THE HUMAN VERSUS THE SUPERNATURAL: INTERVALLIC, MOTIVIC, AND HARMONIC CONNECTIONS IN STRAVINSKY'S *THE FIREBIRD*

by

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STATEMENT OF DISSERTATION APPROVAL

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ABSTRACT

In *The Firebird,* Stravinsky followed the Russian convention of sharply contrasting the music of the human characters against that of the supernatural characters. Most theorists posit that the human characters are portrayed with principally diatonic music, and the supernatural with principally chromatic music. In the case of the supernatural, the tritone, as personification of the two magical characters, Kastchei and the Firebird, is the basis for all of the music Stravinsky applies to them. He makes extensive use of it as bookends to the pitch sets of their two *leitmotifs*, both drawn from the first six notes of the opening *ostinato*. The ubiquitous tritone is of prime importance in the building of intervallic, motivic, and harmonic elements in the piece and helps to provide unity in the work as a whole.

My greatest contribution in analyzing the music of *The Firebird* relates principally to the music representing the Princesses, captive humans under the supernatural control of Kastchei. In this dissertation, I will demonstrate that this music, commonly believed to be primarily folk or diatonic, and therefore given less importance by theorists, in actuality, is in large part constructed from the same source materials that spawned the supernatural music of the Firebird and Kastchei. Undoubtedly, the Princesses' music has frequent harmonic and motivic hints in the foreground and background of the chromatic *leitmotifs* of the principal supernatural characters. In addition, musical motifs in the "Princesses" sections are at times constructed by giving the pitch sets of the supernatural characters a more "diatonic" quality, extending or

contracting their outer interval of a tritone by a semitone, to form perfect fourths or fifths. There is evidence that, for Stravinsky, this was part of the reasoning governing his motivic, intervallic, and harmonic choices. The perfect fifth, certainly, was seen as representative of the human element of the work, while the tritone was seen as representative of the supernatural element. The combination of the two elements is what makes the composition of Stravinsky's *Firebird* truly masterful.

To Professor Steve Roens, for the endless patience and good counsel

I received from him in the preparation of this document.

To Professor Margaret Rorke, for her dedicated attention to detail.

To Monika, my wife, for the support and love given me during the time in which

I conceived and executed its composition.

To my children, Ambrynn, Jaantje, Johannes, and Chrisvenn.

I am grateful to all involved for their faith in me during this process.

In addition, I am grateful to Igor Stravinsky for the great inspiration his music is to me,

and am ultimately grateful to the Creator of all.

"Music…was created probably by God, and I think, I even not think, but I am sure, that when we read about the creation of the world, that it was created—with just a big drum and cymbals—and music."

~Igor Stravinsky

Stravinsky, documentary by Wolf Koenig and Roman Kroitor, 1966.
Available at http://www.nfb.ca/film/stravinsky/

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INTRODUCTION

This dissertation, at least in part, may not have been possible without Richard Taruskin's two-volume monumental work, *Stravinsky and the Russian Traditions: a Biography of the Works through Mavra.* His research and treatment of Stravinsky's ladder of thirds has been indispensable and is part of the scaffolding upon which I have built my own research, and therefore, I will refer to it repeatedly. In fact, the first section of this dissertation sets forth the main premises of Taruskin's work, with occasional clarifications and added insights of my own. This was necessary in order for the reader to fully comprehend the scope of my own research. Throughout this dissertation, I have endeavored to be clear in showing where Taruskin's research should be credited, and also to call attention to my own findings, which, I believe, contribute to the body of knowledge concerning the organization, genesis, and development of compositional material of *The Firebird,* and also add considerable depth and detail to the findings of Taruskin.

After the conclusion of the dissertation, I have included many musical connections I have found to the music of Stravinsky's other two "Russian" ballets, *Petrushka* and *The Rite of Spring*, as well as to two of Debussy's works from around the same time period, Ondine, from *Preludes, Book II* and his seminal *Prelude to the Afternoon of a Faun.*

Firebird Editions

There are four different orchestral versions, or better, "revisions" of *The Firebird.* The word "revision" is appropriate here because Stravinsky not only made the suites shorter by excerpting entire numbers from the original version, but also made motivic and instrumentation changes as well. The original version was published in 1910. Stravinsky's first revision immediately followed the completed piece, published in 1911. The next two revisions were called "suites," and came in 1919 and 1945.[1] Throughout the paper, I frequently refer to the 1910 (original) version and the 1945 *Suite.* When citing examples from scores, I notate measure numbers in the 1945 *Suite* in parentheses, whereas measure numbers for the 1910 version will be notated without. I also use figure numbers (often called "rehearsal numbers") that coincide with important sections of the work. These will be shown in square brackets (e.g., Figure [5]). In addition, at the end of each major subsection of the 1945 *Suite*, Stravinsky wrote two types of endings, perhaps thinking they were likely to be performed separately or out of sequence. Instead of notating them as traditional bracketed "first" and "second" endings, however, he labeled them with only the words "for ending" and "for continuing." For purposes of this paper, I am considering the suite in its "continuous" state, so "for ending" sections are excluded in my numbering.[2]

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[1] Those wishing more complete information about the different revisions may consult the Ph.D. dissertation, *Stravinsky's Firebird: Genesis, Sources, and the Centrality of the 1919 Suite*, Joni Lynn Steshko, Univ. of California, Los Angeles, 2000.

[2] Where length is concerned, the original 1910 version is by far the longest, being about 45 minutes of performance music, whereas the 1945 suite totals only about 30 minutes.

Anglicized Russian Spellings

Russian names are often anglicized in inconsistent ways. I will always use *"Petrushka"* for the name of the second ballet in Stravinsky's "Russian" period. I will also use "Kastchei" for the name of the evil sorcerer in *The Firebird* and other works, whereas in quotes from other theorists or composition titles of other composers, other spellings commonly arise.

Accidentals

I will spell accidentals with the number (#) sign for "sharp," the letter (x) for double-sharp, the letter (b) for "flat," as superscripts (i.e., "A^{b}," "$A^{\#}$," or "A^{x}"). For naturals I will use no sign at all "A," or spell out "A-natural."

Instrument Transpositions

For purposes of this paper, my examples with transposed instruments will be in concert (or sounding) pitch. To be clear, I have notated *sounds as written* on these examples.

