form to the mix: I₅. It highlights the importance of the semitone throughout the work and in the row itself. It also allows Stravinsky to use all twelve pitches by combining two row forms. Stravinsky uses a similar strategy with the seventh variation. In the seventh variation, the passacaglia theme is in the piano and the cello, with the violin presenting P₄ with a different rhythmic identity. The viola, here too, is playing I₅ as it did in variation IV. However, Stravinsky adds in another row form in the horn, P₇. The extra row form is not needed to produce a chromatic environment; however, Stravinsky does use these forms together to exploit more invariant horizontal structures that can exist when combined, as seen in example 4.

P ₄	E	B	A	G	F#	G#	C#	B	G	F#	G#	G	A	C	G#	A
P ₇	G	D	C	A#	A	B	E	D	A#	A	B	A#	C	D#	B	C
I ₅	F	A#	C	D	D#	C#	G#	A#	D	D#	C#	D	C	A	C#	C

Figure 13. Vertical structures repeated through variation VII.

The free counterpoints are found only in the winds throughout the three variations and draw their qualities from the row. Stravinsky draws most pitches from P₄ and the melodic content from its intervals. This follows with Stravinsky's usual procedure in variation compositions is to preserve the melodic structure of the theme.²⁰ While I am not discussing the Gigue in this paper, it is an important tangent that Stravinsky's treatment of variation applies to the third movement as well.²¹ The opening passages give the impression of a rising scale. The

²⁰ Robert U. Nelson, "Stravinsky's Concept of Variations," *The Musical Quarterly* 48, no. 3 (1962): 328.

²¹ Stravinsky treats the pitch-class set from which the row is derived as a scale in the third movement, Gigue. Stravinsky's presentation of each scale is based on the starting pitch of that row form. Stravinsky treats these scales freely after the presentation of a row form. Its importance is worth mentioning as Stravinsky's adaption of row form segments is related.

clarinet opens the first variation with the pitch collection of E, F#, G, and A. In the bass at rehearsal mark 15, we find a B. This combination of five notes replicates the first five pitch classes of P₄. The next two bars of the clarinet line contain A, B, C, D, E, G, and the bass, C#; we have most of the notes in I₄. The F# is an outlier here, but its explanation can be found in its smaller grouping. This F# with the D, E, and G form (0135), which is one of the invariant portions of the row itself.

Parts of the rows can be interpreted either a pitch-class set that preserves the contour of the original row or can be considered as transposition from another row into the melodic line. The last few measures of the clarinet line in the first variation make for a good example of this procedure. Measure five, containing A B G# A#, could be viewed as simply (0123) or transposition from P₆ as members three through six from the row. The set-class explanation is probably better, as A# has no meaning either in P₄ or in I₄, where most pitches belong. The last three measures can all be interpreted as free use of the notes from I₄ and conform to sets (013) or (01235). The same approach may be applied to the bassoon part in the first variation. The largest deviation in the bassoon is the F that begins its melodic line in the first variation. Without the F, the next eight pitches would fit perfectly into the P₄, similarly to the clarinet. A possible explanation for this deviation is that we have already heard the B in the passacaglia against the F# when the clarinet begins the variation. The passacaglia B now appears in the horn on the first measure, and the F against it would produce a character distinctly different from than that of an interval previously heard.

Variation IV follows a similar technique in creating the counterpoint. The bassoon echoes the clarinet in the first variation with the same pitch collection deriving from P₄. The horn begins with segments between E and G. The minor third is the least used interval in the row, appearing

only once. The function here appears purely harmonic, emphasizing E as a major harmonic center at the beginning of the row. The rest of the material for the horn derives from either P₄ or I₄. The F would be the only member not belonging to either collection. The measure is contained in three measures after rehearsal 18 does form (0135) deriving from I₇. From the G onward, the horn's melodic content comes directly from P₄ with a cluster of notes found in the row together. Without the G, the remaining pitches also form (0135).

The bassoon takes up the E and G motive from the horn. There is some doubling of the passacaglia theme in the bassoon before returning to the counterpoint. Patterns begin to emerge when comparing the clarinet and bassoon. Although they do not always share pitch collections, Stravinsky does use similar set classes simultaneously. In the fifth measure of the variation, the set classes are transpositions of (0123). The following measure is (013), though the F[#] in the bassoon does not belong to this collection. The first half of the next measure derives from (0135), referring to the prime row. The last measure for both the clarinet and bassoon derives from the collection of I₄.

The seventh variation focuses on counterpoint between two instruments, the bassoon, and the clarinet. The clarinet enters with the opening material from the first variation, again coming from P₄. Stravinsky uses A, D, and C in the end of the second measure to the third measure of the variation, which do not appear together in any row form. The set class is still like the (027) formed at the start of all the rows. Stravinsky is emphasizing either intervals or sets that frequently any row form. The bassoon's entrance is the most varied of all the counterpoints thus far. It spends three measures alternating between E and G. Stravinsky thereby seems to be emphasizing E as the tonal center at least in the first half of the row. The remainder of the row uses (01235) and (0135) to finish the variation.

We can see that Stravinsky's free counterpoint, while free in its usage, still derives its material from the row and its row forms. These groupings of pitch collections reference the row forms directly or indirectly through set classes that mimic the contour of the row. Prominent sets, such as (0135) and (0123), are found both in the row and throughout many of these free counterpoints. This usage also begins to foreshadow the next movement, in which Stravinsky places "scales" in the score for each theme's appearance and its transpositions. What is clear is that Stravinsky composes strictly, adhering to the order positions, and freely in deriving melodic and scalar material that resembles prominent features of the row.

Chapter III: Superset/Subset networks of Toru Takemitsu's Rain Tree Sketch

The *Rain Tree Sketch* (1982) is the first of two pieces of the same name by Toru Takemitsu. Initially, Takemitsu planned on composing three more pieces for the collection, but did not complete the set because of his premature death in 1996.²² The composer offered it as a gift to his friend Maurice Fleuret while he dedicated the second to Olivier Messiaen. Takemitsu drew inspiration from a passage from Kenzaburo Oe's novel, *Atama no ii, Ame no Ki* (Ingenious Rain Tree).²³ Takemitsu states, "It has been named the 'rain tree': for its abundant foliage continues to let fall rain drops collected from last night's shower until well after the following midday. Its hundreds of thousands of tiny leaves — finger-like — store up moisture while other trees dry up at once. What an ingenious tree, isn't it?"²⁴

Takemitsu used the passage to inspire many other works involving water or rain imagery.²⁵ Many of these pieces contain a type of titles, such as *Rain Tree* and *Rain Coming*. We can group Takemitsu's pieces with similar imagery and titles under the same series. Takemitsu treats non-musical objects as concepts that he wished to give musical form.²⁶ These series include Dreams, Water, and Gardens. Some series have subseries that exist within them. The Water series, for example, contains Sea, Rain, and Rain Tree.²⁷ These names for the series are usually the titles of pieces or the names that appear in the title of the piece.

