**PENTACHORDAL CONFIGURATIONS IN TWO LATE WORKS BY LEOŠ JANÁČEK**

by

Jonathan Norman Easey

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# Abstract

Modern research on the work of Leoš Janáček is often focused on elements that are explored in Janáček's own theoretical writing: techniques of text-setting, speech rhythm, organicism, and narration. This scholarly preponderance is important, because it brings Janáček's own work in music theory to the fore, but it has also become prohibitive because Janáček's theories have drawn scholars' attention away from more focused, detailed analysis of his music.

This study represents a refocusing of the analytical lens. In it I examine the pitch materials of two of Janáček's works from the 1920s: the first movement of *String Quartet no. 1* and an aria from *Z Mrtveho Domu (From the House of the Dead)*. My examinations show that Janáček, in addition to being in the vanguard of developments in text-setting and speech rhythm, was also innovative in his deployment of pitch collections and his manipulation of standard tonal procedures. Indeed, my examination aims to show that Janáček's use of pitch collections itself represents a skillful manipulation of tonality. By isolating and reflecting on the properties of particular intervals and groups of intervals, Janáček is able to craft his own unique brand of tonality that eschews many of the characteristics and hierarchies of standard practice.

In the quartet we see Janáček developing motivic material based on a pentachord formed by the motives of the opening bars. This pentachord and its intervallic subsets have interesting properties which Janáček then illustrates through the motives' deployment in the movement. The tonal allusions in the piece are all drawn from triadic relationships contained in the pentachord and its derivations.

In the opera aria Janáček utilizes pentatonicism to establish a juxtaposition of semitones and perfect fifths – the only two intervals that can generate the totality of twelve-tone pitch space. Because both of these intervals generate pitch spaces which utilize all of the twelve pitch classes, they share a unique isomorphism which emerges from Janáček's deployment of pentatonic pitch collections and which is explored here from both analytical and theoretical perspectives.

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*for my mom*

# Chapter 1: Introduction

Leoš Janáček's music has enjoyed a recent surge in popularity. His operas are now among the most commonly staged works of the twentieth-century repertoire, and his instrumental compositions are regularly programmed by many ensembles. In scholarship, the past few decades have seen a surge of writing on Janáček produced by music theorists and musicologists. John Tyrell's massive two-volume, 2,000-page study, *Janáček: Years of a Life* appeared in 2007, following publications such as Paul Wingfield's 1999 *Janáček Studies*, a collection of writings on a variety of topics related to Janáček scholarship, and Michael Beckerman's 1994 *Janáček as Theorist*.

A look at the table of contents in Wingfield's volume reveals that most of the book's chapters concern either historical issues such as publication or performance, or issues of narrative and text setting. There are good reasons for this: Janáček himself wrote extensively on these issues, and is even today espoused as one of the great Czech writers on music. His theoretical writings delineate his ideas on the aesthetics of music, especially regarding the junction of music and text. In that sense, these writings are not theoretically "hard" in the same manner as work produced in the tradition of other composer/theorists like Rameau or Schoenberg; all the same, Janáček's writings are still vastly interesting. Modern scholars have used them as touchstones for fascinating studies of his unique skill in deriving musical and narrative structures from natural forms and human speech.

Nonetheless, Janáček-the-theorist's predisposition with matters of text, narrative, and aesthetics seem to have hindered modern investigations into his music via other avenues. Only one of the

ten chapters in Wingfield's book deals with issues of pitch and form: Thomas Adès's "'Nothing but pranks and puns': Janáček's solo piano music" deals with broad issues of harmony and form in many of Janáček's piano works. While it is unquestionable that modern scholarship should cultivate the fertile ground tilled by Janáček's own theoretical writings, it is striking to observe the dearth of focused musical analysis being done on Janáček's works.

The present study is an attempt to show that, whatever the reason for their scarcity, concrete analyses of Janáček's music are rewarding. Analysis represents a worthwhile investigation into his compositional process, even if Janáček's music theoretical writings may have never hinted at the fruitfulness of such investigations into his own works.

I began this project because of an interest in the *sound* of Janáček's music. Hearing his works performed live and on recordings germinated my intuition that his idiom involves unique and interesting approaches to pitch and harmony, modality, tonality, chromaticism, and modernism. Browsing the extant literature on Janáček's music, I was surprised to find that no one had, as yet, attempted to address my curiosities. And so I began to analyze on my own terms.

This study presents my analyses of two pieces by Janáček from the 1920's: the first movement of his String Quartet No. 1, subtitled "Kreutzer Sonata," and an aria from his final opera, *Z Mrtveho Domu* (*From the House of the Dead*) in an attempt to show the fruitfulness of developing new approaches to analyzing Janáček's music. Both of the pieces I've analyzed are from later in Janáček's life:  the string quartet was completed in 1923, and the opera went unfinished at his death in 1928.

The first analysis – that of the string quartet – is focused on isolating sets of pitch intervals and observing the methods by which Janáček transforms them throughout the movement, both on the large and small scales. More than a set-class analysis, however, my investigation is sensitive to the intricate tonal and modal implications that Janáček employs in his writing, and I try to integrate these fascinating tendencies into set-theoretic analysis in a way that acknowledges, hopefully, the fabulous and complex sonic worlds that Janáček is able to create and explore in the movement.

The second analysis, of the aria, takes a similar approach except that it focuses on Janáček's use of pentatonicism (rather than tonality or modality). In this analysis I explore the different types of pentatonic and pentatonic-like collections that Janáček employs in the aria and I reveal his fascinating and systematic organization of those collections and how they contribute to the unique aesthetics of the aria's setting. The analysis also explores Janáček's configuration of pitches into collections which share interesting isomorphisms on several levels. A discussion of neo-Riemannian transformational techniques, as they apply to the analysis, is also included.

These two analyses both show that Janáček very skillfully generates and juxtaposes collections with an understanding of their complex theoretical relationships, and with great sensitivity to these collections' unique sonic properties. My analyses are followed by a short theoretical exploration that attempts to tease apart the relationships between the systems Janáček employed in both pieces. In particular, I examine relationships between different types of intervals

(semitones, major thirds, and perfect fifths, in particular) and their importance within larger collections such as [037] trichords and pentatonic collections.

These analyses will show that Janáček's music exhibits a nuanced approach to tonality that explores the fundamental intervals and builds compelling musical frameworks around those intervals from the ground up. Indeed, Janáček, in these examples, can be shown to use elemental *intervals* in lieu of pre-established tonal attributes such as triads, and instead generates his own unique type of tonality. He eschews reliance on the tonal impulse of individual triads and their relationships in favour of a network of smaller-scale musical connections that still manages to reverberate with richness and vibrancy.

The result of my exploration will hopefully be an understanding that Janáček was a composer who was adept (or far more-so than he is given credit for) in exploiting the properties of familiar and unfamiliar pitch-class collections. Moreover, it is my hope that my analyses do not lose sight of the aspect of Janáček's music that initially drew me to this examination. It is clear to me that Janáček did not treat his understanding of these complex systems as significant on their own, but wove them into a musical fabric that is as intriguing to listen to as it is to analyze. Indeed, I hope that my analyses can shed light on the fascinating mechanics that drive Janáček's unique sound.

# Chapter 2: The First Movement of Janáček's String Quartet No. 1

## 2.1 The Main Formal Components of the First Movement

The first movement of Janáček's String Quartet no. 1 begins with a distinctive two-measure

motto, presenting a miniature antecedent-consequent structure (see Figure 2.1).

**Figure 2.1 Janáček, String Quartet no. 1, first movement, opening motto "M," mm. 1-2**
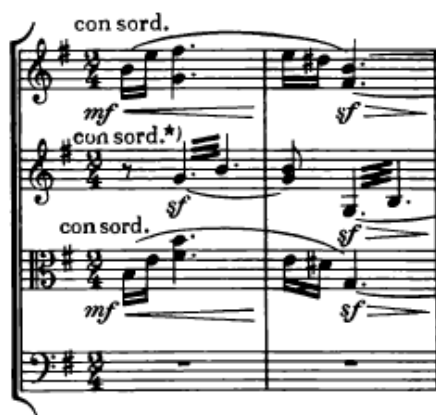


The first violin and viola play a melodic line in octaves (excepting the last note), and reinforce

their two agogically accented melody tones with double-stopped accompaniment pitches that lie

within the compass of the octave doubling: {G4, B4} is added within the {F#4, F#5} octave in

m. 1, so that the two instruments play the pcset {F#, G, B} with F# doubled; and in m. 2, the first

violin adds F#4 to its melodic B4 and the viola G3, so that the two instruments again present the

pcset {F#, G, B}, but in a different pitch representation. These double-stops are also reinforced

by a {G, B} tremolo dyad in the second violin, {G4, B4} in m. 1, echoed an octave lower in m.

2. *Sforzando* markings place additional emphasis on these two moments, and their two different

registral arrangements and doublings of the pcset {F#, G, B}: {F#4, G4, G4, B4, B4, F#5} in m.

1, and {G3, G3, B3, F#4, B4} in m. 2.  Among other things, we may note that the pitch dyad

{F#4, B4} is the intersection of these two sets, and matches the double stop played by the first

violin in m. 2.  We note also that F# is more prominent in the simultaneity in m. 1, which

doubles F# and features F#5 as its highest pitch and F#4 as its lowest pitch.  In m. 2, F# is no

longer doubled and it is B4 that is featured as the highest note, and G3 as the bass.  We will soon

develop some other ideas to explore distinctions between m. 1 and m. 2 and formulate ideas

about their harmonic character in relation to the manner in which the movement constructs and

presents E minor in the small and the large.


This motto is followed by a nine-measure melody in the cello, accompanied by sustained pitches

in the other three instruments (see Figure 2.2). The cello melody dances rhythmically within the

tonic fifth {E3, B3}, while the upper strings sustain the chord {G3, B3, F#4, B4}. This is

essentially the chord from m. 2, except that G3 is no longer doubled.


**Figure 2.2 Janáček, String Quartet no. 1, first movement, melody "N," mm. 3-11**

This chapter will explore how the pitch materials of these opening eleven bars involve innovative approaches to harmonic function and draw on traditional harmonic and scalar resources in fascinating ways.  The discussion will also study how these materials are treated throughout the remainder of the movement. This examination will help to position the quartet's distinct style within various compositional contexts, and offer insight into certain previously unexplored aspects of Janáček's musical thinking.

We will refer to the two-measure opening motto as *M* and the following eleven-measure melody as *N*. Within the movement there are six occurrences of M (beginning in mm. 1, 12, 23, 37, 43, and 86) and six occurrences of N (beginning in mm. 3, 14, 25, 90, 101, and 113). Additionally, there are two mutations of M (hereafter M′ and M'') that begin in mm. 125 and 162. These repetitions and mutations occur at varying levels of transposition and in different combinations of instruments.  Table 2.1 summarizes this information.  In addition to tabulating comparative information about motives M and N, the table also includes motives O and P, which will be introduced and discussed later. Table 2.2 follows and presents a simplified version of this information in a chronological format.

**Table 2.1 Four themes of the movement**

| M | M1* | M2** | M3*** | M4 | M5 | M6 | M' | M" |
|---|---|---|---|---|---|---|---|---|
| Key | E minor | F# minor | B minor | Ab Minor | Ab Minor | E minor | ? | E major |
| Measures | 1-2 | 12-13 | 23-24 | 38-39 | 43-44 | 86-87 | 125-126 | 162-- |
| Melody Instrument | V1, Vla | V2, C | V1, C | V1, Vla | V1, Vla | V1, C | V1 | V2, Vla |
| Acc. Instruments | V2 | Vla | Vla | V2, C | V2, C | V2, Vla | V2, C | V1, C |
| Notes | Paired | Paired | Paired | | | Introduction of triplet sixteenth figures in Vla | Each half suggest diff. key | Only the first half of M |

| N | N1* | N2** | N3*** | N4 | N5 | N6 |
|---|---|---|---|---|---|---|
| Key | E minor | F# minor | B minor | E minor | D minor | C minor |
| Measures | 3-11 | 14-22 | 25-33 | 90-98 | 101-109 | 113-120 |
| Melody Instrument | C | V1 | V2 | V2 | Vla | C |
| Acc. Instruments | V1, V2, Vla | V2, Vla, C | V1, Vla, C | V1, Vla, C | V1, V2, C | V1, V2, Vla |
| Notes | Paired | Paired | Paired | | | Melody doesn't resolve |

| O | O1 | O2 | O3 |
|---|---|---|---|
| Key | B major | ? | E major |
| Measures | 46-56 | 72-85 | 133-148 |
| Melody Instrument | V1, V2, Vla | V1, V2 | V1, V2, Vla |
| Acc. Instruments | C | Vla, C | C |

| P | P1 | P2 |
|---|---|---|
| Key | B major | E min/maj |
| Measures | 57-68 | 149-161 |
| Melody Instrument | V1, V2, Vla | V1, V2, Vla |
| Acc. Instruments | C | C |

**Table 2.2 Chronological presentation of the mottos**

| Measures | Themes | Keys |
|---|---|---|
| 1-2 | M1* | E minor |
| 3-11 | N1* | E minor |
| 12-13 | M2** | F# minor |
| 14-22 | N2** | F# minor |
| 23-24 | M3*** | B minor |
| 25-33 | N3*** | B minor |
| 38-39 | M4 | Ab minor |
| 43-44 | M5 | Ab minor |
| 46-56 | O1 | B |
| 57-68 | P1 | B |
| 72-85 | O2 | ? |
| 86-87 | M6 | E minor |
| 90-98 | N4 | E minor |
| 101-109 | N5 | D minor |
| 113-120 | N6 | C minor |
| 125-126 | M' | ? |
| 133-148 | O3 | E |
| 149-161 | P2 | E min/maj |
| 162-- | M'' | E |

The first three appearances of M and N occur in coordination with one another. (This is the meaning of the word "paired" in the Notes cells for those entries, and of the single, double, and triple asterisks that show the pairings.) The opening statement, M1, presents E minor in an interesting schematic manner that will soon be explored in more detail. As we have seen in the two preceding examples, M1 is immediately followed by N1, which also presents E minor, much less ambiguously, but with the use of both A# and A natural creating the possibility of competing modal contexts for the E minor triad that eventually emerges as the cello melody unfolds and cadences. The second M-N pair, labeled M2 and N2, posits F# minor in an essentially identical manner, and the third pair, M3 and N3 posits B minor. These first three paired statements thus

expand, on a larger formal scale, the first three pitches of M, <B, E, F#>, in an order that reinforces the E minor tonic first, its transposition by whole step next, and eventually its transposition to the minor dominant.