HISTORICAL BACKGROUND

Premiere of *The Firebird*

The 1910 premiere of *The Firebird* marked a serious, almost cataclysmic, event in the life of its composer. Before its composition, Stravinsky was little more than another student of Rimsky-Korsakov. After its premiere, virtually overnight, he literally became a household name. In addition, it marked the first of his three Russian ballets, followed by *Petrushka*, and culminating in *The Rite of Spring,* the composition that marked his advent into modernism and the capstone of his own early compositional style. Interestingly, for Stravinsky, it also marked a turn of Rimsky-Korsakov's family against his music.[3] In addition, it also spawned his career as a conductor.

> The Firebird has been a mainstay in my life as a conductor. My conducting debut occurred with it (the complete ballet) in 1915, at a Red Cross benefit in Paris, and since then I have performed it nearly a thousand times, though ten thousand would not erase the memory of the terror I suffered that first time. And, oh yes, to complete the picture, I was once addressed by a man in an American railway dining car, and quite seriously, as "Mr. Fireberg."[4]

The last thing it did for him was "bankroll" the rest of his long career as composer and conductor.[5] Though it was considered a "box office success," there is much negative talk

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[3] "Stravinsky Conversations. Memories and Commentaries by Igor Stravinsky and Robert Craft," review by Eric Walter White, in *The Musical Times*, Vol. 101, No. 1414 (Dec. 1960), p. 760.

[4] Igor Stravinsky and Robert Craft, *Expositions and Developments,* pp. 145-152. Quoted in Pieter C. Van Den Toorn, *The Music of Igor Stravinsky.* New Haven, Connecticut: Yale University Press, 1983, p. 2.

[5] "Stravinsky conducts Stravinsky," by Nicholas Cook. Chapter 9 in *The Cambridge Companion to Stravinsky*, ed. Jonathan Cross, New York: Cambridge University Press, 2003, p. 176.

about the composition and conception of *The Firebird*, even by Stravinsky himself. He frequently derided the work as an "audience lollipop."[6] In addition, he asked:

> Am I too critical? Does The Firebird contain more real musical invention than I am able (or willing) to see? I would this were the case. It was in some respects a fecund score for my own development in the next four years, but the few scraps of counterpoint to be found in it—in the Kastchei scene, for example—are derived from chord tones, and this is not real counterpoint.... If an interesting construction exists in The Firebird, it will be found in the treatment of intervals, for example in the major and minor thirds in the Berceuse, in the Introduction, and in the Kastchei music.... Rhythmically, too, the finale might be cited as the first appearance in my music of metrical irregularity—the 7/4 bars subdivided...etc. But that is all.[7]

Notwithstanding all of the negativity put forth by the composer himself, I will show that he indeed did produce a masterpiece of composition, which is not only unified and inventive, but which is also a testament to his genius.

The Russian Tradition: Human vs. Magical Elements

Stravinsky followed the Russian compositional style of the times in his two-part conception of *The Firebird.* He used primarily diatonic music to portray human elements in the work and primarily chromatic music to portray the magical or supernatural elements in the work. Stravinsky was not the first of the Russian composers to use this technique. Eric Walter White comments on this below:

> The composition of *The Firebird* posed an interesting problem—how to differentiate in musical terms between the natural and supernatural elements in the action. The clue to Stravinsky's solution is to be found in Rimsky-Korsakov's *The Golden Cockerel*, which though finished in 1907 was not publicly performed, because of censorship difficulties, until 1910. There the human element was associated with diatonic themes and the

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[6] Pieter C. Van Den Toorn, *The Music of Igor Stravinsky.* New Haven, Connecticut: Yale University Press, 1983, p. 4.

[7] Ibid., p. 2.

> magical element with chromatic arabesques of an oriental character. Stravinsky took this hint. The music for Ivan Tsarevich, the Princesses, and the hymn of thanksgiving in the finale is all strongly diatonic in character—the two Khorovod themes are folk melodies, the first being *In the Garden* from the Government of Novgorod, and the theme of the finale is based on *By the Gate* whereas all the magical element, including the music for the Firebird and [Kastchei], is conjured out of one chromatic interval, the augmented fourth.[8]

Though White mentions the augmented fourth, or tritone, he does not catalog its use. Anthony Pople also explains the idea of alternating between two types of harmony:

> There are a number of recurring musical figures, the most pervasive of these being the motive that begins the work. This motive spans the tritone—an interval at the heart of Rimskyan exotic harmony—and is sufficiently malleable to find a place in octatonic, whole-tone and even diatonic contexts, according to the articulation of its chromatic group of three notes. If is frequently presented in conjunction with its inversion, and is often, though not exclusively, associated with the firebird herself. the prince is assigned folksong-like materials (some genuine folksongs are included), and the princesses also inhabit an essentially diatonic world, albeit with chromatic inflections.[9]

Richard Taruskin states:

> Against this fantastic world, following the tradition going back some seven decades to Glinka's *Ruslan,* Stravinsky pits the diatonic world of the human characters, Ivan-Tsarevich and the Princesses. The latter, being enchanted, are tinged with [Kastchei's] octatonic influence, but the music never uses the arcane augmented and diminished harmonies that stand for the unalloyed supernatural…. The chords, a dominant seventh and a half-diminished seventh, are harmonies that occur in diatonic practice yet at the same are referable to a single octatonic collection. Thus the musical representation of the Princesses bridges the gap between the human (diatonic) and enchanted (chromatic) worlds of the ballet.[10]

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[8] Eric Walter White, *Stravinsky: The Composer and His Works*. Boston: Faber and Faber, 1966, p. 186.

[9] "Early Stravinsky" by Anthony Pople. Chapter 4 in *The Cambridge Companion to Stravinsky*, ed. Jonathan Cross. New York: Cambridge University Press, 2003, p. 75.

[10] Richard Taruskin, *Stravinsky and the Russian Traditions: a Biography of the Works through Mavra,* 2 vols. Berkeley, California: University of California Press, 1996, p. 602.