²² Peter Serkin, Liner notes, *Peter Serkin Plays the Music of Toru Takemitsu*, CD (RCA, 1996).

²³ Hideaki Musicologist Onishi, "Toru Takemitsu's Japanese Gardens: An Application of Superset/Subset Networks to the Analysis of the Three Orchestral Compositions" (Ph.D. dissertation, University of Washington, 2004), 64.

²⁴ Toru Takemitsu, *Chosakushu* (Tokyo: Shincho Sha, 2000), 5:385-6.

²⁵ Onishi, "Toru Takemitsu's Japanese Gardens," 64.

²⁶ Onishi, 59.

²⁷ Onishi, 63.

Takemitsu's Water period begins after the 1970s and contains varying degrees of water imagery. These works also use a motive that recurs throughout these water pieces, known as the S-E-A motive.²⁸ The motive is built from the pitch class set (016), and originally features the pitches Eb-E-A. Peter Burt implies that this motive can manifest at various transposition levels.²⁹ Along with this motive, the *Rain Tree Sketch* also shares thematic material from other pieces within the Rain-Tree subseries. *Rain Tree sketch* quotes a *Rain Coming* in two places. The first is measures 23-24, citing *Rain Coming* through transposition. The second is the ending of the *Rain Tree Sketch*, where the arpeggio that ends the piece appears almost exactly as in measure 119 of *Rain Coming*.³⁰

Takemitsu often stated that Debussy and Messiaen were his biggest inspirations as a composer. It is easy to notice that the use of modes of limited transposition and other collections associated with Messiaen and Debussy can be found throughout Takemitsu's works. Timothy Koozin's study of Takemitsu's late solo piano pieces investigates various levels of unity through pitch classes and pitch-class groupings that form large-scale associations within an octatonic framework.³¹ He examines melodic and harmonic collections and their association with the octatonic collection. First, Koozin suggests that trichords that are subsets of the octatonic collection are often prominent in Takemitsu's piano works.³² These subsets may appear as linear motives or as vertical structures. Regarding the *Rain Tree Sketch*, Koozin identifies the sets (014) and (026) as two sets that frequently appear throughout the piece. Second, Koozin suggests that

²⁸ Peter Burt, *The Music of Toru Takemitsu* (New York: Cambridge University Press, 2006), 177.

²⁹ Burt, 177–79.

³⁰ Onishi, "Toru Takemitsu's Japanese Gardens," 64. The repetition contains slight modifications between the two pieces.

³¹ Timothy Koozin, "Octatonicism in Recent Solo Piano Works of Tōru Takemitsu," *Perspectives of New Music* 29, no. 1 (1991): 138.

³² Koozin, 134.

sonorities project different transpositions of the octatonic scale.³³ However, there are reasons to reject the claim that the one valid framework for analyzing these pieces is the octatonic.

Interestingly Koozin acknowledges that Takemitsu uses a variety of harmonic collections throughout his works.³⁴ The subsets that Koozin examines are not exclusive to the octatonic collection and are frequent throughout many pitch collections. Thus, these subsets may belong to another harmonic generator. There are just a few places where the octatonic collection manifests in pure form within the *Rain Tree Sketch*. Here is where the connection with Messiaen is important. The octatonic collection is Mode 2 of Messiaen's modes of limited transposition. For Messiaen, the modes allowed him to generate harmonic and melodic material based on a given mode. These modes sometimes appear in Takemitsu's compositions. Rarely do these modes appear in pure form. Hideaki Onishi notes that Takemitsu often introduces pitch classes that do not belong to the modes of limited transposition.³⁵ It is difficult to state how important the modes of limited transposition are to Takemitsu and his music. It is possible that Takemitsu's late piano pieces, and especially the *Rain Tree Sketch*, may derive its harmonic and melodic material from the modes of limited transposition or even another set entirely. The aim of this study is to reexamine the *Rain Tree Sketch* and determine other important structural sets.

The methodology for this analysis will focus on pitch-class sets and the use of superset/subset networks. Using pitch-class set analysis allows us to examine Takemitsu's harmonic vocabulary throughout the *Rain Tree Sketch*. The usage of superset/subset networks derives from Onishi's usage of these sets in his analysis of three of Takemitsu's orchestral works

³³ Koozin, 136–37.

³⁴ Koozin, 125; 138.

³⁵ Onishi, "Toru Takemitsu's Japanese Gardens," 109.

from a later period.³⁶ In his study, Onishi used these networks built around three main pitch-class sets: the diatonic, the whole-tone, and the octatonic collections.³⁷

Superset/Subset Network of the Whole-Tone Collection

Decad supersets (3): 10-2 (6); 10-4 (6); 10-6 (3)
Nonad supersets (3): 9-6 (6); 9-8 (12); 9-12 (2)
Octad supersets (3): 8-21 (6); 8-24 (6); 8-25 (3)
Heptad supersets (1): 7-33 (6)
Itself (1): 6-35 (1)
Pentad subsets (1): 5-33 (6)
Tetrad subsets (3): 4-21 (6); 4-24 (6); 4-25 (3)
Triad subsets (3): 3-6 (6); 3-8 (12); 3-12 (2)
Dyad subsets (3): 2-2 (6); 2-4 (6); 2-6 (3)

Superset/Subset Network of the Diatonic Collection

Decad supersets (4): 10-2 (3); 10-3 (2); 10-4 (1); 10-5 (4)
Nonad supersets (4): 9-6 (1); 9-7 (3); 9-9 (4); 9-11 (2)
Octad supersets (3): 8-22 (2); 8-23 (2); 8-26 (1)
Itself (1): 7-35 (1)
Hexad subsets (4): 6-Z25 (2); 6-Z26 (1); 6-32 (2); 6-33 (2)
Pentad subsets (9): 5-12 (1); 5-20 (2); 5-23 (4); 5-24 (2); 5-25 (2); 5-27 (4); 5-29 (2);
5-34 (1); 5-35 (3)
Tetrad subsets (13): 4-8 (1); 4-10 (2); 4-11 (4); 4-13 (2); 4-14 (4); 4-16 (2); 4-20 (2);
4-21 (1); 4-22 (6); 4-23 (4); 4-26 (3); 4-27 (2); 4-229 (2)
Triad (9): 3-2 (4); 3-4 (4); 3-5 (2); 3-6 (3); 3-7 (8); 3-8 (2); 3-9 (5); 3-10 (1); 3-11 (6)
Dyad subsets (6): 2-1 (2); 2-2 (5); 2-3 (4); 2-4 (3); 2-5 (6); 2-6 (1)

³⁶ Onishi, 108–17.