M6 (in mm. 86-87) and then N4 (mm. 90-98) both return to E minor, but the other four M and N iterations appear independently, earlier and later, positing new key areas. The M mottos beginning in mm. 37 (M4) and 43 (M5) are in Ab minor, and the two further N melodies are in D minor (N5, m. 101) and C minor (N6, m. 113).

The M′ statement beginning in m. 125 is tonally ambiguous. It is unlike M in a few ways: the intervals of the melody are changed (though the contour remains the same); the doubling of the melody is removed; there is a new texture added (the half note cello pitches); and the tremolo dyad pitches are different in each bar. The M′′ in m. 162 ends the movement and differs from M in that it presents E major (M forms otherwise occur only in minor keys) and it features only the first half of the motto.

Overall, the six M mottos occur in E minor, F# minor, B minor, and Ab minor. The manner in which three of these tonics eventually sketch-out a large-scale schematic E major triad (considering Ab as enharmonically equivalent to G#) over the span of the movement seems cogently related to the localized E major harmony projected by M′′ near the end of the movement. Moreover, collectively these four keys suggest a pentatonic schema, at least in the sense that their tonic notes (again considering Ab as enharmonically equivalent to G#) form a four-note subset of a pentatonic collection (missing C#). Some senses in which pentatonic

structuring is relevant will be explored in detail shortly. Of course, what holds true for the four

tonic pitches of the M statements also holds true for all analogous pitches in these statements:

over the long-range span of the unfolding M statements, they too will sketch out four-note

subsets of other (transposed) pentatonic collections, as parallel constellations to the collection

formed by the tonic pitch classes.

The N melodies occur in E minor, F# minor, B minor, C minor, and D minor. Four of these

tonics, excepting B minor, sketch out a four-note whole tone schema, over the large span of

unfolding N statements. By imagining a pentatonic schematic for the M statements, and a whole-

tone schematic for the N melodies, we can imagine these iterations as occurring in different sonic

worlds.  As this study unfolds, we will explore other ways in which the pentatonic and whole-

tone "worlds" are manifest in the movement. The M motto tonics inhabit a pentatonic sub-space

that privileges fifths and major seconds. Their tonic pitch classes form a [0247] tetrachord.  Its

interval class vector, <021120> privileges IC 2 and IC 5, is balanced in terms of even and odd

interval classes, and does not contain IC 1 or 6.  The N iterations occur in a space that posits a

stronger tension between even and odd interval classes. The N tonics, now including the B minor

statement, are arranged in a pentachord of the form [01357], with interval class vector

<131221>, in which 6 even ICs dominate over 4 odd ones, but the sole semitone interval also

creates several trichords of the form [0,1,x] where x is odd, and these will interest us later on.

We note for the moment that the {F#, G, B} trichord featured in M is a [015] member of this

family.

Interestingly, though the sonic worlds that the M and N tonics inhabit are quite different, the collections they form are strikingly similar. The pcset of M tonics ([0247]) is actually a subset of the pcset of N tonics ([01357]).  (An imagined M motto in Bb would create a [01357] pentachord of M tonics, one that would be an inversion of the [01357] set of N tonics.) This relationship points to some of the underlying connections to be explored in the movement between the pentatonic, whole-tone, and also chromatic sonic spaces. As such, these tonics, their intervallic relationships, and the ways they can be organized are all issues that will be shown to permeate many levels of analysis in this movement.

## 2.2    Properties of Motto M

Figure 2.3 shows how the opening M motto can be divided easily and intuitively into component parts based on its rhythmic, instrumental, metric, and registral features. One distinctive component of the motto is the ascending antecedent melodic gesture <B, E, F#> that occurs in the first bar, doubled at the octave. Another is the response <E, D#, B> melodic gesture that follows in the second bar, the first two notes of which are likewise doubled at the octave. The third component is the pair of {F#, G, B} trichords that are formed by the melody and accompaniment together during the agogically weighted pitches of the antecedent and consequent gestures. See Figure 2.3.

**Figure 2.3 Trichord Subsets of M**
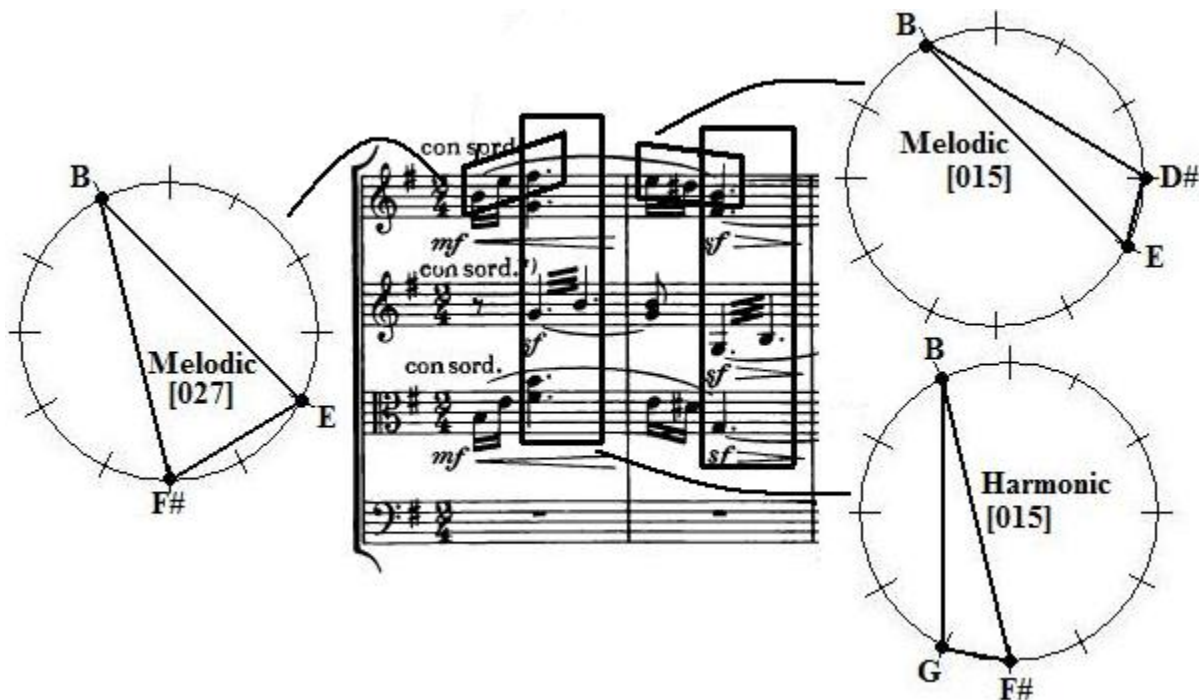


The <B, E, F#> component forms a [027] trichord. The <E ,D#, B> and {F#, G, B} components

each form [015] trichords. The union of all three trichords is the pitch-class pentachord {B, D#,

E, F#, G} of type [01348], with interval class vector <212320>.  This pentachord type will

henceforth referred to as the M pentachord. This [01348] pentachord has some interesting

properties that help to elucidate the sonic qualities of M.


Before discussing these qualities, it is important to note that the intervals and pitches of the

[01348] M pentachord have commonalities with the transpositional levels of M and N mentioned

previously, making the pentachord an especially salient feature of the movement. The tonics of

the first three M-N pairs (E minor, F# minor, and B minor) form a [027] trichord that is the same

(in pitch class) as the trichord formed by the opening melodic segment of M. The [015] trichords

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formed by the second melodic segment and by the accompaniment pitches are also related by inversion and transposition (respectively) to the [015] trichord formed by the B, C, and E iterations of N. The melodic {E, D#, B} trichord is related to the N-transposition trichord {B, C, E} by $I^3$, and the accompaniment {G, F#, B} is related to {B, C, E} by $T^5$. Both transformations are salient to prominent features of motto M. The T5 relation reflects the directed interval between the motto's first two pitches, B4 and E5. Meanwhile, the I3 inversional relationship maps those two initial pitch classes onto one another, and by also mapping an E minor triad to E major, suggests another way to conceive the relationship between the first M statement in E minor and the last modified one, which projects E major.

The [01348] M pentachord is inversionally symmetric around the pitch class B, which is the only pitch class that the pentachord's three component trichords (the [027] and the two [015]s) have in common. This axis of symmetry will be referred to as J. J is the contextual inversion that captures the symmetry not only of the complete [01348] pentachord, but also of the trichordal components we have identified, since J maps the [027] trichord of the first melodic M segment onto itself, and also maps the melodic [015] onto the harmonic [015], and vice versa, as shown in Figure 2.4.

**Figure 2.4 J symmetry in motto M**
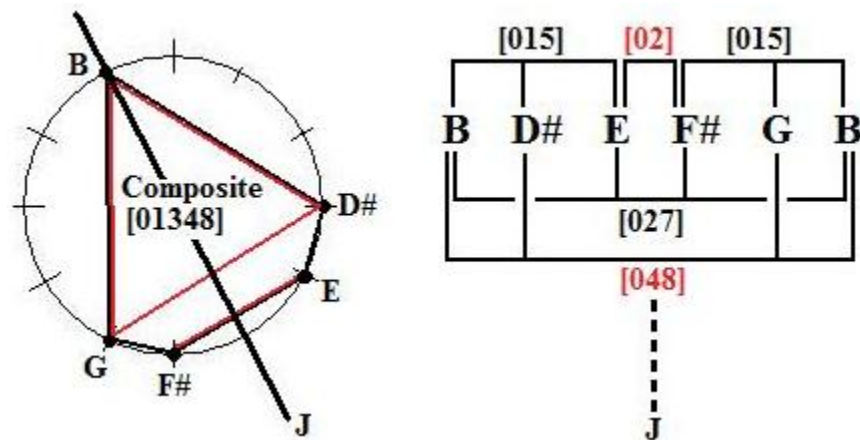


J also is the line of inversional symmetry for another subset division of [01348]. This is the division of the pentachord into a {B, D#, G} augmented triad ([048]) and the {E, F#} whole tone ([02]). J-symmetry, in other words, is intimately related to a partition of the M pentachord into its odd and even odd whole-tone components, i.e. into the odd [048] {B, D#, G} and the even [02] dyad {E, F#}.

This division is not arbitrary, but rooted in the experience of listening to the opening motto. The [048] augmented triad occurs locally during the second sixteenth of m. 2, but also seems to permeate the motto's entire consequent phrase (m. 2). The material has an open sonic quality brought about by the [048] trichord (and also no doubt by the doublings of the melodic line) that gives the passage a distinctive harmonic ambiguity. The G-B tremolo dyad plays against the melodic D# that occurs in the second phrase to complete the augmented triad. (The issue of harmonic implication will be discussed later.) Meanwhile, the {E, F#} whole tone is given a distinct sort of emphasis by the <E5, F#5, E5> neighbour motion at the top of M melodically,

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and by the overall tonic "add9" quality implied by the antecedent melodic gesture in combination

with its accompaniment (i.e. {E, G, B, F#}). There seems to be a tonal weight placed on the F#

supertonic that elevates it from its status as a local appoggiatura to a more structural member of a

referential E minor tonic harmony that is never manifested as a simple triad. This is because of

the F#'s strong agogic emphasis in the first bar and doubling in the harmonic pitches in the

second.  Perhaps more important is F#'s presence among the harmonic pitches (the {F#, G, B}

trichord shown in example 2.3), which sets it apart as not only a melodic but also harmonic

entity that participates in the schematic sense of E minor that is projected by M.

As it turns out, J is also the line of inversional symmetry for a third subset division of [01348],

into the two [037] trichords {E, G, B} and {B, D#, F#}. These trichords share the pitch B and are

the minor tonic and corresponding major dominant triads of the movement's key of E minor. The

pitch class B and line of J symmetry reflect a triad's pattern of major and minor thirds onto itself

in a manner that generates the [01348] pentachord. In this fashion, the contextual inversion J is

the line of symmetry between any minor triad and the major triad whose root is seven semitones

above it, the combination of which is an [01348] pentachord.  Figure 2.5 shows the case at hand,

and depicts J as the contextual inversion of a minor triad about its fifth (or equally of a major

triad about its root). Interestingly, if one performs this exercise starting with a major triad, and

similarly inverts about its fifth, e.g. E-G#-B-D-F#, the result will be a pentachord of type

[02469]. While also a symmetrical pentachord, its interval-class vector is <032221>, which has

even stronger whole-tone character than the <212320> interval-class vector of [01348].

**Figure 2.5 Minor and major triads in the M pentachord and their relationship**
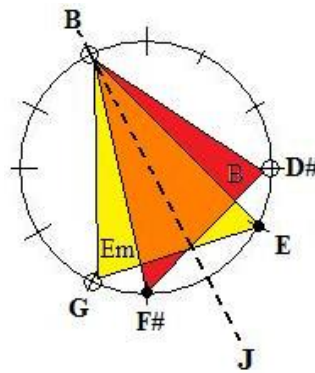


## 2.3    Unions of [048] and [02]

To examine the M pentachord further, we can imagine the four possible [048] trichords in an array, as in Figure 2.6. This example allows us to study all the possible forms of pentachord [01348]. For our purposes, we will call the four [048] trichords North, East, South, and West, given that each augmented triad contains only one pitch class among the four cardinal axes of a circle diagram, i.e. pitch classes 0, 3, 6, and 9.  (The figure in Figure 2.5 is of East orientation because the {B, D#, G} augmented triad contains PC 3.) This concept is similar to ideas developed by Cohn in his 2000 article, "Weitzmann's Regions, My Cycles, and Douthett's Dancing Cubes," wherein Cohn groups collections of "*klaenge*" into regions that he labels North, East, South, and West.  Each [048] trichord can generate three distinct [01348] pentachords, by adding different [02] dyads to the trichord.  Each [048] trichord on its own has three possible identity inversions. One of these identity inversions is J for the [01348] union of the trichord and a specific [02] dyad. Given the four [048] trichords and the three distinct [02] additions they each can accommodate, there are twelve possible [01348] pentachords. See Figure 2.6.  Each of the

twelve distinct forms of [02] is therefore associated with one and only one [01348] pentachord. This fact is also connected to the pentachord's interval-class vector, <212320>, which has only one instance of ic 2. Dyads representing each of the interval classes in the pentachord will be associated with the same number of [01348] forms as the corresponding vector entry. (Each [01], [03], or [05] dyad will belong to exactly two different [01348] pentachords, and each [04] dyad will beyond to exactly three distinct pentachords.) Because each [02] corresponds with only one [01348] pentachord, we can in that specific sense consider the whole tone to be a uniquely characteristic feature of this pentachord type. The whole tone is an identifying feature of the pentachord type, in the sense that each whole tone corresponds to a unique representation of the set class. (Of course, the [048] trichord is also highly characteristic of this pentachord type, but in a rather different sense.)