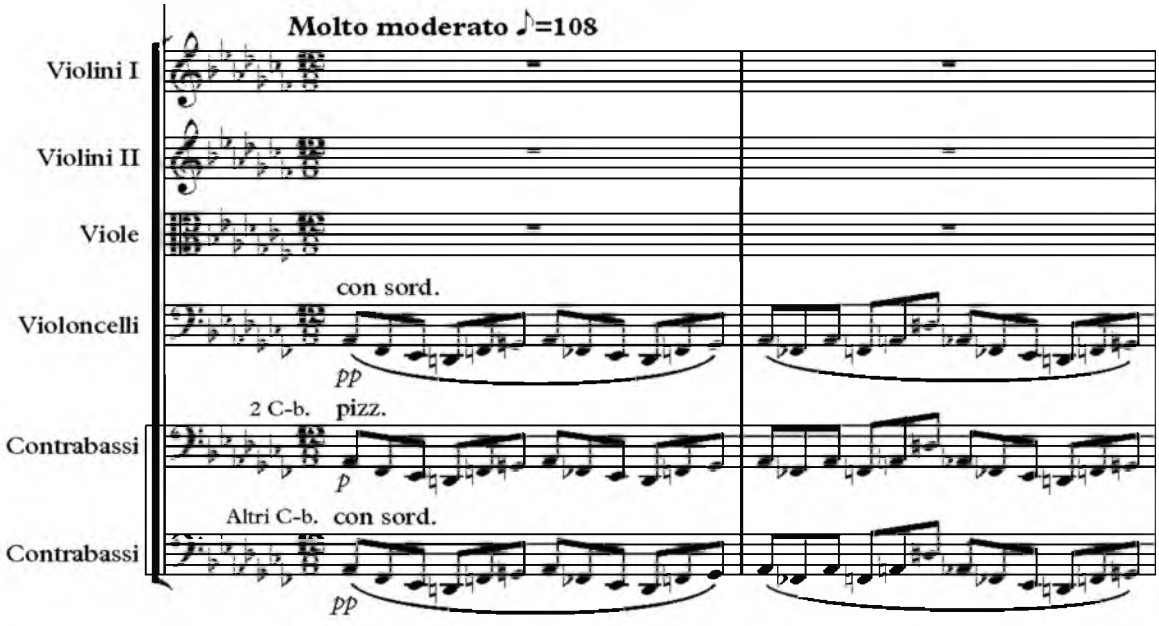
Though Taruskin's description of this is by far the most colorful, he does not spend time elaborating the concept or showing musical examples of how the Princesses inhabit a world that has the duality of both harmonic worlds. This aspect shall be explored later.

TARUSKIN'S RESEARCH WITH ADDED COMMENTARY

The Firebird *Leitmotif* and the Kastchei *Leit-harmonie*

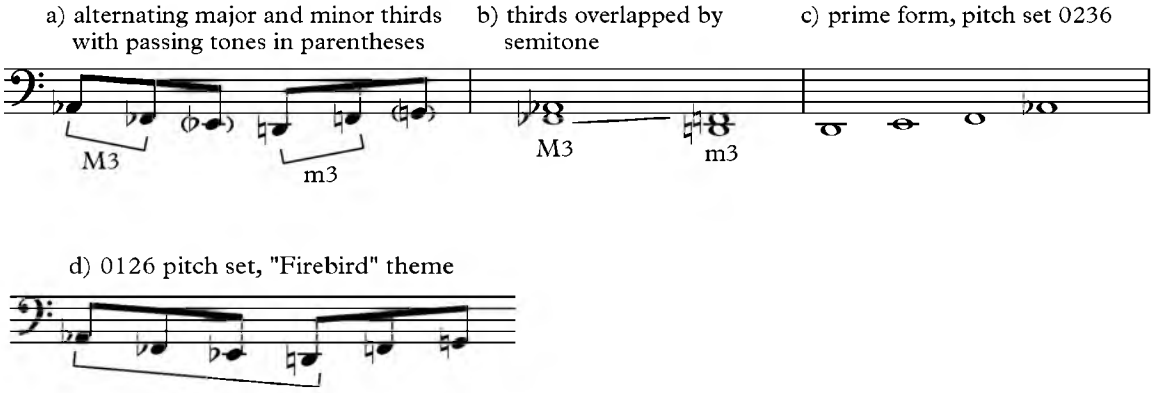
It is common knowledge that the opening six notes of the *ostinato* in the cellos and basses provide two intervallic points of departure for the entire work. See EXAMPLE 1 below. Stravinsky described the opening *ostinato* as a major and a minor third with passing tones,[11] as shown in EXAMPLE 2a below. Importantly, the two alternating minor and major thirds overlap by a semitone.

EXAMPLE 1: The Firebird, *Introduction*, mm. 1-2.



[11] Quoted in Taruskin, p. 596.

EXAMPLE 2a-d: *Introduction*, Pitch sets 0236 and 0126 derived from the opening *ostinato*.



These opening two thirds, A^{b}-F^{b} and D-F (see EXAMPLE 2b), form what Stravinsky termed the "Kastchei *leit-harmonie*" and also form what, in modern times, would be termed the tetrachord or pitch set 0236 (see EXAMPLE 2c).

Not mentioned by Taruskin is the significance of Stravinsky's choice of orchestration and texture for the opening *ostinato*.[12] The low strings play the *ostinato* monophonically, in octaves, calling special attention to its interval content and their implied harmonies. This is similar to the opening of a fugue, where the subject is stated by itself, in only one voice, calling the listener's attention to the melodic and intervallic source from which will spring the greater part of subsequent compositional material. Perhaps, in this way, Stravinsky is also showing the listener the source from which springs all of his melodic, intervallic, and harmonic decisions in *The Firebird*. In addition

[12] Orchestrationally, the opening of *The Firebird* is a bold move. Rarely, if ever, had a piece of music opened with such striking timbral color and register. For one, two of the lowest voices in the orchestra play the *ostinato* in octaves. The contrabasses are *divisi*, two players assigned *pizzicato*, and the *altri* (remaining) basses and cellos marked *pianissimo con sordino*. The *pizzicato* in the basses gives contrast and clarity to the slurred figures, and is proof of the testament that for Stravinsky, every instrument in the orchestra is treated as a percussion instrument.

to producing the "Kastchei" *leit-harmonie*, the opening four notes of the *ostinato* also produce the "Firebird" motive, or pitch set 0126 (see EXAMPLE 2d above).[13]

Stravinsky, naturally, does not name the two *leit-harmonies* of the Firebird and Kastchei by their pitch set names, 0126 and 0236, as this method of nomenclature was developed later in the twentieth century. He named them by their interval content. In his mind, they were intervallically related as they both contained an augmented fourth and a minor second.[14] One observes that Stravinsky has strategically chosen two sets whose outer pitches form a tritone, but are filled in somewhat differently.[15] In fact, they both share the trichord 026, a common subset of the major, melodic minor, and whole-tone scales, as well as the octatonic collection. Trichord 026 is also a subset of both the dominant seventh and the half-diminished seventh chords. It is no surprise that most of the "supernatural" music relies heavily on the whole-tone and octatonic collections. The more diatonic music used in the Princesses sections relies principally upon the dominant seventh and half-diminished harmonies. The Kastchei tetrachord 0236 also contains 036, a subset of the fully- or half-diminished seventh chords, and the dominant seventh chord, all useful harmonic tools. Lastly, the Kastchei tetrachord is also a subset of the dominant minor ninth chord. I will later show how this is prevalent in the Kastchei sections as well as in many dances of the Princesses.