³⁷ Onishi, 113–14.

Superset/Subset Network of the Whole-Tone Collection

Decad supersets (3): 10-2 (6); 10-4 (6); 10-6 (3)
Nonad supersets (3): 9-6 (6); 9-8 (12); 9-12 (2)
Octad supersets (3): 8-21 (6); 8-24 (6); 8-25 (3)
Heptad supersets (1): 7-33 (6)
Itself (1): 6-35 (1)
Pentad subsets (1): 5-33 (6)
Tetrad subsets (3): 4-21 (6); 4-24 (6); 4-25 (3)
Triad subsets (3): 3-6 (6); 3-8 (12); 3-12 (2)
Dyad subsets (3): 2-2 (6); 2-4 (6); 2-6 (3)

Figure 14. Networks for the diatonic, octatonic, and whole-tone collections.

These networks allow us to examine pitch-class sets and their relationship to other sets throughout Takemitsu's music. However, it is possible to make use of other networks as well, depending on the needs of the analysis. For example, in his examination of *Dream/Window*, Onishi found another set that was relative to the analysis. He named this set the *Dream/Window* Octad (8-24)³⁸. In fact, the *Dream/Window* Octad is an important set within *Dream/Window* as both a harmonic and melodic generator.

While the focus of this analysis is to examine Takemitsu's pitch-class and set-class structures in *Rain Tree Sketch*, this section will briefly discuss the temporal aspects of Takemitsu's music. Takemitsu has spoken about these aspects in relation to traditional Japanese music, specifically *ma*.³⁹ The temporal aspect, *ma* (間), appears in traditional Japanese music and other Japanese arts. The composer once said *ma* is "plainly interval or pause."⁴⁰ However, this definition does not encompass the true meaning of the word. From this definition, it is easy to

³⁸ Onishi, 132.

³⁹ Takemitsu Toru, "My Perception of Time in Traditional Japanese Music," *Contemporary Music Review* 1, no. 2 (January 1987): 9–13.

⁴⁰ Toru, 10.

confuse silence in music, written as a rest or a grand pause, as being the same as *ma*. However, this definition is too simple. A better understanding is *ma* describes the pause between sounds or between spaces.⁴¹ This understanding of *ma* fits better with Takemitsu's understanding of *ma*, stating:

The most important thing in Japanese music is space, not sound. Strong tensions. Space:
ma: I think *ma* is time-space with tensions. Always I have used few notes, many silences, for my first piece.⁴²

Ma is a concept that is closely tied to Japanese culture and is not limited to music:

Ma is not simply the pause between words and lines or timing; it is also the embodiment of 'expression without expression,' a common element of Japanese arts and public entertainment that range from music and dance, to drawing and literature. The Japanese regard *ma* as significant. In music, for example, the Japanese find meaning in the silence that follows a lingering tone, and in dance they relish the absence of motion between two actions.⁴³

Thus, *ma* is an action rather than inactive as opposed to the Western concept of rest found in art music. It manifests in the *Rain Tree Sketch* in two ways. The first of these takes the form of measures of rest of various lengths. Often, Takemitsu writes ties to show that the sound bleeds into these measures of rest. Within the *Rain Tree Sketch*, there are 19 such measures, relatively evenly distributed the piece. The outer sections contain eight measures of silence, and the middle section contains three. The second manifestation of *ma* is the use of fermatas. Takemitsu writes three types of fermatas throughout the piece: a short, a medium, and a long. Most fermatas

⁴¹ Onishi, "Toru Takemitsu's Japanese Gardens," 30.

⁴² Toru Takemitsu quoted in Fredric Lieberman, "Contemporary Japanese Composition: Its Relationship to Concepts of Traditional Oriental Musics" (M.A. thesis, University of Hawaii, 1965), 140-1.

⁴³ "Ma: Space Full of Meaning in Japanese Culture," *The East*, August 17, 1981.

appear in the middle section of the piece, while the largest concentration of longer fermatas appears at the end of the piece. There are three short, four medium, and two long fermatas.

Before proceeding further, I will need to discuss Takemitsu's bar line divisions. The composer uses both solid lines and dotted lines; however, these divisions represent two different aspects. Solid bar lines indicate measures, while dotted lines indicate rhythmic gestures within a measure. It is possible that these dotted lines also divide the measure into harmonic gestures. I will not count measures with dotted bar line separations as separate measures in either case. Koozin and Tomoko Isshiki appear to count subdivisions created by dotted lines as separate measures, yielding a count of 83 measures.⁴⁴ Ignoring the subdivisions in the count yields a total of 65 measures.

I have already alluded to the form earlier in discussing the distribution of the rest in the *Rain Train Sketch*. The formal division of *Rain Tree Sketch* is in ternary form, with some modifications to the form. In discussing his *Requiem for Strings*, Takemitsu stated that the form of the work was in "a monothematic and free ternary form."⁴⁵ Ternary form is a simple form that is found in Western art music, among other musical cultures. The basic form takes an introduction before the first A section that contains the thematic material that Takemitsu will develop throughout the piece. Takemitsu balances all three sections of the piece, with each section containing a similar number of measures. More details about the form will be found later throughout the analysis.

Formal Division of *Rain Tree Sketch*

Introduction	mm. 1-6
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⁴⁴ Tomoko Isshiki, "Toru Takemitsu's Cosmic View: 'The Rain Tree Sketches'" (Ph.D dissertation, University of Houston, 2001), 91.

⁴⁵ Toru Takemitsu, *Chosakushu* (Tokyo: Shincho Sha, 2000), 5:402.

A Section	mm. 7-23
B Section	mm. 24-46
A' Section	mm. 47-65

Figure 15. Complete form of the Rain Tree Sketch.

The short introduction presents material that will appear throughout the piece. Two motives appear in the first measure: the set (0124) that spans the uppermost voice, and the set (0258) arpeggiated in the bass. Takemitsu places (0124) in the lower treble in measure two, while truncating the set in the upper voice. Measure three is a restatement of the first measure. A new motive appears in measure four, constructed from (013578) and characterized by its stepwise descending motion. Underneath this new motive is an expanded form of (0124). Measure five contains an expansion of the two motives from the first measure and reimages them using the set 8-12.