**Figure 2.6 An Array of the twenty-four triadic subsets of the twelve [01348] pentachords generated by [048] U [02]**
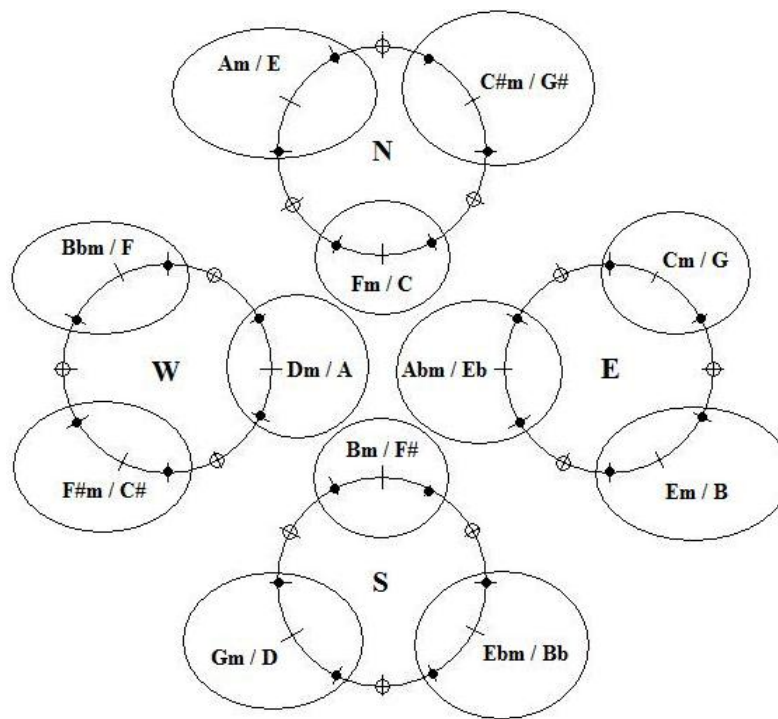


In addition to the ways, just described, in which even interval classes characterize this pentachord type, odd interval classes also have their own signatures in this pentachord. Each of the [01348] pentachords includes a pair of [037] trichords in the configuration mentioned previously, and as shown earlier in Figure 2.5.  The [037] trichords collectively incorporate the IC 3 and IC 5 intervals in the pentachord, evenly distributed between the two trichords.  And Figure 2.5 also shows clearly how the two IC 1 intervals in the pentachord are the minimal voice-leading perturbations between the two [037] trichords, which share one pitch class. In fact, one might, for purposes other than ours, define a contextual transformation that transposes a [03] pitch dyad by semitone, against a fixed pitch four and five semitones away from each "side" of the respective [03]s, which would accomplish this transformation between [037] trichords in another way. The axis of symmetry shown on Figure 2.5 also depicts a different way of relating

the two [037] trichords, by inversion rather than minimal voice leading. Each pentachord's J

acts not only as a line of inversional symmetry, but also as a transformation that we will call

"minor – major dominant" which transforms any minor triad into the major triad built seven

semitones above it and transforms any major triad into the minor triad built seven semitones

below it. Thus each augmented triad can accommodate six keys – three major and three minor.

Refering back to Figure 2.6, it is worth noting the trajectory accomplished by the M-tonics in the

movement follows the path E, W, S, E, W, E, N. This places emphasis on the East collection

because the music begins there, returns for emphasis throughout the piece while exploring South

and West at moments, and ends by completing the circuit in the North collection (which had,

until the end, gone unexplored).

We have noted that there are whole-tone transpositional strategies with respect to the N motto,

and there are other examples of Janáček's use of whole-tone material, as we will see in the next

chapter. It is clear, then, that Janáček exhibits an engagement with whole-tone compositional

techniques. We have also noted how the M pentachord can be partitioned into its disjoint whole-

tone subsets, and how these come to our attention when we notice the augmented triad embedded

therein.

We have divided the [01348] pentachord into complementary [048]/[02] subsets and intersecting

reflected [037] subsets, and now we can begin to tease apart the relationships between these

subdivisions and discern how they interact more abstractly. To begin, we must consider the

following: Adding an [02] dyad to an [048] trichord can be done in one of three ways; equally,

adding an [02] dyad to an [048] trichord can result in one of three PC set types. If one of the

[048] pitch classes intersects with either of the [02] pitch classes, the result will be a tetrachord

of type [0248]. This tetrachord is entirely a subset of one of the two whole-tone collections. If

both [02] pitch classes sit one semitone from a single [048] pitch class, the result will be a

pentachord of type [03458]. If the [02] pitch classes each sit one semitone from two distinct

[048] pitch classes, the result is the [01348] pentachord derived earlier.  Figure 2.7 shows these

three possibilities.

**Figure 2.7 Possible sets resulting from [048] U [02]**
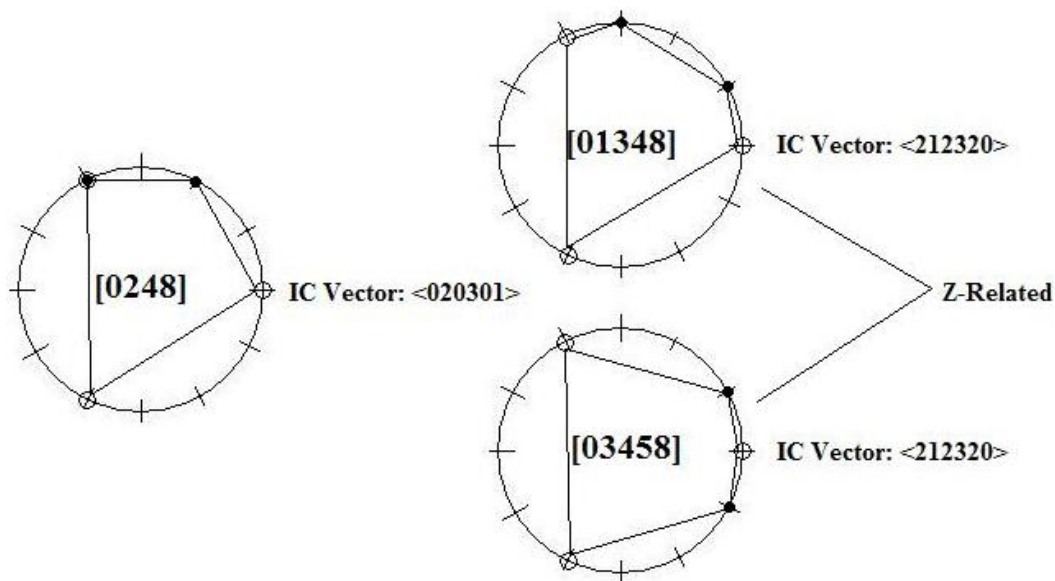


Comparing the interval-class vectors of each of these prime forms reveals that [03458] and

[01348] are Z-related, meaning that they share exactly the same intervals in kind and frequency.

Knowing this, we can expect that the [01348] and [03458] pentachords will share some similar

subsets. Since they were generated by sliding an [02] dyad along an [048] trichord, they will

obviously share the [048] and [02] subsets. However they also both contain pairs of [015] and

[037] trichords (in the case of [01348], these are the trichords we derived earlier from the music itself). See Figure 2.8.

**Figure 2.8 [015] and [037] subsets of [01348] and [03458] pentachords**
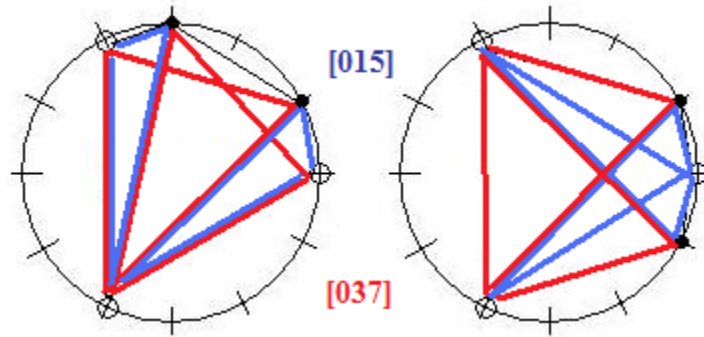


We know that the [037] trichords formed by [01348] relate across the pentachord's J-inversion by the Minor – Major Dominant transformation. The [037] trichords formed by [03458], however, relate across that pentachord's J inversion by the Neo-Riemannian Relative transformation, since they share not only a single pitch, but an [04] dyad. See Figure 2.9.

**Figure 2.9 Relative transformation across J in an [03458] pentachord**
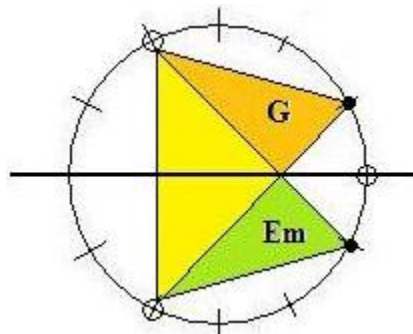
Like the Minor – Major Dominant [037] transformations within [01348], the Relative

transformations of [037] within [03458] produce twenty-four triads – twelve major and twelve

minor. See Figure 2.10.

**Figure 2.10 An array of twenty-four triadic subsets of twelve [03458] pentachords generated by [048] U [02]**
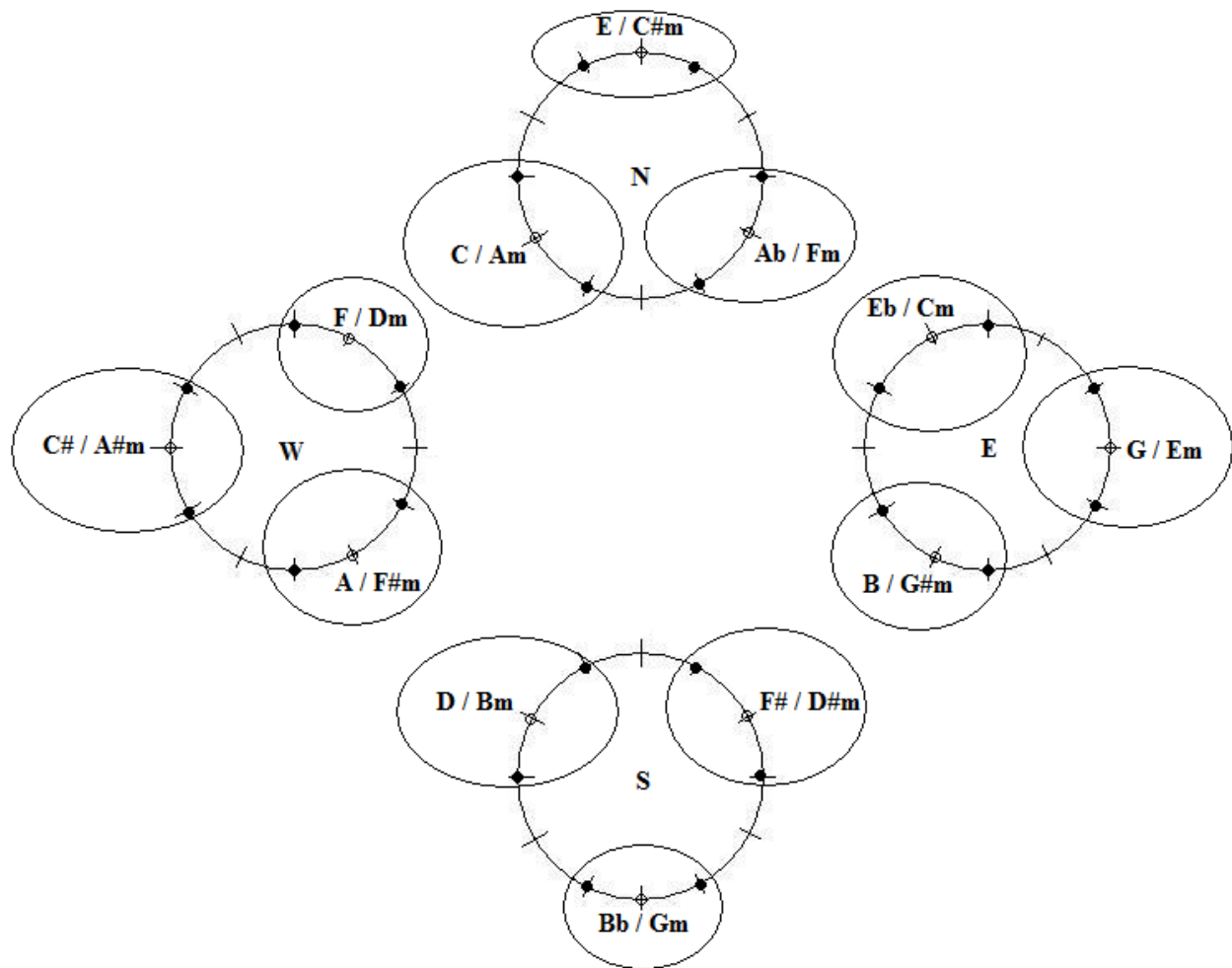


It is easy to see that with some enharmonic adjustments, this array of tonalities generated by

Relative transformation is essentially the same as the array of the tonalities related by Minor –

Major Dominant transformation shown previously. The triads are not related to each other via the same pairings, but the keys found in each N, E, S, or W collection are the same. That said, the only other difference is that one favours the [01348] pentachord and the other [03458]. Thus: sliding an [02] dyad around [048] not only alternates between pentachords (disregarding the [0248] tetrachords), but produces [037] trichords that relate by alternating Relative and Minor – Major Dominant transformations. The colour coding in Figures 2.11, 2.12, 2.13, and 2.14 shows these transformations clearly.