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[13] Taruskin, p. 595.

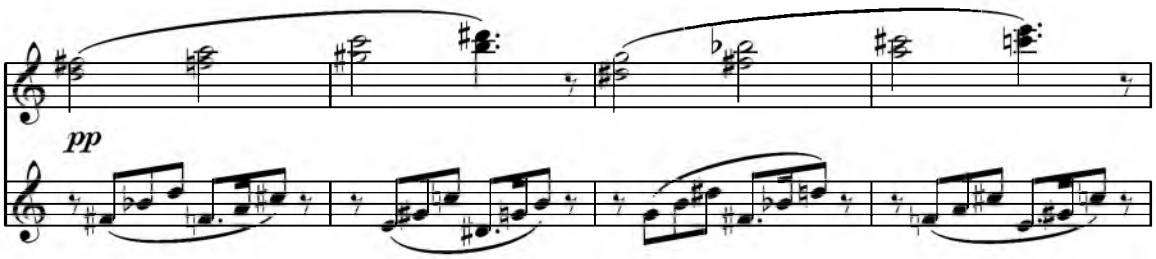
[14] Ibid.

[15] The fact that the melodic line of the *ostinato* falls and rises is also a foreshadowing of the role inversion and axes of symmetry will play in future development of the motives.

The Evolution of the Ladder of Thirds

Taruskin shows very well how Stravinsky used what is termed a "ladder of thirds" as the compositional harmonic basis in many of his early pieces, beginning with *The Nightingale,* and including *The Firebird.* This was something he modeled[16] from his teacher, Rimsky-Korsakov, who was in turn influenced by examples in the music of Lizst.[17] For example, Taruskin shows that in his *Faust-Symphonie*, Lizst commonly used circles of major thirds, rising in succession, a minor third apart, whose roots form the notes of a diminished-seventh chord (see upper staff, EXAMPLE 3a).[18] This is harmonized by augmented triads that descend by semitone (EXAMPLE 3a, lower staff).[19] It is important to note that, as the thirds of the upper staff progress upward, the lower note of the second third is a semitone below the higher note of the first (see EXAMPLE 3b).

EXAMPLE 3a: Liszt, *Eine Faust-Symphonie*, I, letter Z



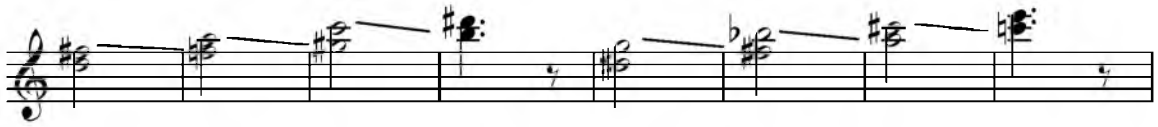
[16] Both cases of modeling (Stravinsky of Rimsky-Korsakov and Rimsky-Korsakov of Liszt) may be more appropriately termed "misreadings," according to Harold Bloom, *The Anxiety of Influence: A Theory of Poetry.* New York, Oxford University Press, 1973.

[17] Taruskin, pp. 280-81.

[18] Ibid.

[19] Both the diminished-seventh chord and the augmented triad are symmetrical sonorities.

EXAMPLE 3b: Liszt's thirds from EXAMPLE 3a overlapping by semitone (semitone shifts marked with slanted lines).[20]



Taruskin, in Chapter 4 of his treatise, documents that Rimsky-Korsakov borrowed this idea from Liszt.[21] In addition, he used the idea of minor third cycles so much that Taruskin states:

> Virtually nothing happens in a late Rimsky-Korsakov opera that is not immediately and literally restated a third or a tritone away. This pattern obtains at every level, from the measure to the period to whole sections of a piece. There can be no denying that Rimsky-Korsakov's use of symmetrical modes and axes became mechanical, and his sequences trite, obsessive, and—we may as well face it—somewhat philistine.[22]

Though Rimsky-Korsakov may have overused symmetrical cycles a minor third apart, at some point he developed an indispensable variant. His new ladder of thirds became a series of ascending *alternating* major *and* minor thirds that overlap, such that the lower note of the second is a semitone below the higher note of the first. Rimsky-Korsakov used these thirds as leitmotifs for the evil sorcerer in his operas *Mlada, Pan Voyevoda,* and *Kastchei the Deathless* to personify Kastchei or other evil sorcerers.[23] There is no doubt that Stravinsky was familiar with these works of his teacher, and that he modeled his own "Kastchei" motive after Rimsky-Korsakov. In Rimsky-Korsakov's

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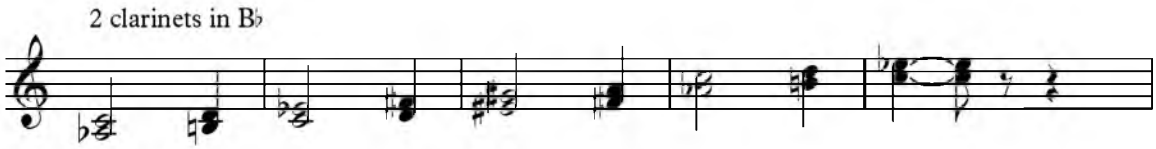
[20] My example.

[21] Also revisited in pp. 589-90.