Measure	Set Class	Super/Subset Network
1	9-12	Whole-Tone
2	8-13	
3	9-12	Whole-Tone
4	8-12	8-12
5	8-12	8-12

Figure 16. Superset/Subset Network for the Introduction.

Examining the superset/subset network of the opening measures results in something intriguing. The opening pitch collection belongs to Messiaen's third mode of limited

transposition, 9-12. This collection belongs to the whole-tone network and reappears in the third measure. Measure two's pitch collection is 8-13, while measures four and five belong to 8-12. Neither of these sets are subsets of 9-12, nor do they belong to any of the previously mentioned networks. However, because 8-12 will continue to appear throughout the piece in various forms, I find it appropriate to create a network for this set.

Superset/Subset Network of 8-12

Decad supersets (5): 10-1(1); 10-2(1); 10-3(2); 10-4 (1); 10-6 (1)
 Nonad supersets (4): 9-2 (1); 9-3 (1); 9-8 (1); 9-10 (1)
 Itself (1): 8-12 (1)
 Heptad subsets (8): 7-4 (1); 7-8 (1); 7-10 (1); 7-16 (1); 7-z18 (1); 7-26 (1); 7-28 (1); 7-31 (1)
 Hexad subsets (24): 6-2 (2); 6-z3 (1); 6-5 (1); 6-z10 (1); 6-z12 (1); 6-z13 (1); 6-15 (1); 6-z17 (1);
 6-21 (2); 6-27 (2); 6-z28 (1); 6-30 (1); 6-31 (1); 6-34 (1); 6-z36 (1); 6-z39 (1); 6-z40 (1);
 6-z42 (1); 6-z44 (1); 6-z45 (1); 6-z46 (1); 6-z49 (1); 6-z50 (1)
 Pentad subsets (31): 5-1 (1); 5-2 (2); 5-3 (1); 5-4 (3); 5-5 (1); 5-6 (1); 5-7 (1); 5-8 (2); 5-9 (2);
 5-10 (3); 5-11 (1); 5-z12 (1); 5-13 (2); 5-16 (3); 5-z18 (1); 5-19 (3); 5-21 (1); 5-22 (1);
 5-24 (1); 5-25 (3); 5-26 (3); 5-27 (1); 5-28 (3); 5-30 (1); 5-31 (4); 5-32 (3); 5-33 (1); 5-34
 (1); 5-z36 (2); 5-z37 (1); 5-z38 (2)
 Tetrad subsets (28): 4-1 (2); 4-2 (4); 4-3 (2); 4-4 (3); 4-5 (3); 4-6 (1); 4-7 (1); 4-8 (1); 4-9 (1);
 4-10 (2); 4-11 (3); 4-12 (6); 4-13 (5); 4-14 (1); 4-z15 (4); 4-16 (1); 4-17 (2); 4-18 (5);
 4-19 (3); 4-20 (1); 4-21 (2); 4-22 (2); 4-24 (2); 4-25 (1); 4-26 (2); 4-27 (5); 4-28 (1);
 4-z29 (4)
 Triad subsets (12): 3-1 (3); 3-2 (7); 3-3 (7); 3-4 (4); 3-5 (6); 3-6 (3); 3-7 (6); 3-8 (7); 3-9 (1);
 3-10 (5); 3-11 (6); 3-12 (1)
 Dyad subsets (6): 2-1 (5); 2-2 (5); 2-3 (6); 2-4 (5); 2-5 (4); 2-6 (3)

Figure 17. Complete network of the set 8-12.

Compared to the superset/subset networks of the diatonic, octatonic, and whole-tone collections, the set 8-12 is an expansion in its reach. The 8-12 collection allows Takemitsu a greater range of harmonic possibilities. The relationship between the octatonic collection and 8-12 is also remarkable. Both collections differ by one pitch class; (01345679) versus (0134679T). Because of these similarities, both sets sound almost identical to each other. Both sets share a considerable number of supersets and subsets. In the example below, the sets that are marked with stars are sets that frequently appear throughout the piece.

Shared Sets between 8-12 and 8-28

Decad supersets: 10-3; 10-6

Nonad supersets: 9-10

Heptad subsets: 7-31*

Hexad subsets: 6-z13; 6-z23; 6-27; 6-30*; 6-z49*; 6-z50*

Pentad subsets: 5-10; 5-16; 5-19; 5-25; 5-28*; 5-31; 5-32

Tetrad subsets: 4-3; 4-9; 4-10; 4-12; 4-13; 4-z15; 4-17; 4-18; 4-25; 4-26; 4-27; 4-28; 4-z29

Tetrad subsets: 3-2; 3-3; 3-5; 3-7; 3-8; 3-10; 3-11

Dyad subsets: 2-1, 2-2, 2-3, 2-4, 2-5, 2-6

Figure 18. Shared sets between 8-12 and 8-28 (Octatonic).

The first six measures of the A section alternate between the whole-tone and 8-12 networks. Measure seven derives its material from measure four, with the bass being an almost literal restatement. Measures eight and nine are direct transpositions of measure five by T2 and T4. Measure 12 is where multiple readings are possible. The collection contains 11 pitches, making it difficult to decipher the network in use. Examining the Takemitsu's groupings of the pitches provides clarification. The first three sixteenth notes form the set 8-12, while the next group of two eighth notes forms 10-6. The set 10-6 is a superset to both 8-12 and the octatonic. Subsets present in the second half of the collection can point to either collection. Thus, it is possible to read this measure as derived from either collection or both simultaneously.

8-12 10-6

Figure 19. Two dominant collections in measure 12.

Measure 14 is the first measure in which Takemitsu places dotted bar lines, dividing the measure into three distinct parts. The first partition derives thematic material from measure four and forms the set 7-31. The second and third partitions form 3-5 and 9-11, with the total collection of all three partitions forming 10-3. 10-3 belongs to three networks: the diatonic, the octatonic, and 8-12. However, the best reading of this measure is a combination of octatonic and diatonic. Combining the first two partitions of measure 14 completely manifests the octatonic collection. The third partition, alone or combined with the second partition, belongs to the diatonic network. The second partition serves as a link between the two collections, being common pitch classes to both sets.

Measure 16 further develops measure 14. Takemitsu keeps the basic contours of the melodic and harmonic content, with some content being simply transpositions. The first partition of measure 16 presents the octatonic scale in one measure. The following partitions belong to the octatonic, with the last partition sharing a network with 8-12. However, given the context of the entire measure, the octatonic serving as the referential sonority is far more plausible here.