**Figure 2.11 Progression of triads generated by exhaustive [02] T2 slides around the East [048] augmented triad**

**Figure 2.12 Progression of triads generated by exhaustive [02] T2 slides around the North [048] augmented triad**

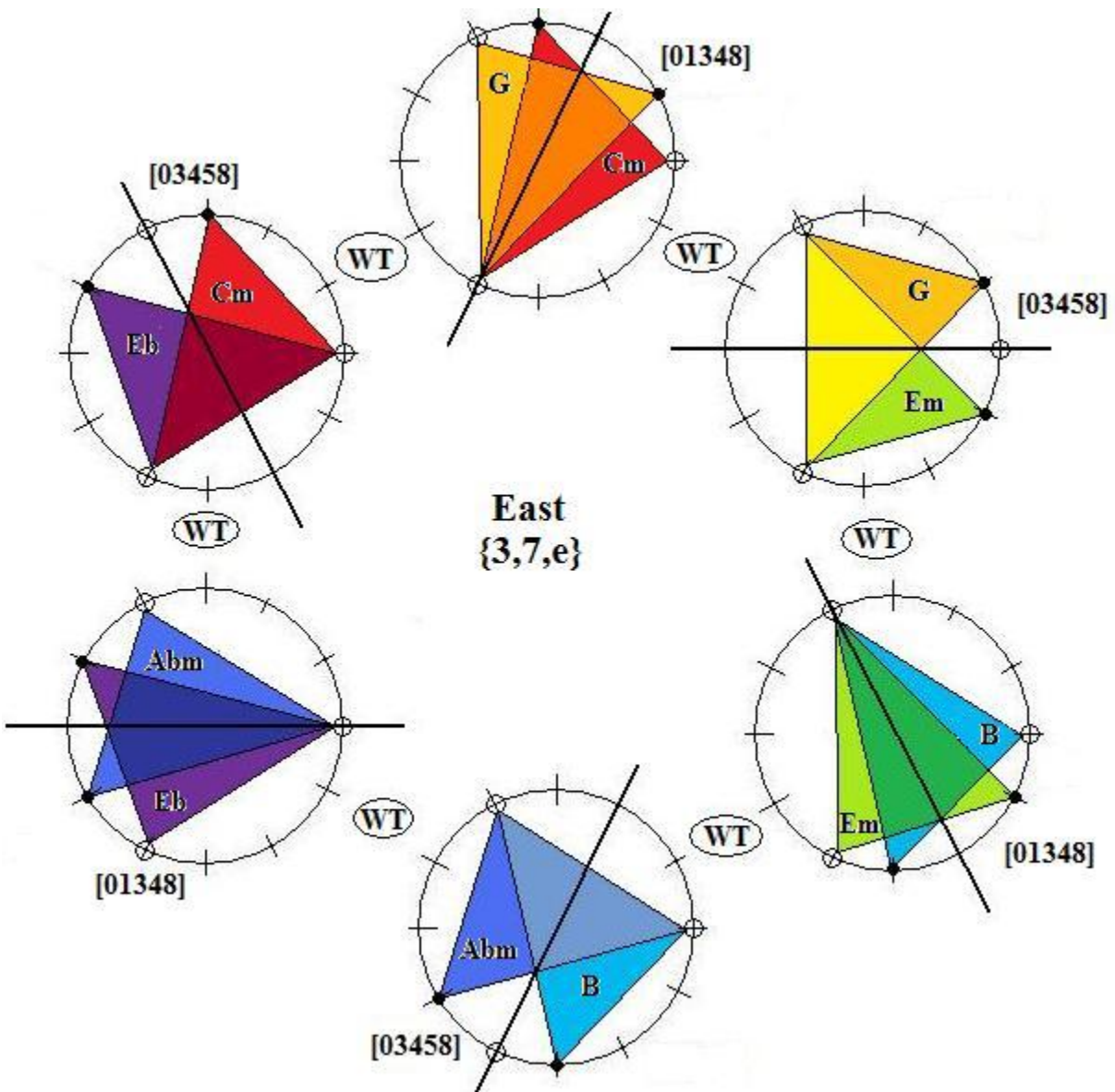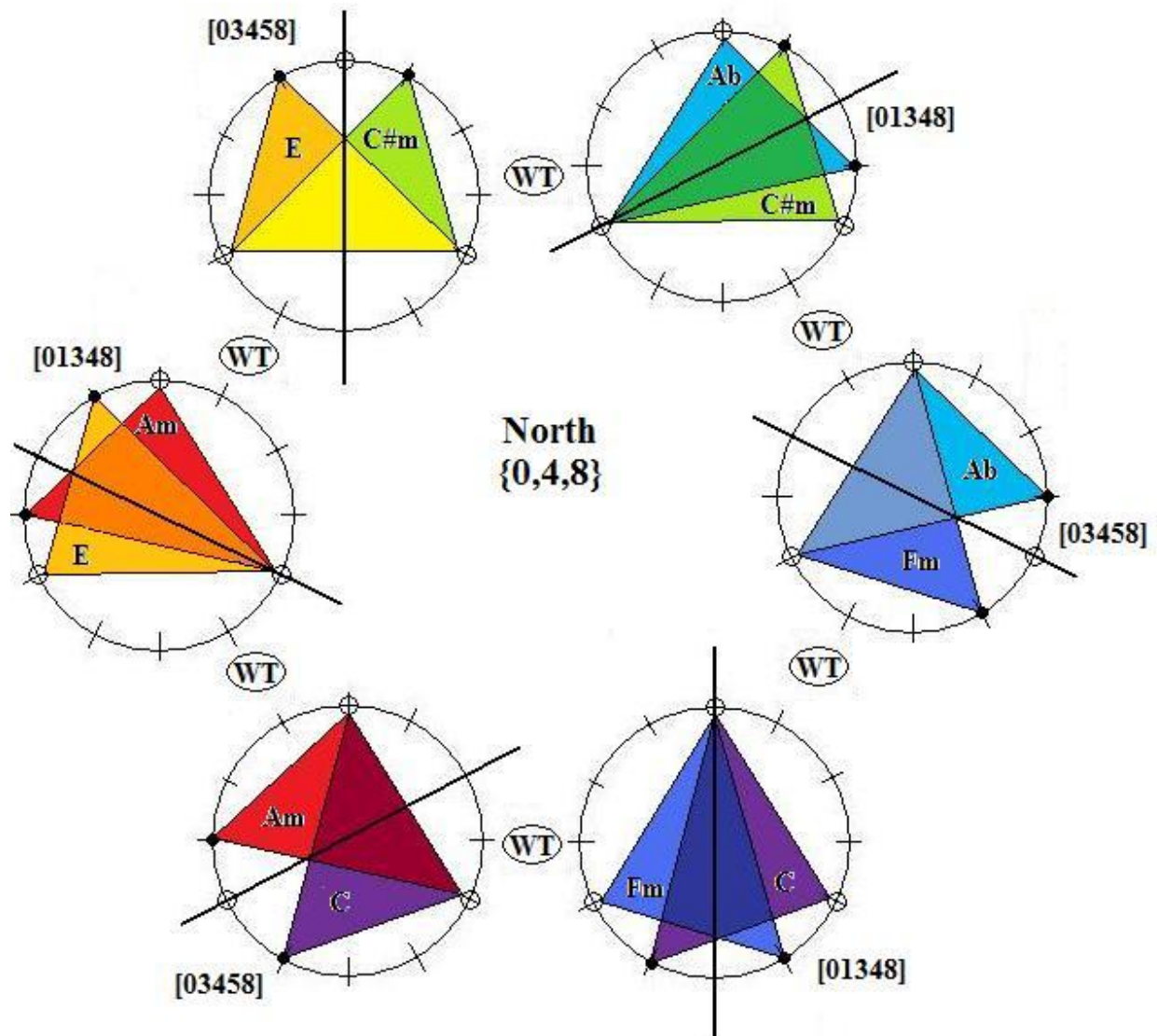**Figure 2.13 Progression of triads generated by exhaustive [02] T2 slides around the West [048] augmented triad**
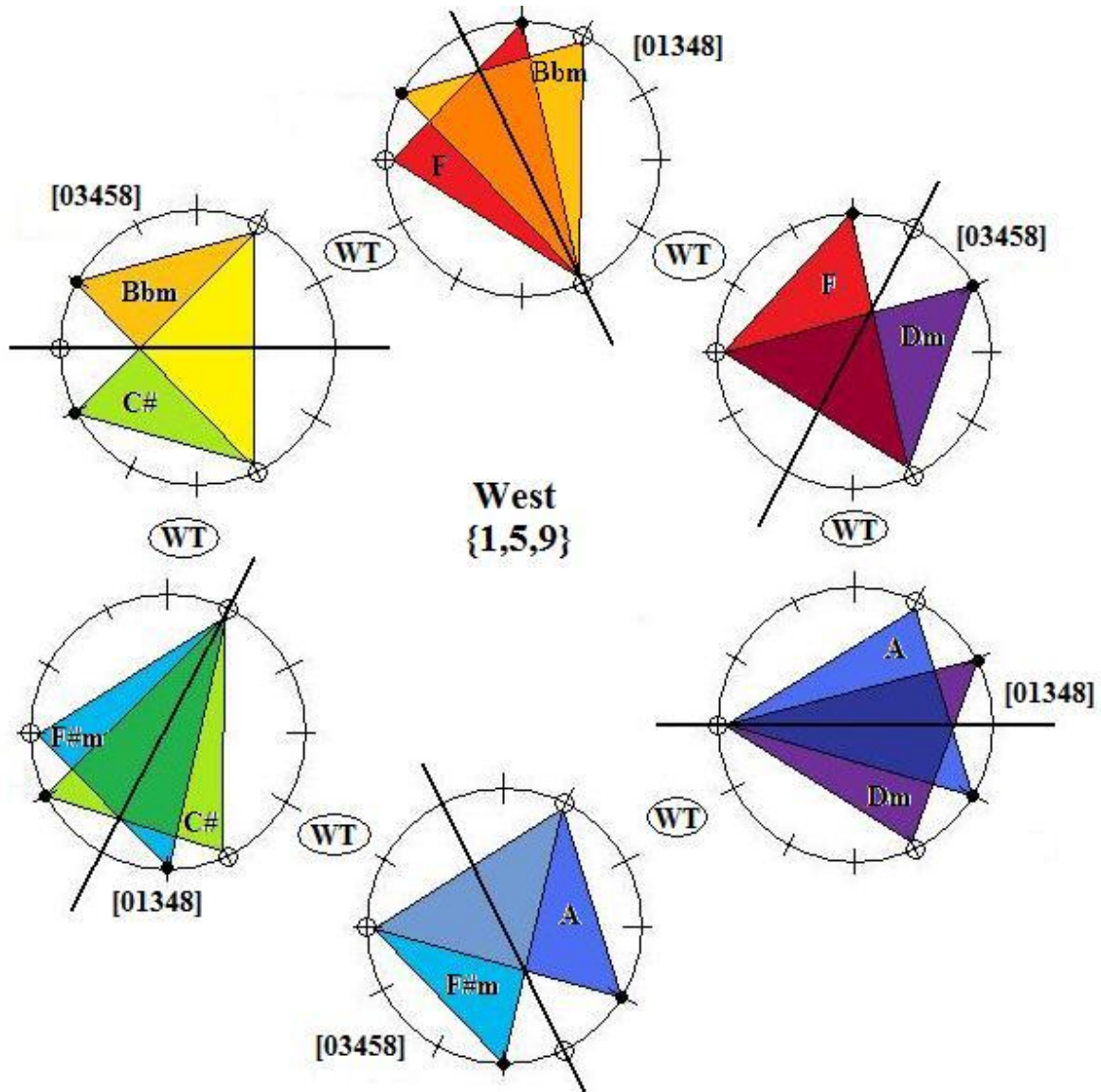
**Figure 2.14 Progression of triads generated by exhaustive [02] T2 slides around the South [048] augmented triad**
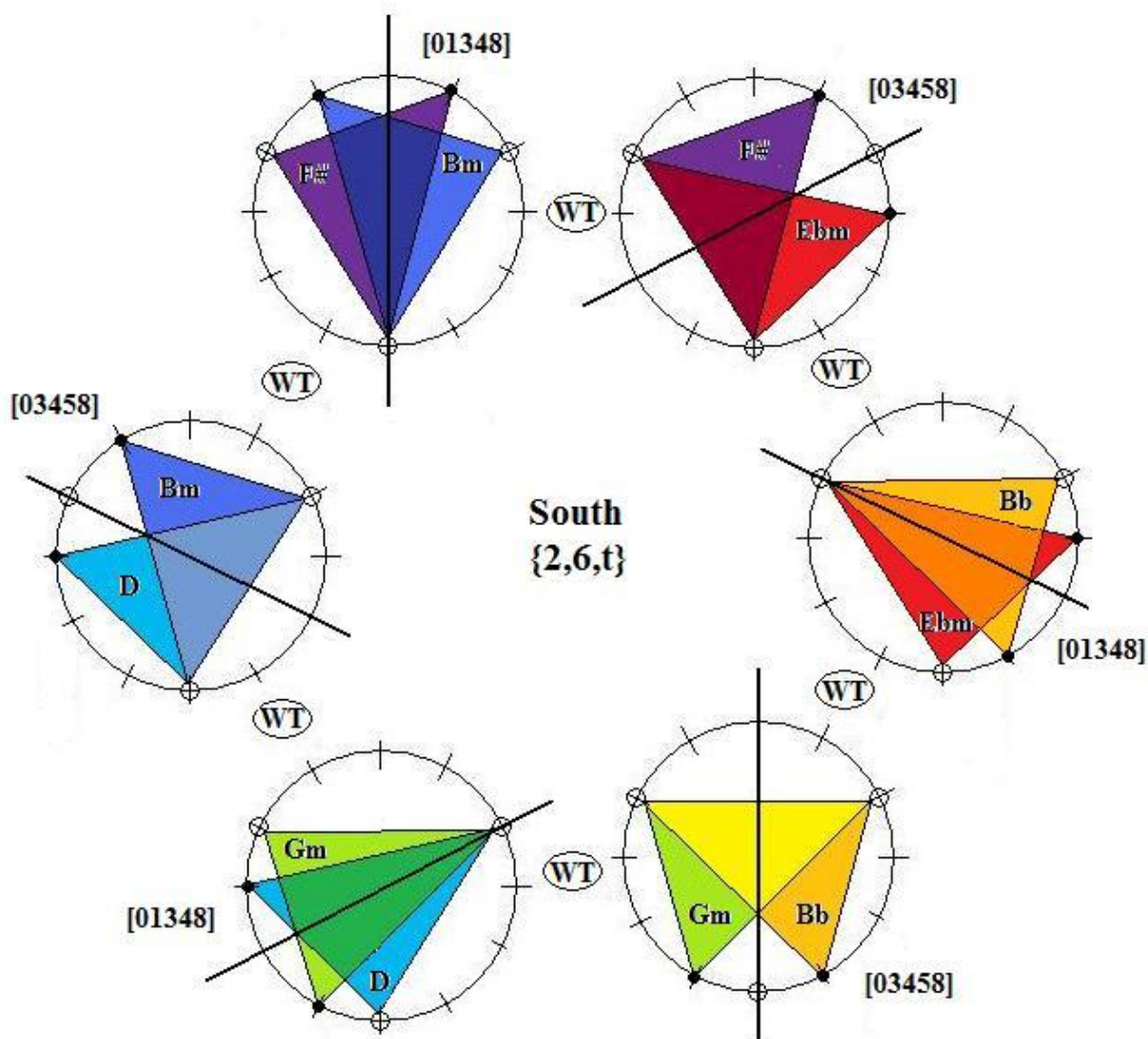


Morris's 1998 article "Voice-Leading Spaces" offers another manner of presenting these relationships. Morris shows discrete pitch collections (that exhibit one of two set classes) in

coordination with each other such that the resultant connections between them are all of the same set class. While Morris's focus is on Riemannian relationships and [037] trichords, the result when applied to our [048] U [02] materials is quite compelling as well. See Figure 2.15.