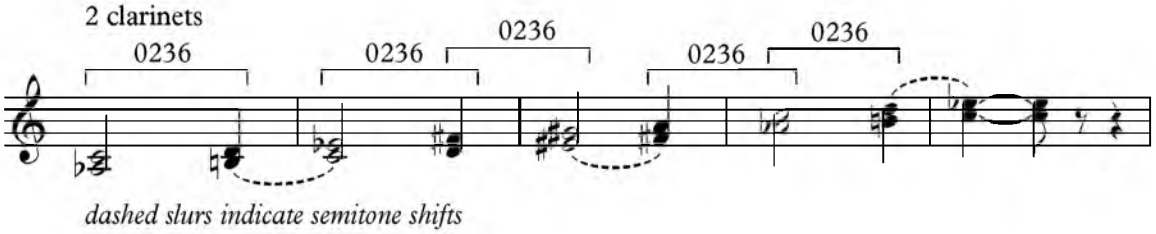
[22] Ibid., pp. 297-98.

[23] Ibid., p. 167.

EXAMPLE 4a: Rimsky-Korsakov, *Kastchei the Deathless,* scene ii, 10 before [59].[24]



EXAMPLE 4b: Rimsky-Korsakov's alternating major and minor thirds forming pitch sets 0236, or the *Kastchei "leit-harmonie."*



opera, *Kastchei the Deathless,* these ascending, overlapping thirds are played by two clarinets. See EXAMPLE 4a above.

In the next EXAMPLE 4b (above), square brackets are added to the above example to denote alternating major and minor thirds that form pitch sets 0236. According to Taruskin, at every third progression, Rimsky-Korsakov "cheats" the series to preserve the integrity of a single octatonic collection.[25] Dashed slurs indicate where he did not *alternate* between major and minor thirds, but used *two consecutive* minor thirds, a semitone apart.[26]

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[24] Ibid., pp. 590-91.

[25] Ibid.

[26] Dashed slurs, pitch sets, and brackets are my invention.

Stravinsky's innovation, or perhaps "misreading," was in taking his teacher's device and harmonically extending it. He soon discovered that continuing the pattern of alternating major and minor thirds, without "cheating" the semitone shifts, would produce a series that provided not only a richer harmonic vocabulary than solely one octatonic collection, but also a pattern whose thirds (every other major or minor) also formed a complete double circle of ascending fourths that traversed all twelve keys, one linking the minor, the other the major.[27] Therefore, for Stravinsky, musical progressions could be achieved by means of cycling through the ladder in numerical order, or in some cases in reverse order, as "retrogression." Taruskin numbers each third for future reference, so one can see how it is used in sequence in score examples. In EXAMPLE 5, slurs are placed between minor or major thirds to show their progression through the double circle of ascending fourths. Upper slurs connect major thirds, and lower slurs connect minor thirds.

The "ladder" was fecund for Stravinsky's compositional technique as it became the catalyst for not only harmonic choices, but melodic ones as well, as will be shown later. Stravinsky immediately put the ladder to work, systematically going through all of its permutations, often combining different pairs. He soon found that the ladder has the possibility to be used as basis of diatonic *and* chromatic music, or in other words, it has qualities of music based on successions of perfect fifths *or* diminished fifths.

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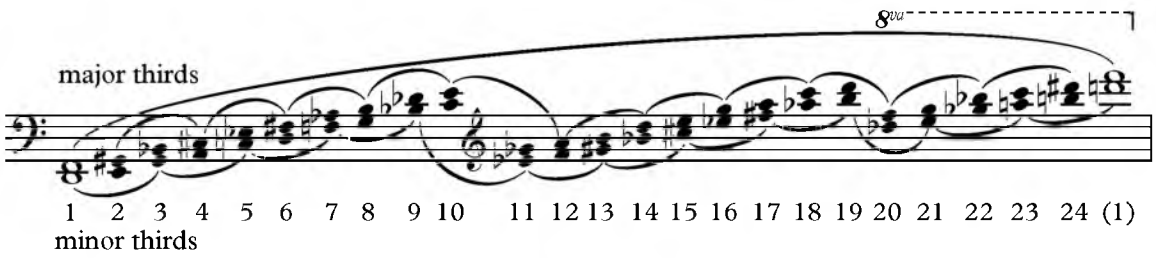
[27] Ibid.

EXAMPLE 5: Stravinsky's ladder of thirds, each rung numbered for future reference.[28]



Compositional Techniques with the Ladder of Thirds

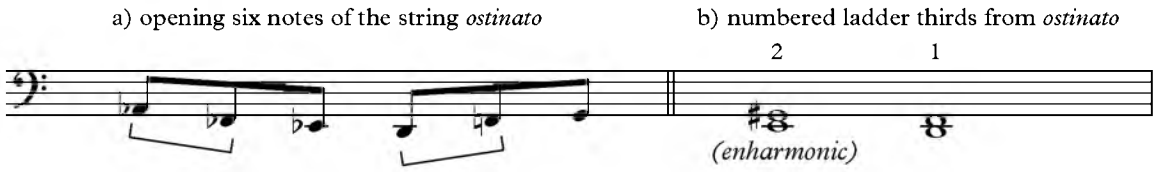
One of the most common ways Stravinsky used the ladder was in pairs of thirds. It has already been shown how he used ladder thirds numbered 1 and 2 to construct the framework for the opening string *ostinato* (see EXAMPLE 6a-b below). It is essential to note that any two adjacent thirds on the ladder always create pitch set 0236 and always span a tritone.

Another item of importance is how the pair of thirds plays or toggles back and forth, as if the harmonic sequence takes a step forward, and then backward, then forward, then backward again, repeatedly.[29] The motivically-related trombone motive played in conjunction with the string *ostinato* in m. 5 is also constructed from thirds numbered 13 and 14 on the ladder (see EXAMPLE 6c below). These also toggle back and forth in similar fashion.

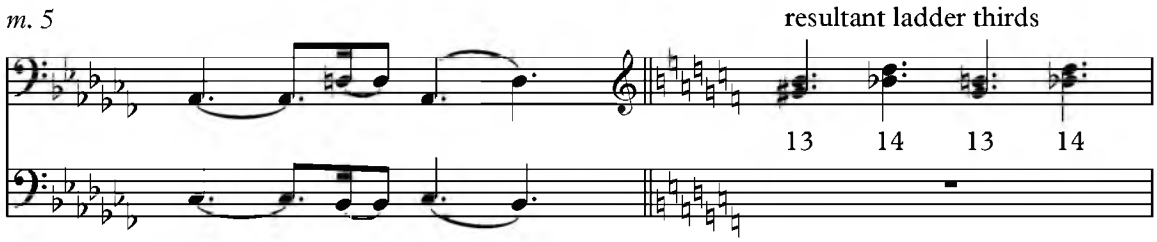
[28] Ibid., p. 591. As the ladder of thirds example will be referred to repeatedly throughout this dissertation, I have conveniently reprinted it in Appendix A at the conclusion of the paper for easy reference.