Measure 18 is simply a transposition of measure 16's last two partitions and thus belongs to the octatonic scale.

Measure 20 is another three-partition measure. However, Takemitsu presents us with a different collection. The first partition clearly presents 8-12 and the second partition with 7-16, a subset of 8-12. Takemitsu deviates from this collection in the third partition with a clear manifestation of the octatonic.

Measure 21 is another measure containing 11 pitches. However, a vertical reading of the structures provides clarity. The first two sixteenths clearly represent 8-12, while the next four-sixteenths produce 8-13. Information about the set 8-13 has been minimal so far, as the chord has not played an important role in the musical structurally. If we divide the hands, we see that the right hand's pitch collection produces a superset unique to 8-13, 9-5. The left hand appears in the octatonic/8-12 network; however, it is more probable that its usage here derives from the set 8-12. Takemitsu is playing with projections of both 8-12 and 8-13 simultaneously vertically and horizontally.

The last measure of the A section is ambiguous. The pitch content points to either the octatonic or the set 8-12. However, all the pitch class sets that appear to swing in no direction towards either network.

Measure	Set Class	Network
7	9-8	Whole-Tone
8	8-12	8-12
9	Silence	

10	8-12	8-12
11	Silence	
12	11-1	Octatonic/8-12
13	Silence	
14	10-3	Diatonic/Octatonic
15	Silence	
16	9-10	Octatonic
17	Silence	
18	7-31	Octatonic
19	Silence	
20	12-1	Octatonic/8-12
21	11-1	8-12/8-13*
22	11-1	Octatonic/8-12
23	Silence	

Figure 20. Superset/Subset Network for the A section.

The B section contrasts with the outer sections in various ways. First, Takemitsu introduces pitches in the piano's lowest register. We also find the first instances of bass clef. In fact, almost all usage of bass clef occurs in the B section, with only the last five measures using it as well. Second, the pitch density is higher. While there are several instances in the outer sections where measures contain pitch collections of 11 and 12 pitch sets, most sets this size frequently occur in the B section.

Takemitsu begins the B section with a pickup, the only one throughout the piece, with two pitch classes that carry into the next measure. Measure 24 begins with one hallmark of Takemitsu's Water period, the S-E-A motive. The pitch collection for the measure is the set 9-10, belonging to either the octatonic or 8-12. Examining all the pitch classes before the last sixteenth note of the measure, we can clearly see the set 8-12. The arrival of measure 25 creates some complications as the measure contains all 12 pitch classes. Many pitches from the previous 8-12 set, [3, 5, 6, 7, 8, 9, 11, 0], are held over and transposed by I_2 to [2, 3, 5, 6, 7, 8, 9, 11] for the first pair of sixteenths of measure 25. The remainder of the measures moves to 10-3. The set here is a superset of another transposition of 8-12, [6, 7, 9, 10, 11, 0, 1, 3].

Measure 27 is another large set, 11 pitches this time, that requires some dissecting. The measure requires four staves, and Takemitsu's notation implies that there are three events in play throughout the measure. Two of these sonic events take similar rhythmic ideas, making it easier to decipher pitch collections. Isolating these events yields three pitch collections: 7-10, 8-25, and 8-12. 8-25 belongs to the whole-tone network. However, the most interesting aspect of the measure is the remaining two sets. The set 7-10 is a subset of 8-12 and the normal form of this set is [11,1,2,3,4,5,8]. If we include the missing pitch class, 7, and compare it to the 8-12 at the end of the measure, we find the sets are inversions.

Continuing similarly, the previous set, 7-10, now appears as a complete set of 8-12 at the beginning of measure 29. The rest of the measure expands to 9-10, belonging to both the octatonic and 8-12. Measure 31 is another partitioned measure. The first partition contains the set 6-z28, a part of the 8-12 network, while the second partition is a complete octatonic collection. The following measure contains multiple ways to extract meaningful sets. Taking the sets

vertically, we have 7-31, 7-31, 7-31, and 6-27. These sets belong to either the octatonic collection or 8-12 collection. The first two vertical structures complete an aggregate of the octatonic collection. The final two vertical structures together combine to form the set 9-2, which belongs to the 8-12 network.

Measure 33 contains two partitions and introduces a new textural figuration. Takemitsu uses two repeating sets simultaneously that he builds from the SEA motive. These figures do not align, as it is a set of six against five. In fact, the two figures are both 5-z18, with the upper figure containing an extra pitch class, and belong only to the network of 8-12. The second partition contains all 12 pitches. Vertically, we have 7-26, 7-21, and 4-12. The horizontal configuration yields 10-3 and 8-19. Disregarding the set 8-19, as it does not belong to any network we are using, the remaining sets could belong to either 8-12 or the octatonic.

Measure 34 returns to one of the few rare appearances of the set 8-13. The music moves to a fermata over a bass A doubled at the octave. Takemitsu holds this pitch class for five measures and has specific pedaling instructions to ensure that we hear it, or at least its resonance. Measures 36 and 38 are identical in pitch structure. The only difference between them is Takemitsu's compression of the rhythmic units. Both sets are 9-11 and belong to the diatonic network. Examining the partitions of these measures separately, we have sets that imply either the octatonic collection or 8-12 collection. Takemitsu has built a set that does not belong to either collection by combining smaller sets taken from the octatonic/8-12 network.

Measure 40 returns to the figure from measure 33. This time, Takemitsu uses two groups, a pattern of 10 pitch classes and a pattern of 8 pitch classes, that he offsets by a sixteenth note. Since there is no consistent vertical alignment, it is best to compare the pitch collections in each

figure. The upper figure is the set 10-1 while the second figure is 8-25. 8-25 belongs to the whole-tone network, while 10-1 only belongs to 8-12. Measure 41 contains the total collection of 10-3. As 10-3 belongs to three different networks, it is best to examine the subsets to which networks best apply. Upon first inspection, the measure, conveniently in 2/4, contains the same set transposed. Both quarter beats are the set 9-10 and Takemitsu has transposed the first set by T_9 . This transposition allows him to exploit the symmetrical nature of the octatonic collection, since applying T_9 to complete the octatonic set returns the original set. As a result, the normal forms of 9-10, [2,3,4,5,6,9,11,0] and [11,0,1,2,3,5,6,8,9], retain only one set between them, the octatonic set [2,3,4,6,8,9,11,0]. We can conclude that this measure stems from the octatonic collection. However, there is one point of interest in the subsets, specifically in the left hand. Each quarter note contains the set 6-z29. This set belongs to no network except the set of 8-13. While the set overall plays no large role, it is possible that Takemitsu is referring to the collection as it appears in the introduction.