**Figure 2.15 [01348] and [03458] pentachords shown in the manner of Morris 1998**
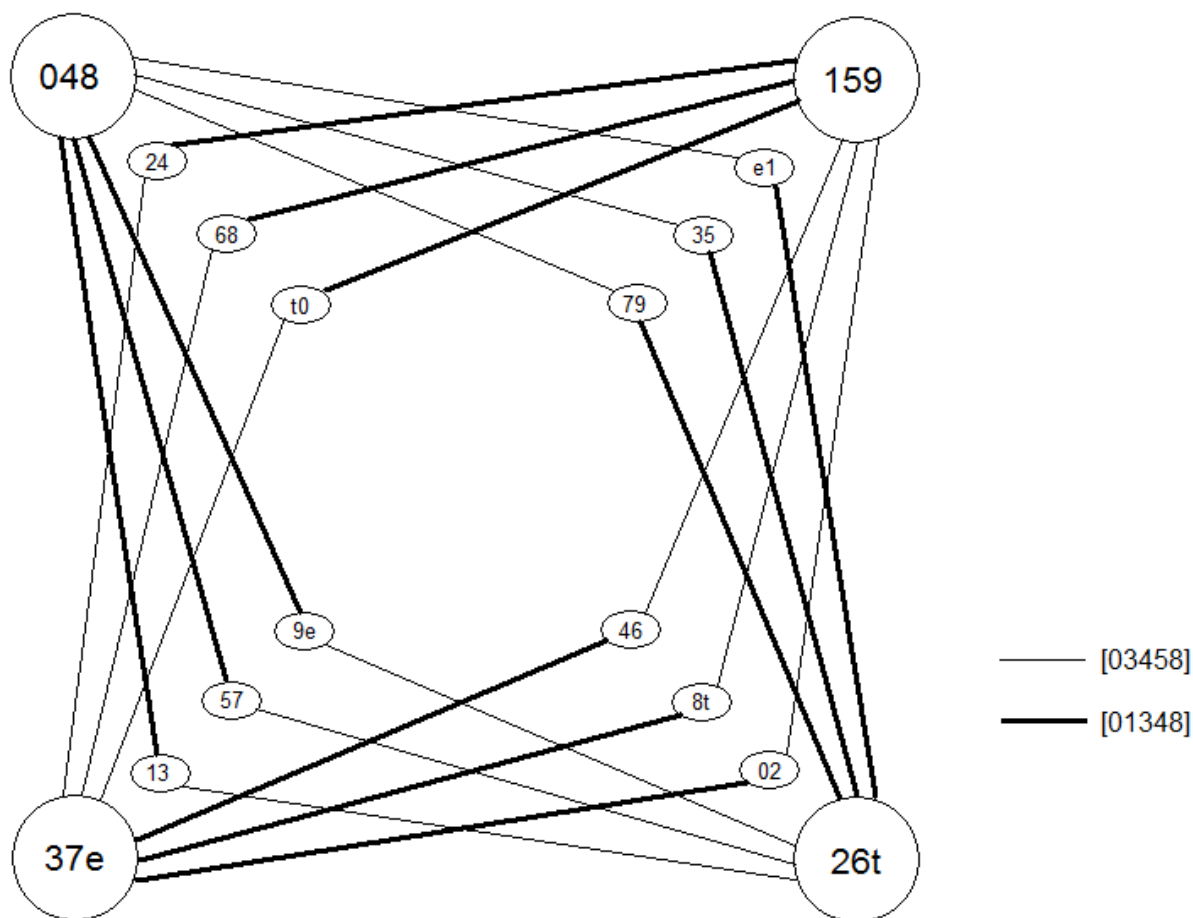


On the figure, the four larger nodes at the corners of the square are filled with the four distinct [048] trichords; the twelve smaller interior nodes show each of the twelve distinct [02] dyads. Nodes along the descending left-right diagonal all belong to the even whole-tone collection,

30

while nodes on ascending diagonal belong to the odd whole-tone collection. The figure shows how each [048] trichord participates in six pentachords (denoted by the lines joining them) – three of form [01348] and three of form [03458]. Each [02] dyad completes a pentachord of one type with one [048] in the opposite whole-tone collection, and likewise, a pentachord of the other type with the other [048] in that (opposite) whole-tone collection. Two distinct "circuits" are thereby formed, alternating the two pentachord types, with trios of alternating thick line segments representing [01348] pentachords, and thin line segments representing [03458] pentachords. (The even [048]s form a circuit with the odd [02]s, and the odd [048]s form a circuit with the even [02]s.) In the diagrams in Morris 1998, there is a pathway from every node to any other node. In contrast, Figure 2.15 is really two distinct diagrams: two discrete trajectories that interweave the indicated subsets of the two whole-tone collections.

[01348] is a notable characteristic of the M motto of the opening of the quartet because of the two types of [037] triads that are its subsets. Moreover, the triads' relationship – tonic-dominant – makes the [01348] pentachord salient to the movement, as we have explored. The [03458] pentachord, by contrast, does not occur in such a prominent manner in the immediate texture of the movement. The Relative relationship between its triadic subsets, however, is nonetheless important. The suggestion of [03458] does not appear in the movement on a surface level in the same way that the implications of the [01348] pentachord are evident, but there are Relative relationships that are at work on deeper levels of the movement, which hints at the salience of the [03458] pentachord.

Table 2.1 shows that there is a progression of keys from the start of the movement through m. 44 that explores E minor, F# minor, B minor, and Ab minor. Each of these keys is delineated by an iteration of the M motto, yet one – the Ab iteration – is given interesting treatment. Unlike the other three M mottos, it is not paired with an N motto in the same key, and, further, the Ab minor M iteration is broken into two parts that are separated by a highly chromatic digression (in mm. 40-42). Further still, the tonics of the other three M mottos that appear before Ab minor are of the form [027], which is a setclass that is prominent in the M motto itself. Ab has no part in the M motto, and is therefore distinctly different than the other three opening M iterations.

So why is it that Janáček uses Ab minor as the final key explored before the introduction of new O1 and then P1 thematic material starting in m. 46? As seen in Table 2.1, O1 and then P1 both enter first in B major, which shares a Relative relationship with Ab minor.  B major is of course also the global dominant, and we have already noted its role in the M1 motto. Ab minor therefore acts as a lynchpin that bridges two larger sections of the piece (the first which engages M and N mottos and the second which introduces new material and the major mode). In this way, the [03458] pentachord – because of the relative relationships between its triadic subsets – is surprisingly apt for addressing these developments.

Thus, the [01348] pentachord is accorded prominence in my analysis because of the immediacy of its presentation and the salience of its application. However, understanding how the [01348] pentachord functions in the movement allows the flexibility to transform it into another (the [03458]) pentachord, which, in turn, can be shown to have special salience within the piece. Both

pentachords share unique properties derived from their matching interval content, and yet both impel different yet compelling harmonic ramifications.

In the next chapter, we will explore different pentachordal sets at work in another of Janáček's compositions.

# Chapter 3: Levels of Pentatonicism in Skuratov's Aria from *From the House of the Dead*

## 3.1 Skuratov's Aria

The second act of Janáček's opera *Z Mrtveho Domu* (*From the House of the Dead*) contains an aria that is striking in contrast to the music around it. This aria, sung by the prisoner Skuratov, explores Skuratov's love for a woman, Lujza, and the events that led to his incarceration. Although the tale is one of murder and deceit, the music that accompanies its narration is simple and beautiful, which makes the aria stand out as one of the more sublime moments in the opera.

The contrast between Skuratov's aria and the music that precedes it is accomplished by Janáček's deployment of contrasting pitch collections. Beginning at rehearsal 12, only pitches from the even whole tone collection are used, excepting the oboe and viola G4 in the first bar. The next seventeen measures are a torrent of *presto* whole tone sonorities. At rehearsal 13, the even whole-tone collection gives way to the Db pentatonic collection (i.e. {Db, Eb, F, Ab, Bb}. It is here that the pace of the scene slows and Skuratov's aria begins. The first violins enter with a simple melody in Db pentatonic, shown in Figure 3.1, as Skuratov begins to detail the events leading to his crime. All measure number references in the following description indicate measures following rehearsal 13.

**Figure 3.1 Pentatonic melody of Skuratov's aria**



Db pentatonic, in this context, refers to the collection of five pitches that is generated by stacking perfect fifth intervals above Db: i.e. {Db, Ab, Eb, Bb, F}. Henceforth, we will call this collection "Q5(Db)." "Q" refers to quintus – the Latin ordinal prefix for five – which in this case references the size of the intervals, while "5" refers to number pitch classes spanned by the cycle of successive perfect fifths. This nomenclature will be convenient later for discussing other collections comprised of stacked fifths. The Db can be thought of as the "tonic" or "root" of this collection, not only because of its position at the bottom of the stack of fifths, but also because the group of five pitches, in compacted ordering (Db, Eb, F, Ab, Bb), resembles a Db major diatonic collection, only with the fourth and seventh scale degrees removed.

The Db-rootedness of this pentatonic collection is reinforced aurally by the violins' melody, because of the emphasis on the Db major triad: Db6 is the highest pitch in the passage, F5 is the passage's final pitch, and Ab5 is the most frequently heard pitch in the passage. The ordering of the pitches also supports this hearing: the first five notes of the melody feature only notes of the Db major triad, and the subsequent Bb5 can be thought of as an upper neighbour to the Ab5 pitches that precede and follow it.

Though it is true in this case, we do not assume that Janáček's pentatonic writing always emphasizes major triadic centricity. The five pitches of Q5(Db) also fit within the Bb natural

minor collection, because a major diatonic collection shares pitch content with its relative natural minor collection. The two – and only two – triads contained within a pentatonic collection will of course always be one major triad and its relative minor triad (and vice versa).

At the conclusion of the violins' Q5(Db) melody, the collection is echoed by a repeating three-note gesture in the clarinets and second violins, as shown in Figure 3.2.

**Figure 3.2 Pentatonic echo that follows melody in Figure 3.1**



These pitches are also members of Q5(Db); indeed, they present Q3(Db), a three-note chain of fifths starting from Db, which is of course a subset of Q5(Db). In this way the Q5(Db) collection is established over the course of the first six measures following rehearsal 13. We will examine the vocal lines in the aria more closely later. The vocal lines never imitate the melody in Figure 1, but they occasionally mimic the gesture in Figure 2 (e.g. in the drunken prisoner's line beginning in m. 5).

After the first six measures following rehearsal 13, the music embarks on a series of transpositions of this pentatonic material. The transpositions are never exact, and some quite freely develop the motivic material, but they only rarely stray from the pentatonic modeling established by the initial material. There are five distinct transposition levels in total. Let us begin to examine them as they occur in time.

In m. 7 (after rehearsal 13), the material shifts to Q5(Eb) and the contents of Figures 1 and 2 are repeated up a whole tone. In m. 15, however, the melodies are altered and the pentatonic collection is intruded upon by first an A and then an {Ab, D} simultaneity, shown in Figure 3.3.

**Figure 3.3 Chromatic alteration to the Q5(Eb) in m. 15**



These pitches are used to create a strong cadence in Eb in measures 15 and 16. The A participates in a V/V harmony, which is followed by V7 (utilizing the Ab and D), and then I. D appears again in mm. 17 and 18 as an emphasis on V before the aria's principle melody (Figure 1) is repeated in Q5(Eb) in m. 19.

The next pentatonic collection we experience is Q5(F), beginning in m. 25. It lacks the melodic qualities and Figures 1 and 2 motives of the Q5(Db) and Q5(Eb) material, but features the full five pitches of Q5(F). It is short, giving way in the pickup to m. 29, but is affirmed by the vocal line's repetition of F and A as well as by a repeated F – C bass progression.

The next occurrence of the aria's principle melody (Figure 1) is in Q5(D) and begins in m. 28. It features the same sub-dominant, leading-tone, and raised sub-dominant additions that we heard intruding upon the Q5(Eb) earlier (the added notes function in exactly the same harmonic capacity as in Figure 3).

Following Q5(D), we hear Q5(E) in m. 36 in much the same way that we heard Q5(F) in m. 25. It is again short and lacks the Figure 3.1 melody, but features emphasis on E and G#. Interestingly, the bass through m. 39 also emphasizes a repeated schematic G#-C# motion, perhaps as a suggestion of E's relative minor. See Figure 3.4.