[29] What is different about the opening pair of thirds is that it begins first with number 2 and goes backward to number 1.

EXAMPLE 6a-b: Numbered ladder thirds derived from opening string *ostinato.* Third number 2 is shown enharmonically.



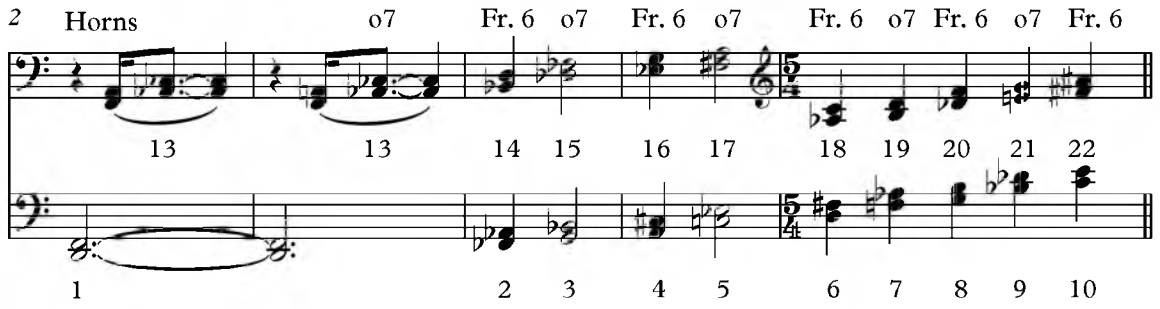
EXAMPLE 6c: *Introduction,* m. 5, trombones shown with resultant ladder third numbers.



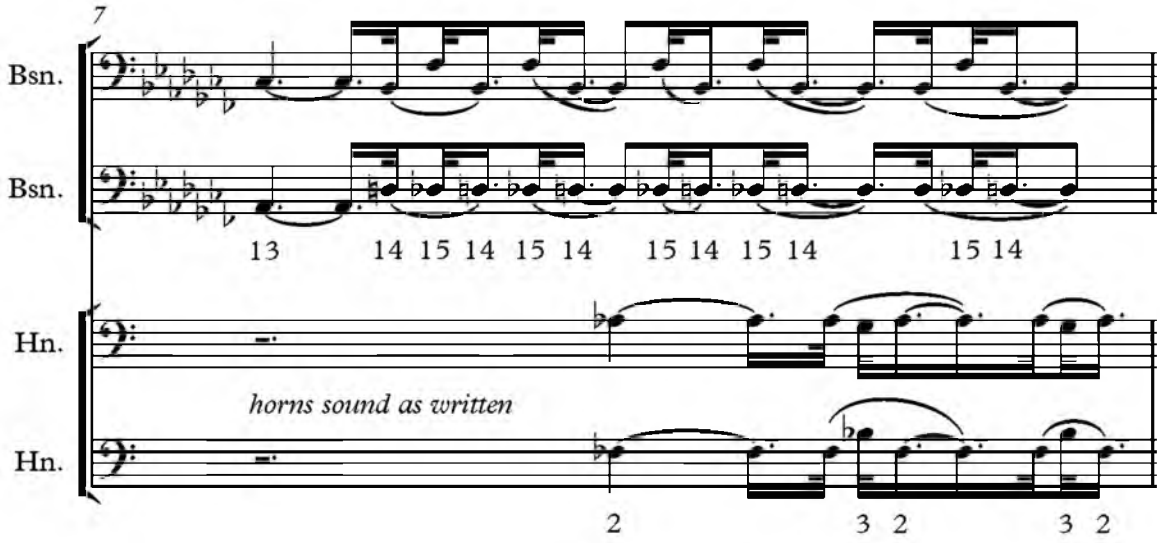
Often, Stravinsky also uses a pair of adjacent ladder thirds in conjunction with another pair, as mentioned previously, creating sonorities that are tritone-rich, as each pair spans its own tritone. The most common combination he uses is pairs that are 12 ladder steps apart, most likely because their roots are also a tritone apart. When minor thirds are 12 steps apart on the ladder (roots a tritone apart), they yield the diminished-seventh chord. When major thirds are 12 steps apart, they yield the French-sixth chord.[30] EXAMPLE 7 from *Kastchei's Awakening* is quintessential (see below).

[30] As the tritone carries supreme importance, the diminished-seventh chord may also be seen as two tritones a minor third apart, and the French sixth chord may be seen as two tritones a whole tone apart.

EXAMPLE 7: *Kastchei's Awakening,* mm. 2-6. Numbered thirds from the ladder used in pairs 12 ladder steps apart have roots a tritone apart and form alternating diminished-seventh and French-sixth sonorities.



EXAMPLE 8: *Introduction*, m. 7. Two bassoons and two horns toggle back and forth between two different pairs of adjacent ladder thirds simultaneously.



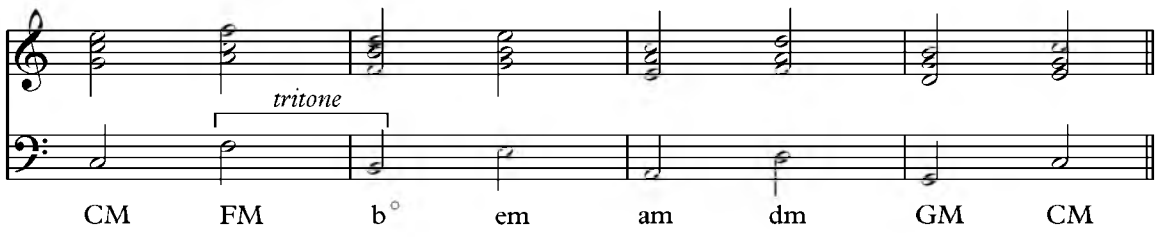
Another example of thirds used in combination may be seen in the *Introduction,* where two groups of two instruments, in this case bassoons and horns, toggle back and forth between two different pairs of adjacent ladder thirds simultaneously. See EXAMPLE 8 above.