Measure 45 belongs to the whole-tone and octatonic networks. Takemitsu clearly presents both collections in separate registers. The upper voice is the whole-tone collection, while the harmonically supported by the octatonic. This measure is unusual, as it is the only measure in the piece where Takemitsu states two well-known collections together in such an obvious manner. Measure 46 employs the same technique as found in 41. The measure of 2/4 divides into two groups of 9-10 that are related by T_9 . Interestingly, Takemitsu retains the same pitch classes from measure 41 in the left hand, transposed down an octave. What does change are the pitch classes in the right hand. We get a different transposition of 9-10, by T_5 from measure 41. This transposition by five semitones means we also get a different transposition of the octatonic collection.

Measure	Set Class	Network
24	9-10	812
25	12-1	Octatonic/8-12
26	Silence	
27	11-1	8-12
28	Silence	
29	12-1	Octatonic/8-12
30	Silence	
31	12-1	Octatonic/8-12
32	12-1	Octatonic
33	11-1	8-12
34	8-13	8-13
35	Single Pitch	
36	9-11	Diatonic*
37	Silence	
38	9—11	Diatonic*
39	Silence	
40	11-1	Whole-Tone/8-12
41	10-3	Octatonic
42	9-10	8-12
43	11-1	Diatonic/8-12
44	9-8	Whole-Tone/8-12

45	10-6	Whole-Tone/Octatonic
46	10-3	Octatonic

Figure 21. Superset/Subset networks of the B section.

The A' section is almost an exact repeat of the original A section. Measures 47 through 60 correspond exactly with measures 7-20. Takemitsu does not deviate from any of the sets, nor does he present them at different transpositional levels. What is different between the two sections is the material that ends in each section. Takemitsu finishes the piece with an arpeggiated gesture that is reminiscent of the ending of the A section in measure 21. Measures 61 and 63 are repeats of each other, and the total collection is the set 10-3. The set 10-3 belongs to three networks: the diatonic, the octatonic, and 8-12. Dividing the hands into separate collections yields the set 8-14 in the right hand while the left hand is the 7-31. 8-14 is a set that we have not encountered throughout the analysis of the piece, though its relationship to both to 8-12, 8-13, and the octatonic is that of one pitch class. 7-31 can belong to either 8-12 or the octatonic.

Our handling of measure 21 showed that there were several sets at work, with 8-12 still being a substantial part of the harmonic structure. Here, Takemitsu leaves the ending quite ambiguous. It is probably best to interpret these measures as being a part of 8-12 and the octatonic network, given that most of the immediate previous material derives from the same networks.

Measure	Set Class	Network
47	9-8	Whole-Tone

48	8-12	8-12
49	Silence	
50	8-12	8-12
51	Silence	
52	11-1	Octatonic/8-12
53	Silence	
54	10-3	Diatonic/Octatonic
55	Silence	
56	9-10	Octatonic
57	Silence	
58	7-31	Octatonic
59	Silence	
60	12-1	Octatonic/8-12
61	10-3	Octatonic/8-12
62	Silence	
63	10-3	Octatonic/8-12
64	Silence	
65	Silence	

Figure 22. Superset/Subset network of the A' section.

Toru Takemitsu's inspiration from the music of Messiaen, is evident through these network tables. The network tables reveal the affinity of Takemitsu's harmonic practice to that of Messiaen. The whole-tone and octatonic collections are important sets in the *Rain Tree Sketch*. However, the set 8-12 is of greater importance. Takemitsu takes advantage of its relationship

with these sets, in particular the octatonic. 8-12's network is vast and encompasses many of the common subsets of these networks. Takemitsu also presents the set in clear formation, more often than the other two sets. It is also clear that the diatonic collection is not an important collection throughout this piece, appearing far less than any. The set 8-13, while not explored in this study, seems to hold some importance, although it seems small in the grand scheme. It is possible that Takemitsu considers the set related to 8-12 as they structurally differ by semitone. What is most important about this study is that it shows that while Takemitsu may use collections like Messiaen, he does not limit his harmonic and melodic development to the modes of limited transposition.

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Appendix A

Blanca Cristina Krieger, 1971

Sonatina

EDINO KRIEGER

PIANO

Moderato

p legato

cresc.

Più mosso

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20.287 - c

First system of musical notation, featuring a treble and bass staff. The music includes various rhythmic patterns and dynamic markings such as *cresc.* and *p*.

Second system of musical notation, featuring a treble and bass staff. The music includes various rhythmic patterns and dynamic markings such as *ff*.

Third system of musical notation, featuring a treble and bass staff. The music includes various rhythmic patterns and dynamic markings such as *p*, *mf*, *rit.*, and *p*. The tempo marking **Tempo I** is present.

Fourth system of musical notation, featuring a treble and bass staff. The music includes various rhythmic patterns and dynamic markings such as *p*.

Fifth system of musical notation, featuring a treble and bass staff. The music includes various rhythmic patterns and dynamic markings such as *p*.

20.287 - c

Handwritten musical score for piano, consisting of five systems of two staves each. The music is in 4/4 time and features complex melodic lines with many accidentals and dynamic markings such as *f*, *dim.*, and *p*. There are also handwritten annotations in the margins, including "0 2 1" and "4 3 2 1".

20287-c

The first system of music consists of two staves. The treble staff begins with a treble clef and a 4/4 time signature. It contains a series of eighth and sixteenth notes, some beamed together. The bass staff starts with a bass clef and a 4/4 time signature, featuring a similar rhythmic pattern with eighth and sixteenth notes.

The second system continues with two staves. The treble staff has a treble clef and a 4/4 time signature. It includes a *rit* (ritardando) marking above the first measure and an *a tempo* marking below the second measure. The bass staff has a bass clef and a 4/4 time signature, with notes and rests corresponding to the treble staff.

The third system consists of two staves. The treble staff has a treble clef and a 3/4 time signature. It features a *dim.* (diminuendo) marking above the first measure, a *p* (piano) marking below the second measure, and an *mf* (mezzo-forte) marking above the fourth measure. The bass staff has a bass clef and a 3/4 time signature, with notes and rests corresponding to the treble staff.

The fourth system consists of two staves. The treble staff has a treble clef and a 3/4 time signature. It begins with a tempo marking *Poco meno mosso* in a rounded box above the first measure. The bass staff has a bass clef and a 3/4 time signature, with notes and rests corresponding to the treble staff.