**Figure 3.4 Q5(E) with C# minor in mm. 36-39**



It is important to note that this suggestion of C# minor is fleeting because the tones and rhythms of the upper voices emphasize F# and B more than C# and E, and because the texture does not leave out any of the Q5(E) pitches that were heard earlier in m. 36. But the emphasis on G# and C# in the lower part points, again, to the fact that the only two triads that can be constructed

using the pitches of a given Q5 collection are a major triad (whose root is the root of the Q5

collection) and its relative minor, as alluded to earlier, and as shown in Figure 3.5.

**Figure 3.5 Major and minor triads of a pentatonic collection**
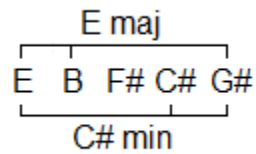


Figure 3.5 shows that when the pitches of the pentatonic collection are spaced in fifths, both

triads in Figure 3.5 require the full span of the Q5 space, because both use pitches on the extreme

ends of the collection, which constitute the IC 4 shared by the two triads. Also noteworthy is the

triads' inversional symmetry around the central pitch of the collection, which is the only member

of the collection that does not participate in either triad. A more detailed discussion of the

relative relationships – in Q space – between triads will follow later.

Following the Q5(E) passage at m. 36, the music then returns to Q5(Db) for a brief two measures

before the arrival of rehearsal 14. Though the shift between Q5(E) and Q5(Db) sounds abrupt (as

Figure 3.6 shows, Janáček simply transposes the upper-voice instrumental motives down a minor

third), it is worth noting that the C# minor implication in the Q5(E) material creates the potential

for very smooth voice-leading connection to Q5(Db), at least so far as a C# minor triad leads by

minimal voice leading to a Db major triad (assuming enharmonic equivalence).

**Figure 3.6 Possible suggestion of C# minor within the Q5(E) and the transition back to Q5(Db)**



## 3.2    Triads in Q Space

Let us return briefly to the E major/C# minor passage addressed previously (refer to Figure 3.4). We normally describe the relationship between the E major and C# minor triads in terms of the Riemannian "Relative" relationship or transformation. Riemannian theory describes this relationship by raising the fifth of a major triad a whole tone, or lowering the root of a minor triad by a whole tone. Later theorists (those of the Neo-Riemannian school) described the relationship as a transformation that flips a triad about its major third dyad.[1] Either way it is conceived, this transformation can be achieved within the span of a Q5 collection, as we established previously. One can imagine as an extension of this that the two triads are really one and the same, only in different states. Because of this, and because the span of a Q5 space encompasses both triads so complementarily, this aspect of their relationship reinforces the relevance of the Q5 apparatus to this kind of Riemannian relationship.

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[1] This concept is discussed in part in Richard Cohn's introduction to the special issue of the *Journal of Music Theory* on Neo-Riemannian Theory, "Introduction to Neo-Riemannian Theory: A Survey and Historical Perspective."

Aside from the Relative relationship, the other well-known Riemannian relationships (or Neo-Riemannian transformations) do not work within the confines of the Q5 span. The *Leittonwechsel* voice-leading procedure, for example, lowers the root of a major triad by a semitone (or equally, raises the fifth of a minor triad by a semitone). By extension, the synonymous Neo-Riemannian transformation flips a triad about its minor third dyad. Performing this operation on our E major triad, for example, results in a G# minor triad that requires an expansion of Q5 to Q6 (see Figure 3.7)

**Figure 3.7 Leittonwechsel transformation of an E triad on a Q6 framework**
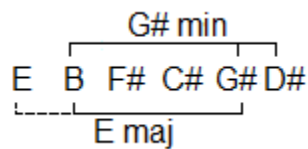


A further Neo-Riemannian transformation – the parallel transformation, which privileges perfect fifths – requires an expansion of the Q-chain even further, to Q8 (see Figure 3.8).

**Figure 3.8 Parallel transformation of an E traid on a Q8 framework**
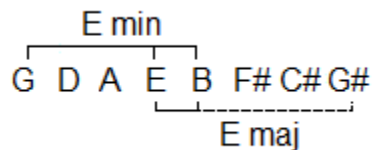


A visualization of these triadic transformations on a Q-chain clockface diagram is provided as Figure 3.9. We will explore more of this Q space later, but for now, it is important to note that it

is laid out exactly as a chromatic clockface diagram, but with a chain of fifths (rather than semitones) around the perimeter.

**Figure 3.9 Relative, *Leittonwechsel*, and Parallel transformations on Q clockfaces**



Relative - Q5          Leittonwechsel - Q6          Parallel - Q8
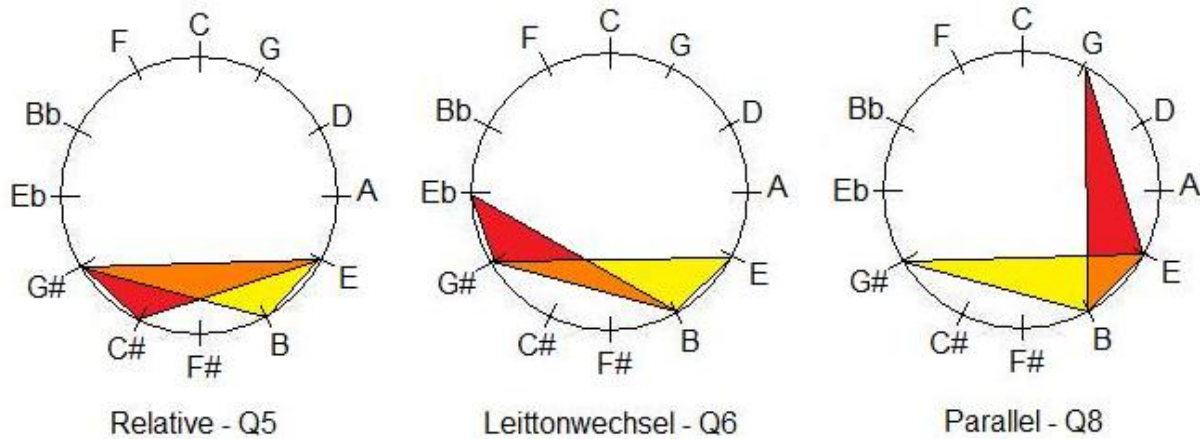
Interestingly, although we are concerned primarily with the Relative transformation because of its affirmation of the Q5 distance, the C# minor – Db major transition shown in Figure 3.6 is an example of a Parallel transformation. That the aural distance traversed in Figure 3.6 seems greater than one might assume (given the Parallel relationship between the triads) might be explained by their distance in Q space. The Parallel relationship in Figure 3.6 seems, in its context, to be somewhat jolting rather than smooth. Perhaps this sensation can be explained by the fact that the context accustoms the listener to hearing relationships within Q5 spaces, or between Q5 spaces that overlap by a shared Q3 subset. In this case, however, the relevant Q5 spaces overlap by only a Q2 segment (Mutatis Mutandis, a Q8 span is needed to accommodate the C# minor and Db major triads.) Moreover, in this case we also hear a triad mode change:

although the transition is from Q5(E) to Q5(Db), we hear a triad shift not from E major to Db major, but from the Relative C# minor to Db major.

## 3.3    Vocal Lines

Let us return briefly to a discussion of the vocal lines of the aria during the section between rehearsals 13 and 14. The motives discussed up to this point occur solely in the instrumental lines of the texture. Indeed it would be fair to say that the melodic and motivic cohesion of this excerpt is supplied entirely by the instruments instead of by the voice. In that sense this is a strange kind of aria – one in which the instruments are supported by the voices and not the other way around. More contextually, one might also imagine that the instrumental lines project a more consistent, and relatable presence in the aria. By contrast, Skuratov's lines show a personality that is much simpler, changeable, less clearly-formed, and relatively confused.

The vocal line features entirely syllabic writing – wherein each syllable of the text aligns with only a single pitch. Additionally, many pitches are repeated (up to seven times in a row), with only occasional deviations within a given string of repeated pitches. In fact, 74% of the 132 vocal pitches in this excerpt are the same as the pitch that precedes them, the pitch that follows them, or both. The musical lines move primarily at the ends of text phrases (i.e. at the ends of sentences), as though to suggest cadential closure. Figure 3.10 shows an excerpt (mm. 17-19) of the vocal line which illustrates these characteristics.

**Figure 3.10 Skuratov's vocal line r. 13, mm. 17-19**
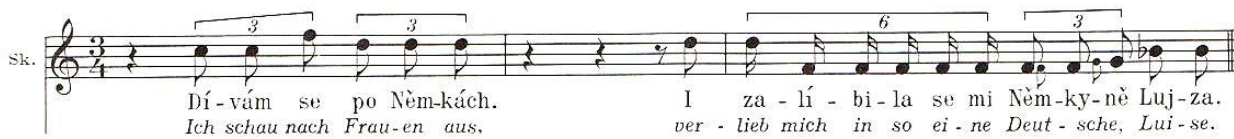


These sorts of features in the melodic lines depict Skuratov as a rather dogged, literal character. In addition, the vocal line is rhythmically sparse, often featuring large spans of rests. Because of this and the other previously mentioned characteristics, the vocal line by itself sounds almost like a Baroque *secco* recitative – a form not known for being especially catchy or memorable. Baroque recitatives essentially allow the characters on stage to "talk" to each other or to the audience without the composer having to fit all of the text into a compelling melodic framework. Because of this, Baroque recitatives often feature syllabic text-setting on repeated pitches and often reserve movement for the ends of phrases, just like in our Janáček example. The comparison is apt for another reason: the Baroque recitative is a form used to relay plot information, which is what Janáček accomplishes in this section. Moreover, though Skuratov is revealing details about the plot, he is neither an eloquent nor an intelligent character;  he does not have a narrative gift, and further, no ability to shape a more interesting melody. The bluntness of the music in his storytelling, therefore, creates an effect that is at the same time plodding and formulaic, not unlike the Baroque recitative. This is not to suggest that Janáček had a particular historical convention in mind while writing the vocal line, but the comparison seems appropriate, given the aria's qualities and overall purpose.

The pitches of the vocal line almost always conform to the pentatonic collections used concurrently in the instrumental motives. However, there are three deviations from this practice. They all occur in the latter part of the section between rehearsals 13 and 14, and they all involve semitonal relationships with members of the concurrent Q5 collection: Skuratov sings a C#4 in m. 30 during a Q5(D) passage; a D#4 is sung in m. 39 during a Q5(E) passage; and he sings a Cb4 in m. 41, during a Q5(Db) passage. In the first two cases, the added note is a semitone below the root of the concurrent Q5 collection: in the third case, the Cb is a semitone *above* the Bb that is the other endpoint of the Q5(Db) chain, and which, interestingly, is the root of the Bb minor triad contained in the collection as the Relative of Db. Also very significant is the fact that all three of these pitches fit within the Q5 collection that in each instance follows next in the music (either literally or, in the case of D#, enharmonically).

We will call these intrusions into Q5 space "mutations" because they expand the reach of the governing Q5 collection into either Q6 space (in the case of the C# and D#) or Q7 space (in the case of Cb). An illustration of this follows as Figure 3.11.

**Figure 3.11 Mutations of Q5 by vocal pitches**
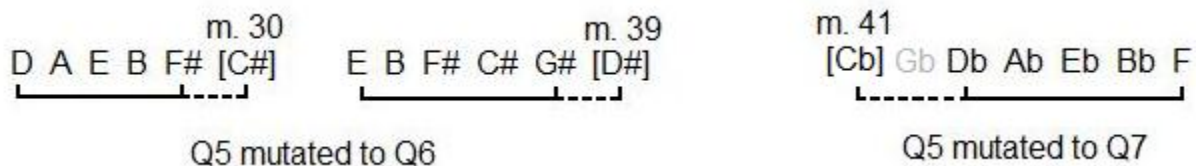


These nonconforming pitches could be interpreted as revealing something about Skuratov's psyche in a number of ways. They could reveal his progressing instability and loss of control –

both in the story he's telling and in the opera itself. Or, quite differently, they could signify a

growing aggressiveness and intent to control the direction of the narrative flow, in particular

through the insertion of semitonal dissonances that force the music to its next collection.

Different performances (i.e. characterizations of the role and stagings) could highlight one or the

other of these options. The dynamics portrayed in the presentation of collections and

modulations between them can also project an experiential dimension of the characters in the

scene, and Skuratov in this instance first appears as a relatively simple, perhaps even innocent

character, but emerges in his narration as much more volatile. The narration, indeed, recounts

and in a way relives a particularly volatile and violent moment in his past. Janáček's music,

through its dynamics of collections and their mutations can be understood as a depiction of the

experience of violent potentiality and rupture in an otherwise simple human psyche.


## 3.4    Hyperpentatonic Structuring


The material that begins rehearsal 14 strongly resembles the passages in Q5(F) and Q5(E) that

we examined earlier (mm. 25-27 and mm. 36-39). However, there is an important alteration to

the material that gives it a totally new character: the collections that were pentatonic in r. 13 now

only comprise *four* notes. See Figure 3.12.

**Figure 3.12 Q4 material in r. 14, mm. 1-3**



 The pitches in this four note collection are still stacked in fifths, and in that sense are generated

in the same manner as a pentatonic collection, so we will label them Q4 collections.

Beginning in r. 14 m. 1, we hear the pitches Bb, F, C, and G, forming Q4(Bb). There is a

centricity to the Bb, given that the bass progression is Bb – F, but there is a distinctive ambiguity

to the passage because of the lack of a D in the instrumental texture, which would complete the

Bb pentatonic collection Q5(Bb). (Alternatively, Eb could be added to Q4(Bb) to create Q5(Eb).)

This ambiguity might be resolved by the presence of a D4 in the vocal line in r. 14 m. 2 –

suggesting Q5(Bb), but the experiences we've had with vocal lines earlier in the aria tell us that

they occasionally slip to the leading-tone (NB: the C#4 in r. 13 m. 30 and D#4 in r. 13 m. 39),

which would suggest that these measures are in Q5(Eb) instead. Confusing matters further is the

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smooth transition in r. 14 m. 4 back to Q5(Eb), which features the melody discussed in Figure

3.3.