Going beyond what Taruskin has shown, with the paired thirds in the above excerpt of music, is to note the alternating dotted rhythms. This is of musical importance because, while one pair of voices sustains a third, the other moves back and forth in dotted rhythms, and vice versa. A second observation is that Stravinsky is extremely tenacious about the pitch spellings of the thirds. In the bassoons, for example, the second bassoon pitches are primarily D-natural and D^{b}. Perhaps, to save ink, an argument could have been made to spell the D^{b} as a $C^{\#}$, to avoid always having to use accidentals for each D-natural and D^{b}. Similarly, in the second horn, E-natural may have been an easier spelling than F^{b}, but Stravinsky chooses otherwise. Perhaps, in his mind, the paired pitches must be seen as "working" thirds from the ladder, and not spelled as augmented seconds or diminished fourths, so that those analyzing may realize that compositionally he is simply manipulating adjacent pairs of thirds from the ladder.

Diatonic Possibilities and Relationships in the Ladder of Thirds

The ladder of thirds, in addition to many tritonal combinations, also has diatonic possibilities. Seen through a diatonic lens, thirds that are 11 steps apart produce complete minor or major triads, as the case may be. As mentioned before, alternate thirds yield cycles of minor or major thirds whose roots form a complete ascending circle of fourths, or descending circle of fifths. This concept is no stranger to tonal music, though in tonal music, the quality of the triads changes as the root progression cycles by fifths, sometimes being minor, sometimes major, as the case of the diatonic pitches and intervals between them warrants. In the case of a major key progression, there are two major triads, one diminished, followed by three minor triads, and concluded with two major ones. All of the bass motions in this sequence are by descending perfect fifths,

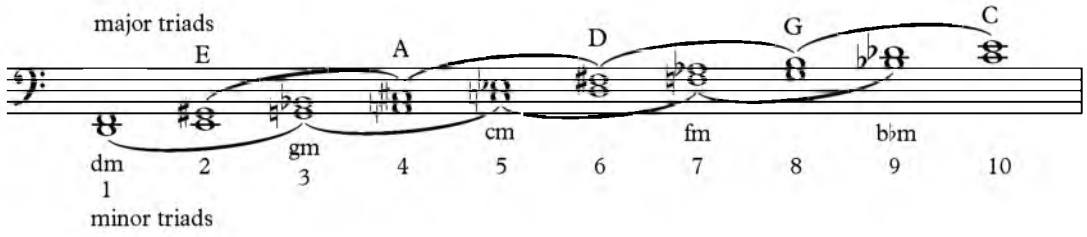
EXAMPLE 9a: The diatonic circle of fifths, showing triad qualities changing between major, diminished, and minor.



with the exception of the IV to the vii° chords (FM to b°), which is a tritone. See EXAMPLE 9a above. In contrast to the diatonic circle of fifths, the progression of the ladder of thirds produces, considering only thirds of the same quality 2 steps apart on the ladder, a complete double chromatic circle of major thirds or minor thirds whose roots form an ascending circle of perfect fourths, or descending circle of fifths. See EXAMPLE 9b below.

Here are some additional insights as to how this was inventive. Every root progression by descending fifth, of either minor or major thirds, always yields the same quality of thirds, giving the music a chromatic or perhaps, in case of Russian composers of the period, more "supernatural" characteristic. By the second fifth progression of the minor thirds (e.g., dm - gm - cm), the cycle has already lost its diatonic feel, as a C minor triad is not native to the diatonic key of D minor (the E^b of the C minor third is outside the key). The same happens with progressions of the major thirds. At the second progression away from the beginning third (e.g., E - A - D), the cycle has lost its diatonic-ness, as there is no D-natural in the key of E major. Another colorful harmonic benefit to this type of progression is that each cycle of fifths, minor or major thirds, never occurs in isolation. They always progress through the intermediary thirds of contrasting

EXAMPLE 9b: Circle of fifths produced by the ladder of thirds. Slurs show circle of fifths motions between roots of major thirds (or minor thirds) 2 steps apart.

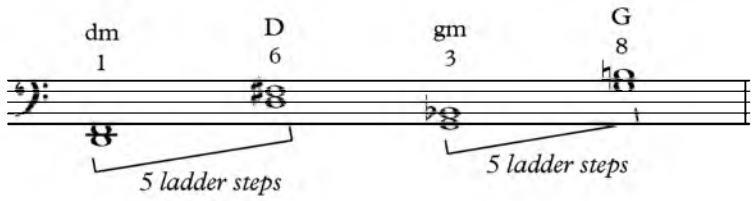


quality. Or, in other words, as the major cycle of thirds progresses, it does so by passing through each intermediary minor third that stands between each major third in the ladder. This no doubt creates a wealth of possibilities to a composer to whom harmonic and orchestral color was of utmost consequence.

Chromatic Shifts

It is helpful to notice now that thirds on the ladder that are 5 steps away are closely related. The only change between them is a chromatic semitone shift in only the top note of the third. Referring to the last EXAMPLE 9b, if 5 steps are added to the first third (dm), it becomes a D major third, or third number 6. The reverse happens to a major third when it moves backward 5 steps on the ladder; it becomes a minor third. Note how third number 8 (G major) and third number 3 (G minor) are 5 steps apart on the ladder. See EXAMPLE 9c below.

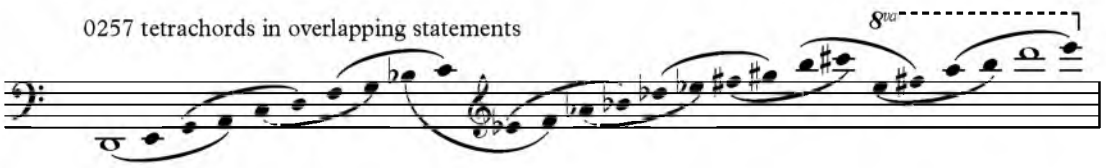
EXAMPLE 9c: Thirds on the ladder 5 steps apart produce chromatic shifts of a semitone in only one of the voices.



The Root-derived Pitch Set

Another pitch set that Stravinsky generated from the ladder is one of his most commonly used, the 0257. Taruskin names this "skimming the tops of the thirds."[31] Though this concept is apparent by looking at all of the top pitches of the ladder, it is perhaps seen more clearly by removing all of the top notes of the thirds and viewing only the lower, or "root" pitches. What is revealed is a pattern of whole-steps and minor thirds, which not only generates a succession of pitch set 0257, but also causes 0257 to occur in overlapping statements. See EXAMPLE 10 below.