The fifth system consists of two staves. The treble staff has a treble clef and a 3/4 time signature. It includes a *dim.* (diminuendo) marking above the second measure, a *c* (crescendo) marking above the third measure, and a *rit* (ritardando) marking above the fourth measure. The bass staff has a bass clef and a 3/4 time signature, with notes and rests corresponding to the treble staff.

The image shows a page of musical notation for a piano piece, consisting of five systems of staves. The notation is written in treble and bass clefs, with various tempo markings and performance instructions.

- System 1:** The first system is marked *Animado* and *a tempo*. It features a treble staff with a melodic line and a bass staff with a rhythmic accompaniment. The tempo is marked *a tempo* and the dynamics are *p*. There are handwritten annotations in blue ink, including "Crescendo" and "a tempo".
- System 2:** The second system is marked *tr. mm.* and *poco rit.*. It features a treble staff with a melodic line and a bass staff with a rhythmic accompaniment. The tempo is marked *a tempo* and the dynamics are *poco rit.*.
- System 3:** The third system is marked *tr. mm.* and *poco rit.*. It features a treble staff with a melodic line and a bass staff with a rhythmic accompaniment. The tempo is marked *poco rit.* and the dynamics are *tr. mm.*.
- System 4:** The fourth system is marked *cresc.*. It features a treble staff with a melodic line and a bass staff with a rhythmic accompaniment. The dynamics are *cresc.*.
- System 5:** The fifth system is marked *cresc.*. It features a treble staff with a melodic line and a bass staff with a rhythmic accompaniment. The dynamics are *cresc.*.

The page number 20.287 - c is located at the bottom center of the page.

Handwritten musical notation for the first system. The right hand starts with a treble clef and a 2/4 time signature. The left hand starts with a bass clef and a 2/4 time signature. The music features a sequence of chords and melodic lines. Performance markings include *poco allarg. e cresc.*, *ff*, *tempo*, and *p*. A circled *ff* and a circled *p* are also present. A circled *8* is written above the first measure of the right hand.

Handwritten musical notation for the second system, continuing the piece. It features various melodic and harmonic textures with dynamic markings.

Handwritten musical notation for the third system. The right hand has a treble clef and a 2/4 time signature. The left hand has a bass clef and a 2/4 time signature. Performance markings include *poco rit.* and *a tempo*. There are also some handwritten notes above the staff, possibly indicating fingerings or articulation.

Handwritten musical notation for the fourth system. The right hand has a treble clef and a 2/4 time signature. The left hand has a bass clef and a 2/4 time signature. Performance markings include *dim.* and *Poco meno mosso*. A circled *p* is written below the left hand.

Handwritten musical notation for the fifth system. The right hand has a treble clef and a 2/4 time signature. The left hand has a bass clef and a 2/4 time signature. The music concludes with a final chord and a fermata over the right hand.

The image shows a page of musical notation for piano, consisting of five systems of staves. The notation includes treble and bass clefs, a key signature of one flat (B-flat), and a 3/4 time signature. The piece is marked "Tempo I".

Tempo markings and dynamics include:

- poco rit.* (first system, first measure)
- a tempo* (first system, second measure)
- p* (first system, second measure)
- poco rit.* (fourth system, third measure)
- a tempo* (fourth system, fourth measure)

Other markings include a fermata over the first measure of the first system, a hairpin crescendo in the fourth system, and a hairpin decrescendo in the fifth system. The piece concludes with a double bar line and a fermata.

SMOZ.

20.287 - C

II

Allegro

fluentemente e sempre legato

p

cruc.

dim.

The musical score is written for piano and consists of five systems, each with a treble and bass staff. The notation includes various rhythmic values, accidentals, and dynamic markings. Handwritten annotations in blue ink are present throughout the piece, including the letters 'RC' and 'V' above notes, and '4/8' and '3' near specific passages. The score includes the following dynamic markings: *cresc.*, *dim.*, *p*, *f*, and *poco rit.*. The piece concludes with a *cresc.* marking in the final system.

First system of musical notation, measures 1-4. The right hand features a melodic line with eighth and sixteenth notes, while the left hand provides a steady accompaniment of eighth notes.

Second system of musical notation, measures 5-8. The right hand continues the melodic development. A *dim.* (diminuendo) marking is present in the right hand starting in measure 7.

Third system of musical notation, measures 9-12. The right hand has a more active melodic line with slurs. The left hand accompaniment includes some rests and eighth-note patterns.

Fourth system of musical notation, measures 13-16. This system includes dynamic and tempo markings: *pp poco rit.* (pianissimo, slightly ritardando) in measure 13, *p a tempo* (piano, at tempo) in measure 14, and *cresc.* (crescendo) in measure 15. The right hand has a complex melodic line with many slurs.

Fifth system of musical notation, measures 17-20. The right hand continues with a melodic line, and the left hand accompaniment features a consistent eighth-note pattern.

This image shows a handwritten musical score for piano, consisting of five systems of staves. The notation includes treble and bass clefs, various note values, rests, and dynamic markings. The score is annotated with handwritten numbers and letters.

- System 1:** Features a treble clef with a circled *ff* dynamic marking and a handwritten number '3' above the first measure. The bass clef has a handwritten 'MTR' below it.
- System 2:** Similar to the first system, with a handwritten 'MTR' below the bass clef.
- System 3:** Includes a treble clef with a handwritten 'A2A' above it. The bass clef has a handwritten 'MTR' below it. There are handwritten numbers '4', '5', '3', '4', '3', '5', '2' below the bass staff.
- System 4:** Features a treble clef with a handwritten 'MTR' below it. The bass clef has a handwritten 'MTR' below it. A handwritten 'm. r.' is above the first measure.
- System 5:** Includes a treble clef with a handwritten 'MTR' below it. The bass clef has a handwritten 'MTR' below it. A handwritten 'p' is below the first measure.

At the bottom center of the page, the number '20287-c' is printed.

Appendix B

12

II Passacaglia

Circa $\text{♩} = 60$

Clarinetto in La *mp* *p ma ben marc.*

Corno in Fa *p*

Fagotto *mp* *p*

Piano *p*

Viola *mp*

Violoncello *mp* *p ma ben marc.*

15

Ci. in La *p*

Cor. in Fa *p ma ben marc.*

Fag. *p ma ben marc.*

Pao. (b)

Vc. *p*

B. & H. 17447

16

Cl. in La *sempre espress. ma non f*

Cor. in Fa

Fag.

Pao.

Vln. *{ cantabile ma non f*

Vla.