In any case, the material that occupies the first few bars of r. 14 acts as a clear delineation within

the aria between the material that precedes it, which we have been describing, and the material

that follows, which is repetition of much of that material (Q5(Eb) follows the Q4 material just

discussed) but with the introduction of new, more chromatic elements and other additions that

propel the aria along. In this way, r. 14 represents a denouement to the Q5 material that we've

established up to the end of r. 13.

Let us, then, reconsider the pentatonic roots we have heard emphasized since the beginning of

the aria through the start of r. 14. The music begins in Q5(Db), moves one whole tone up to

Q5(Eb), and then again up another whole tone to Q5(F) – spanning a major third overall.  Then it

descends a minor third to Q5(D), and then again ascends by whole tone to Q5(E) before quickly

descending another minor third to return to Q5(Db). A table summarizing the Q5 collections

follows as Table 3.1.

**Table 3.1 Table of all Q5 collections used between r. 13 and 14**

| Measures | Q5 Collection | Instrumental motives | Vocal pitches |
|---|---|---|---|
| 1-6 | Db | Example 1, 2 | Db, Ab, Eb, F |
| 7-23 | Eb | Example 1, 2, 3 | Bb, F, C, G, [D] |
| 24-28 | F | | F, G, D, A |
| 28-35 | D | Example 1, 2, 3 | D, A, E, B, F#, [C#] |
| 36-39 | E (C# min) | | C#, G#, [C#] |
| 40-41 | Db | | [Cb], Db, Ab |

This progression of tonics, Db – Eb – F – D – E, delineates and fills in a chromatic segment of form [01234]. However this is not the only way to visualize this group of pentatonic roots. Since we are dealing with pentatonic collections, it is worth considering how these roots might appear if they occupied a pitch space organized by fifths instead of semitones.

**Figure 3.13 Pentatonic roots of the aria on a fifths-privileging clockface**
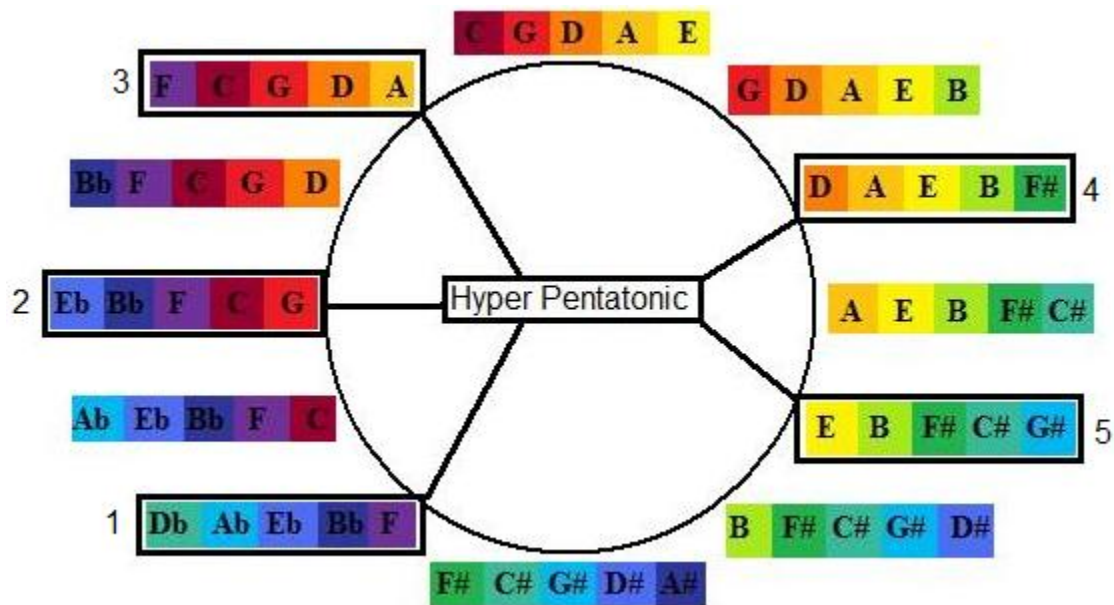


Figure 3.13 shows the twelve pentatonic collections positioned around a circle that inhabits Q space – that is, spaced such that their roots progress in fifths moving clockwise (and fourths counterclockwise). The notes are coloured so that their occurrence and placement in particular pentatonic collections are clear from the perspective of chromatic space. The colours also emphasize the logic behind spacing the pentatonic roots according to fifths and fourths and not semitones, as one might on a normal pitch clock diagram. In this way, the pitches from one pentatonic collection are largely retained in the adjacent collections: one is lost, and one is gained.

Figure 3.13 also highlights the particular pentatonic collections used in Skuratov's aria between rehearsals 13 and 14. The example helps us to see that in fact they form a pentatonic collection of pentatonic collections – a hyper-pentatonic collection. They do this in a way that implements

the isomorphism between the circle of fifths and the circle of semitones in a fascinating way. In particular, a pentatonic pitch class collection will appear on the semitone pitch-class clock as an ordered chain of three whole tones and two minor thirds, and these intervals can be represented as multiples of semitones in any rotated ordering of the sequence <22323>. Analogously, Figure 3.12 shows how the five pentatonic collections are likewise positioned on the clock as a <22323> pattern, starting from Q5(Db), but with the intervals now measured not in semitones but in fifths — the characteristic interval that generates the Q5 collections in the first place. Indeed, the order in which Janáček uses these five collections in the aria is also represented on the clock face by numbers next to the collections indicate their order of appearance. These help us see that the collections present, in temporal order, a <22323> pattern registered in fifths, rather than semitones. It is also worth noting that, more generally generally, reiterated transposition by seven steps in Q5 produces a series of steps on the chromatic circle, just as the reiterated transposition by seven steps on the chromatic circle produces a series of steps in Q5. Figure 3.13 thus displays a hyper-pentatonic configuration in a space entirely constructed from fifths.

Observing this configuration is not to ignore the semitone connections between these pentatonic roots. Despite its temporary focus on smaller collections (in this case pentatonic), Janáček's music fully inhabits equal-tempered chromatic space. Indeed, the five collections in the hyper-pentatonic space of Figure 3.13 collectively complete the aggregate, generating it as a series of fifths rather than semitones.

**Figure 3.14 Completion of the aggregate in Q space**
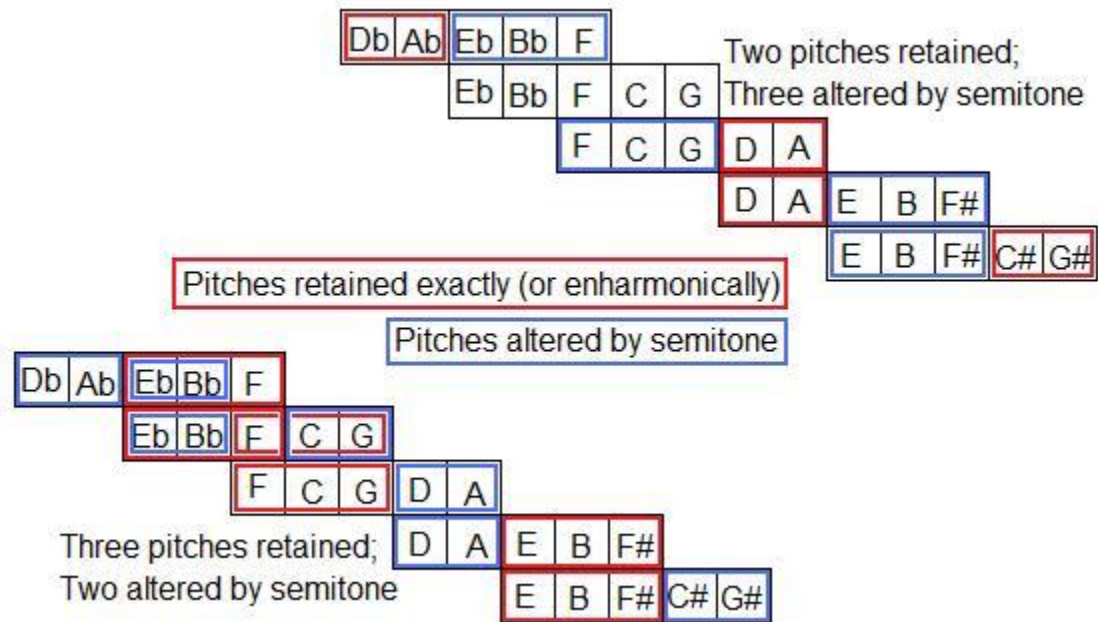


Figure 3.14 shows the same chain of Q5 collections twice. Duplicate pitches from each

collection overlap, showing that the five Q5 collections do indeed complete the aggregate (the

Db and Ab in the top left corner wrap around and overlap with the C# and G# in the lower right).

The colour-coding highlights movement between pitches within any two adjacent collections.

For example, the red dyads in the middle of the top diagram (D and A), are held in common

between the Q5(F) and Q5(D) collections, while the other three pitches of the respective

collections form Q3 chains that relate to each other by T1 or T11.

As a rule, the pitches of any two consecutive Q5 collections in this system can be related by

either T0 or T1. Figure 2.4.3 shows that adjacent Q5 collections in Janáček's hyperpentatonic

system are related either by three semitonally transposed pitches and two maintained pitches (the

top chain in the diagram) or by two semitonally transposed pitches and three maintained pitches (the bottom chain in the diagram).

The isomorphism between transposition by semitone and perfect fifth is what causes the hyper-pentatonic collection that appears between tonics that seem, on the surface, as though they are related more closely by semitone transposition. We know that the semitone and fifth are related in their unique capacity to generate the full complement of twelve chromatic pitches when stacked exhaustively. Indeed these transposition functions also share the same orbit size (that is: in mod-12 space, T1 and T7 generate the aggregate in twelve iterations). This is not true for any other intervals, such as the whole tone, or the major and minor thirds.

Given this isomorphism, it is not surprising that we need not look far, in fact, for examples of strictly chromatic writing in Skuratov's aria. Beginning after rehearsal 16, there is an iteration of the Figure 3.3 motive in Q5(Eb) that is accompanied by a rather intrusive descending chromatic line. This is illustrated in Figure 3.15.

**Figure 3.15 Descending chromatic line during Figure 3.3 motive in r. 16**



The chromatic line enters in m. 17 after rehearsal 16 and descends from Ab6 (note the 8va) to Db6 by the start of m. 21. The following passage features only the descending chromatic line (without the Figure 3 motivic material) doubled at the octave, and proceeds from Db back down to Ab. The inclusion of this chromatic material produces a frightening, almost psychotic distortion of the otherwise pleasant Figure 3.3 motive. This hints at the underlying instability, madness, and despair that propel Skuratov to his crime.

This passage offers a direct juxtaposition of the two pitch-space systems that Janáček explores within the aria: fifth space and semitone space. The simultaneity of the two gestures – one chromatic and the other pentatonic – illustrates the relevance of the isomorphisms between the chromatic and pentatonic worlds. The manner in which Janáček conceived this connection is not clear, but the use of these elements in combination is very striking indeed.

# Chapter 4: Conclusion

## 4.1    Synthesizing Theoretical Concepts

Now that we have examined both the string quartet movement and the opera aria, let us examine

more abstractly some of the theoretical underpinnings that we discovered at work in both pieces.

We learned in both pieces that the pentatonic world was important to Janáček, as we discovered

it operating, in different ways, in both of the pieces we examined. The Q5 space we worked with

in Chapter 3 proved a fruitful apparatus for examining aspects of the opera aria. Let's examine

what happens when we combine Q5 spaces with each other. We'll begin with a space that

inscribes Q5(D). See Figure 4.1.

**Figure 4.1 A Q5(D) space**

| D | A | E | B | F# |
|---|---|---|---|----|

To increase the number of dimensions, we'll then wrap the end of the Q5 space onto its

beginning and begin a new Q5 from this point. See Figure 4.2.

**Figure 4.2 Q5(D) wrapped around itself**

| D  | A  | E  | B  | F# |
|----|----|----|----|----|
| F# | Db | Ab | Eb | Bb |

Because of the properties of Q5 that we've discussed already, we know that the end of a Q5 span

is a major third higher (given octave equivalence) than its root. Thus, the vertical intervals in

Figure 3.2 are major thirds (reading from the upper row of the example to the lower one).

Obviously the left-to-right intervals are perfect fifths, and right-to-left intervals are perfect

fourths. Using these rules, it is possible to construct a *Tonnetz* of looped Q5 spaces that will

generate each pitch in chromatic space. This *Tonnetz* (which we will call IC5 x IC4 because of

the interval classes along each axis) is shown in Figure 4.3.


**Figure 4.3 IC5 x IC4** *Tonnetz*

| Bb | F | C | G | D | A | E | B | F# | Db | Ab | Eb |
|----|----|----|----|----|----|----|----|----|----|----|----|
| D | A | E | B | F# | Db | Ab | Eb | Bb | F | C | G |
| F# | Db | Ab | Eb | Bb | F | C | G | D | A | E | B |
| Bb | F | C | G | D | A | E | B | F# | Db | Ab | Eb |
| D | A | E | B | F# | Db | Ab | Eb | Bb | F | C | G |
| F# | Db | Ab | Eb | Bb | F | C | G | D | A | E | B |


This *Tonnetz* embeds Q5 spaces looped around onto each other, in the sense of the preceding

example. Yet, it holds some interesting properties that relate it to the kinds of intervals that

Janáček showcases in the opening of the string quartet. Most obvious, perhaps, is the prevalence

of augmented triads. Any two consecutive vertical moves along the *Tonnetz* will span a [048]

trichord. We saw the augmented trichord featured prominently in the opening two bars of the

quartet, and it figured importantly in our analysis of the [01348] pentachord in our discussion of

the opening motto.

Another common trichord in the quartet is the [027] trichord. The initial three pitches of the

violin line delineate [027]. Additionally, the first three transpositional levels of the M motto form

a [027] trichord. [027] trichords appear on our *Tonnetz* as any 3-note segment along the

horizontal axis, because the horizontal axis represents a chain of perfect fifths.

What about the [015] trichord type, which is prominent in the opening of the quartet, in both the

second part of the melodic component of M and the harmonic accompaniment? A [015] trichord

will appear on our *Tonnetz* in any three-note "L" shape inscribed by a down-then-right sequence

of moves. The inverse pattern, up-then-left, also inscribes a [015] trichord anywhere on this

*Tonnetz*.