Vc.

rall. a tempo

Cl. in La *mf*

Cor. in Fa *p espress. ma non f*

Fag. *espress. ma non f*

Pao. *f non legato*

Vln. *f*

Vla. *f pizz. #*

Vc. *f*

B. & H. 17447

14

17

Cl. in La
Fag.
Pno.
Vin.
Vla.
Vc.

f
f
fp
f
fp

Detailed description: This system contains the first six staves of the musical score. The Clarinet in La and Bassoon parts are mostly rests, with a forte (*f*) note in measure 17. The Piano part features a complex rhythmic pattern with many sixteenth notes. The Violin part has a dynamic marking of *fp* (fortissimo piano) in measures 14 and 17. The Viola and Violoncello parts have rests in measure 14 and play a single note in measure 17.

Cl. in La
Cor. in Fa
Fag.
Pno.
Vin.
Vla.
Vc.

mf
poco sf
mf
meno f
poco sfp
meno f
poco sfp

Detailed description: This system contains the next six staves. The Clarinet in La and Bassoon parts have rests in measure 14 and play a note in measure 17. The Horn in F part has a *poco sf* (poco fortissimo) marking in measure 17. The Piano part continues with its complex rhythmic pattern, marked *meno f* (meno forte). The Violin part has a *poco sfp* (poco fortissimo piano) marking in measure 17. The Viola and Violoncello parts have rests in measure 14 and play a note in measure 17.

B. & H. 17447

espress.

Cl. in La
Cor. in Fa
Fag.
Pno.
Vln.
Vla. pizz.
Vc. arco pizz. arco pizz. arco (pizz.)

20

Cl. in La
Cor. in Fa
Fag.
Pno.
Vln.
Vla. arco pizz. arco
Vc. arco pizz. marc. arco pizz.

B. & H. 17447

Cl. in La
Cor. in Fa
Fag.
Pno. *stacc.*
poco sf
left Ped.
Vln.
Vla. *lh. pizz.*
Vc.

21
Cl. in La
Cor. in Fa *etc. sim.*
Fag.
Pno.
Vln.
Vla.
Vc.

22

Cl. in La

Cor. in Fa

Fag.

Pno.

Vln.

Vla.

Vc.

pp sempre

23

Cl. in La

Cor. in Fa

Fag.

Pno.

Vln.

Vla.

Vc.

marc. in p

B. & H. 17447

Appendix C

To Maurice Fleuret, for his fiftieth birthday

Rain Tree Sketch

for
Piano

Toru Takemitsu

$\text{♩} = 3$ $\text{♩} = 63 \sim 56$ (Tempo I)

in p

R. $\frac{1}{2}$

$\text{♩} = 2$ $\text{♩} = 84 \sim 80$ (Tempo II)

in pp poco più mosso

R. L.

Tempo I

p *pp*

R. $8va$

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First system of musical notation, featuring a grand staff with treble and bass clefs. It includes various musical notations such as slurs, accents, and dynamic markings. A right-hand (R.) bracket is visible at the bottom right.

Second system of musical notation, including tempo markings: *Tempo II*, *poco rall.*, and *Tempo I*. It features dynamic markings *p* and *poco mf*, and includes a right-hand (R.) bracket at the bottom.

Third system of musical notation, including tempo markings *Tempo II* and *Tempo I*. It features a *8va* marking and includes right-hand (R.H.) and left-hand (L.H.) labels for the staves. A right-hand (R.) bracket is at the bottom.

Fourth system of musical notation, including tempo marking *Tempo II* and dynamic markings *pp*, *p*, and *poco stringendo*. It features a *cresc.* marking and includes a right-hand (R.) bracket at the bottom.

legatiss. rapidly

3 3 3 3 3 3

pp

8va

Tempo II

p cresc.

marcato e cresc.

f

R. ^

Senza misura

Tempo I

Senza misura

ff

p

pp

pp

pp

ppp

dying away

Sus. ^

R. ^

Sus. ^

Tempo II (rapidly)

gradually cresc en do .

legatiss.

pp

pp

L.H.

R.H.

R. ^

8va

3 3 3 3

m

R.H.

(sta)----- loco Tempo I

piu f

p

R. ^

R. ^

R. ^

This system contains the first three measures of the piece. The piano part begins with a forte dynamic (*f*) and a *piu f* marking. The right hand starts with a piano (*p*) dynamic. The tempo is marked 'Tempo I'. A dashed line labeled '(sta)' spans the first two measures, and a dashed line labeled 'loco' spans the last two measures. The right hand has a fermata over the final note of the first measure. The piano part has a fermata over the final note of the first measure. The right hand has a fermata over the final note of the first measure. The piano part has a fermata over the final note of the first measure.

sta----- loco Tempo II

piu p

p

pp

R. ^

R. ^

L. ^

This system contains the next three measures. The piano part begins with a piano (*p*) dynamic and a *piu p* marking. The right hand starts with a piano (*p*) dynamic. The tempo is marked 'Tempo II'. A dashed line labeled 'sta' spans the first two measures, and a dashed line labeled 'loco' spans the last two measures. The right hand has a fermata over the final note of the first measure. The piano part has a fermata over the final note of the first measure. The right hand has a fermata over the final note of the first measure. The piano part has a fermata over the final note of the first measure.

p

R. ^

R. ^

This system contains the final three measures. The piano part begins with a piano (*p*) dynamic. The right hand starts with a piano (*p*) dynamic. The right hand has a fermata over the final note of the first measure. The piano part has a fermata over the final note of the first measure. The right hand has a fermata over the final note of the first measure. The piano part has a fermata over the final note of the first measure.

Tempo I
sta *sta* *loco*

pp

This system contains the first two staves of music. The upper staff is in treble clef and the lower in bass clef. The music begins with a piano (*pp*) dynamic. The first staff has a tempo marking of *Tempo I* and a *sta* marking. The second staff has *sta* and *loco* markings. The music includes various note values, slurs, and accents.

This system continues the musical notation from the first system. It features similar dynamics and articulations, including slurs and accents. The lower staff includes some rhythmic markings that look like *R. ^* with arrows pointing right.

Tempo II Tempo I

pp *pp* *un poco cresc.* *mf* *pp* *softer than before* *dying away*

This system shows a tempo change from *Tempo II* to *Tempo I*. The music is written in piano and treble staves. The lower staff has dynamic markings: *pp*, *pp*, *un poco cresc.*, *mf*, *pp*, *softer than before*, and *dying away*. The upper staff has some rhythmic markings like *γ γ γ*. The lower staff includes *R. ^* and *L. ^* markings with arrows.