There are, in fact, many trichords pertinent to the quartet analysis present in this *Tonnetz*. Figure

4.4 shows some of the possible trichords composed of pitches adjacent to one another along the

vertical, horizontal, and diagonal axes in the *Tonnetz*.

**Figure 4.4 Trichords found in the Q5** *Tonnetz*



Many of these trichord types are relevant to my analysis of the quartet opening – the

aforementioned [048], [027], and [015] trichords all figure into the analysis of the M motto.

Additionally, the [037] trichord as well as the chromatic [012] trichord are both involved with

the quartet analysis in that both are integral in understanding the material in the quartet as

positioned between the chromatic and tonal worlds: [012] represents a space of semitones, and

[037] represents a space that privileges major and minor triads, such as was seen in Figure 3.15

where there is a direct contrast between triad-based tonal harmony and a descending chromatic

line.

Moreover, it is interesting to observe that the [01348] pentachord type appears as the union of

the [015], [037], [027], and [048] trichord types on this *Tonnetz*, i.e. as a cross or plus-sign shape

pattern. This pentachord is central to my analysis of the quartet, in that it describes all of the pitches of its opening two bars. In the case of the specific pitches in the quartet example, the pitch class at the centre of the cross is B, the inversional centre of the collection, as shown in Figure 4.5.

**Figure 4.5 [01348] pentachord from the quartet analysis shown on the Q5** *Tonnetz*
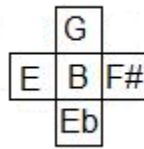


Let us now return to our previous discussion of Riemannian functions that were represented earlier on a clockface with fifths (traversing clockwise) around its perimeter. Figure 3.9 used this clockface to show how the three familiar Neo-Riemannian transformations are manifested in the extended pentatonic Q-space. These triadic transformations, such as the Relative and *Leittonwechsel* transformations that we saw occurring in the aria, result in a shared pitch dyad. In the string quartet M motto, we saw the triads being reflected across line J through a single pitch (see Figure 2.5). This suggests that the triads in the aria are more closely-related to one another (on a pitch-retention level) than those in the opening of the string quartet.

This in itself is an interesting observation. We'll return later to the relationship between our "minor – major dominant" transformation and our Q space apparatus, but for now let us consider the theoretical junction of these two concepts: Riemannian transformations (of triads) that preserve pitch dyads, and other triadic transformations that preserve only a single pitch. In

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pondering this distinction, one wonders whether there are combinations of Riemannian

transformations that will relate triads that share a single pitch. Indeed, if the three Riemannian

transformations P, R, and L, are applied once each, in any order, in combination they will

transform a major (or minor) triad to a minor (or major) triad (respectively), that shares one

common tone[2]. Whether the shared tone is a root, third, of fifth of either triad depends on

whether the initial triad is major or minor, and on the order in which the P, R, and L

transformations are applied. Figure 4.6 shows all the possibilities in a compact format, involving

a cyclical set of transformations through a closed cycle of three minor and three major triads.  All

possible orderings of P, R, and L, starting from either a major or minor triad, can be found on the

diagram, either as a clockwise movement or as a clockwise sequence, from one triad to the

antipodal triad three transformations away.  (In every case, the clockwise and counterclockwise

routes from a triad to its antipode involve a retrograde sequence of transformations, e.g. PRL

clockwise, and LRP counterclockwise, from B minor to E major.) Interestingly, this also means

that we can describe the "minor – major dominant" transformation we named earlier in terms of

Neo-Riemannian labels. This particular transformation is the result of a RLP sequence, or

equally a PLR sequence. Thus, we might rename "major – major dominant" as RLP or PLR.

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[2] See again Cohn's "Introduction to Neo-Riemannian Theory: A Survey and Historical Perspective."

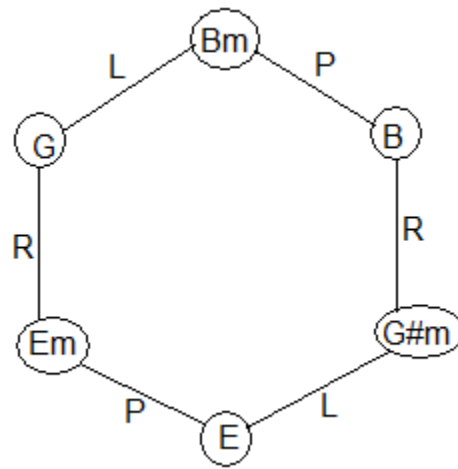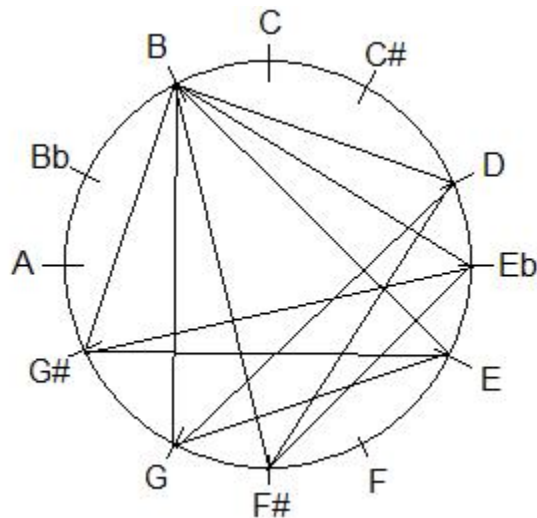**Figure 4.6 PRL series shown as a succession of triads**



Figure 4.7 shows the same six triads on a chromatic clockface, and shows that the entire collection is symmetrical around a single pitch, B and line of symmetry (which we might again refer to as J).

**Figure 4.7 PRL triadic transformations on a chromatic clockface**

The pitches in this collection constitute a heptachord of form [0124569]. Because the heptachord

contains all six [037] trichords that include pitch class B, it is understood that two of these

trichords will share a "minor – major dominant" relationship, which in combination, as we have

established, form an [01348] pentachord. Indeed, in addition to this pentachord that has single-

pitch symmetry, this heptachord contains as all of the tetrachords that result from the three

Riemannian transformations (which have pitch *dyad* symmetry) as subsets.


We see that the heptachord inscribes much of the interior of the diagram, not quite but almost

filling the chromatic space with maximum evenness. Let's now examine how these PRL

transformations look represented in Q space. See Figure 4.8.


**Figure 4.8 PRL triadic transformations on a Q clockface**

We see that here the heptachord is much more compact. In Q-space, the normal form of this

heptachord is [0134578]. Recalling that its normal form is [0124569] in semitone space, it is

fascinating to note the [0134578] and [0124569] are Z-related. It is also fascinating to observe

that the [0134578] heptachord contains as subsets the two pentachord types we examined earlier

in Chapter 2, [01348] and [03458].


Referring back to [01348] and [03458] pentachords, let's examine how they appear in Q space.

For reference, Figure 4.9 shows both of these pentachords on chromatic clockfaces.


**Figure 4.9 [01348] and [03458] pentachords in chromatic space**
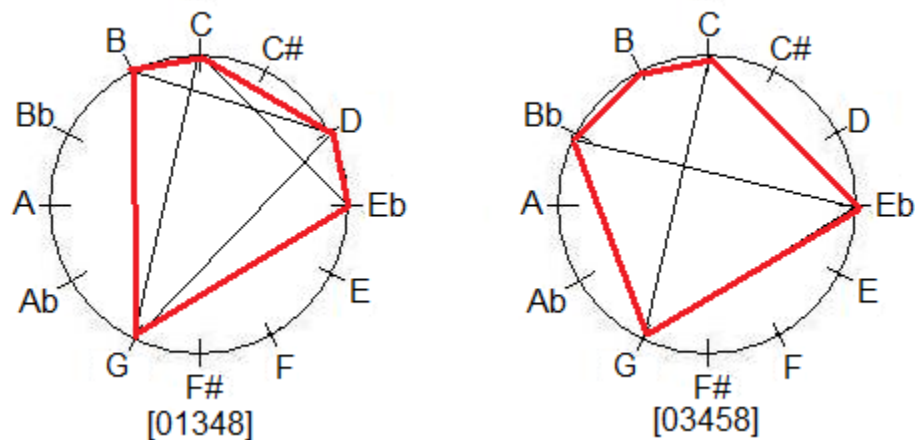


The thinner black lines represent the triads connected by the transformations (RLP and R) that

are interior to these pentachords. The RLP transformation, acting in the [01348] pentachord,

engages all five members of the pentachord. The R transformation, in the [03458] pentachord,

engages four out of five members, missing the pitch class (B in this case) that is the axis of

symmetry within the pentachord.

Figure 4.10 now shows the same pentachords on Q-oriented clockface diagrams.

**Figure 4.10 [01348] and [03458] pentachords in Q space**



[01348]          [03458]
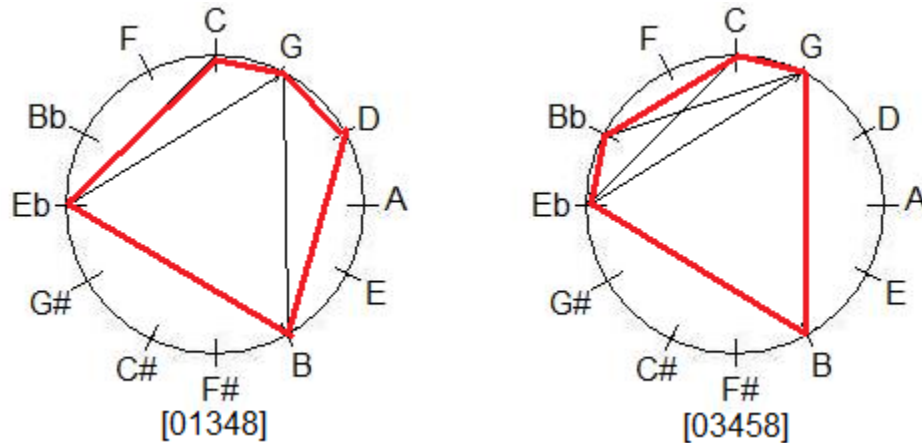
The isomorphism between these pentachords is easily seen:  the geometry of the [01348]

pentachord in semitone space is identical to the geometry of the [03458] pentachord in Q-space,

and vice versa. This connection has been noted by many scholars including Hubert Howe[3] and,

in particular, Robert Morris,[4] who discusses the isomorphism in terms of an operator – M –

which multiplies pitch class numbers by 5 (mod 12). The M operation, in Morris's description,

maps the Q5 world onto the chromatic. Thus, a broader conclusion can be drawn from this

isomorphism. Because the semitone and perfect fifth (and their complements) are the only

intervals that can generate the totality of twelve-tone pitch-class space, Z-related sets will often

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[3] Howe, Hubert. 1965. "Some Combinatorial Properties of Pitch Structures," *Perspectives of New Music*, Vol. 4 No. 1, 45-61.
[4] Morrs, Robert. 1991. *Class Notes for Atonal Music Theory*. Hanover, NH: Frog Peak Music, 58-62.

exhibit this type of exchanged geometry when represented on semitone- and fifth-based pitch-class clocks.[5]


**4.2    Conclusion**

We have seen both in his first String Quartet and in an aria from *Z Mrtveho Domu* that Janáček's writing is noteworthy for reasons far outside the realms of text-setting, narrative, or aesthetics. At the level of pitches and pitch collections, Janáček's manipulation of musical materials reveals a very unique and forward-thinking approach to composition wherein he appropriates small musical components (pitch intervals) into larger schema to form a unique kind of tonality that, in a way, eschews many of the conventions associated with triad-based tonality that is the basis for other kinds of western music.

In exploring Janáček's use of pentatonic and whole-tone techniques, we saw that his modus operandi was not the strict application of pre-existing (tonal) rules, but rather a kind of inquisitive examination of particular intervals and groups of intervals. The perfect fifth and the whole tone (and, in the quartet, the major third) are intervals that Janáček privileges in the construction of his unique sonic identity. Though they are intervals that feature prominently in standard tonal constructs, they are assembled using novel approaches that skirt the associations of standard tonality. In Janáček's new systems, the weight placed on certain components changes the relationships those elements have with other components. For example, in the opera aria, we saw that the Q5 world was brought to prominence by Janáček's reliance on the fifth interval, and

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[5] In fact, the paired geometric representations will occur whenever the Z-related sets contain exactly the same number of IC1 and IC5 dyads. This is the case for all the Z-related pentachord pairs, but only for 8 of the 15 total Z-related pairs of hexachord sets.

that apparatus then stood out against the normally universal semitone apparatus. The isomorphisms between them were underscored in a way that is not typically highlighted in standard tonal music – all because of Janáček's juxtaposition of the two systems.

This breaking-down and re-synthesis of elemental components (in Janáček's case musical intervals) is similar to the impulse behind some of the earliest forms of pure abstraction in visual art. Wassily Kandinsky, whose forays into abstraction occured at roughly the same time Janáček's quartets and *Z Mrtveho Domu* were composed, is widely credited as the first purely abstract painter[6]. His purely abstract works (such as *Composition VI* and *Composition VII*) feature representations of the smallest and most broken-down components of visual art – line, colour, and shape – assembled into a new framework that offers a unique perspective outside of the parameters of representational art.

It is often difficult to understand the novelty behind certain compositional impulses in the same way it is to understand novelty in visual art. This is most likely because visual art is capable of representing objects in a manner that is life-like. Music is not modeled after sounds that occur naturally, and therefore cannot be compared to our experiences of the natural world as directly as in the case of visual art. Abstraction, then, in a musical sense, must be understood on a processive level. The process by which Janáček generated his system underscores the principles that made early abstract visual art abstract. And therefore, though it is difficult to make compelling arguments about the connections between visual and acoustic art forms, I believe that

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[6] Janson, H. W. 2007. *Janson's History of Art: The Western Tradition*, Upper Saddle River, NJ: Pearson Prentice Hall

this comparison is an apt one. While I would avoid using the term "abstract" to describe Jancek's music, I have come to understand through my analyses that Janáček's compositional process may have been "abstract" in principle. Like Kandinsky, who isolated individual components of painting and found alternative ways of presenting them on canvass, Janáček isolates individual intervallic relationships into new representational frameworks.

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