EXAMPLE 10: Lower notes of the ladder of thirds form pitch sets 0257. Slurs show the overlapping 0257 statements.[32]



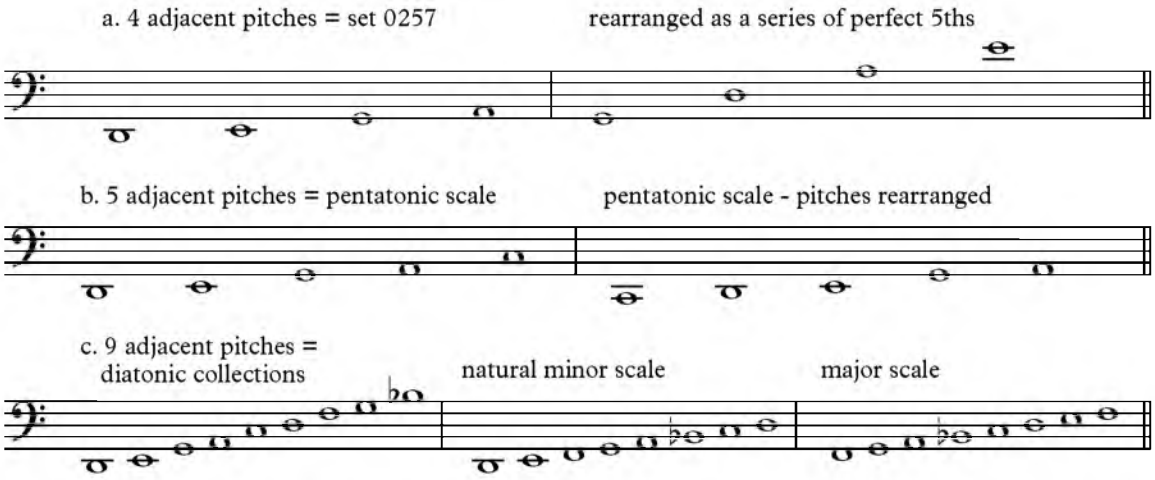
Taruskin describes the music that uses this pitch combination as "polytonal" or "enigmatic" (with examples at Figures [112] or [116] in the original score).[33] It is, in any case, a clever way in which elements of music that have properties of both the diatonic and chromatic worlds can be mixed. The complete succession of pitches in this collection, derived from the ladder, may be seen a few different diatonic ways. First of all, pitch set 0257, which occurs with any group of four pitches in succession, may be classified as the normal order of a tetrachord of stacked perfect fifths, a diatonically-derived set (see EXAMPLE 11a below). Other ways of looking at it are that any

[31] Ibid., pp. 610-11.

[32] This example is my own invention.
[33] Ibid. See also p. 595.

pentachord of adjacent notes in the sequence yield a pentatonic scale (EXAMPLE 11b), or that the first nine notes of the sequence produce all of the pitches in the diatonic scale (either natural minor or major) as shown in EXAMPLE 11c below.

EXAMPLE 11a-c: Different ways of seeing the collection of pitches formed by the lower ladder of thirds.



Exhausting all of the Possibilities of the Source Sets

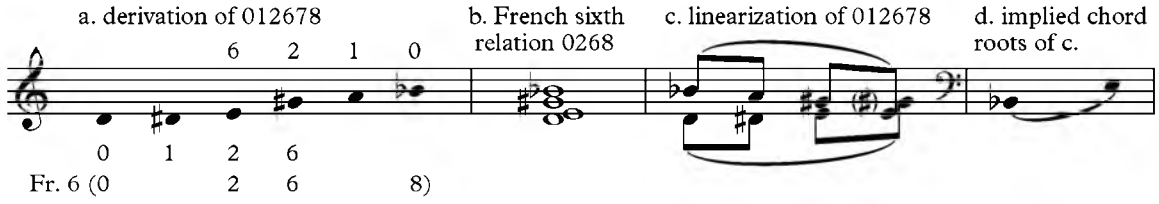
Once Stravinsky had decided on the two harmonic and melodic leitmotifs for the magical characters, 0126 (Firebird) and 0236 (Kastchei), he must have explored all of the permutations of melodic and harmonic possibilities of the two sets. Some of the most useful of these are using two identical sets in mirror inversion. The first permutation is arrived at by inverting set 0126 at the minor-sixth, or I_8. In this way, two common tones (the inner major third) are preserved, and the set 012678 is derived, a set with many whole-tone properties, and of which the French sixth (0268) is a subset.[34] Taruskin names

[34] As stated before, the French sixth is also a sonority produced by major thirds on Stravinsky's Kastchei "ladder of thirds" 12 steps (tritone) apart.

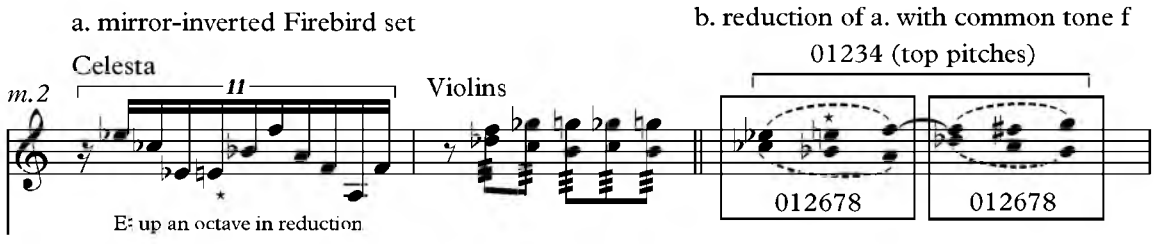
this last set the "mirror-inversion of the Firebird *leit-harmonie*" (see EXAMPLE 12a-d below). It most frequently occurs in the linearized form (EXAMPLE 12c). In addition to its inversional and harmonic qualities, when the I_8 permutation is used as a mirror of two sets 0126 voiced against each other in contrary motion, the intervals formed imply chord roots a tritone apart (EXAMPLE 12d). These last features delineate two techniques that Stravinsky used repeatedly in the composition of *The Firebird:* mirror motion and tritone progressions. These will be explained in greater detail later in this dissertation.

Taruskin claims that this mirror-inverted *leit-harmonie* is "expressed most distinctly in the celesta and harp arabesques that decorate the tableau of Kastchei's magic garden"[35] (see EXAMPLE 13a below, or the music at Figure [1] in the score). Perhaps he was overlooking the figures in the violins and clarinets in between iterations of the celesta, where the linear treatment of the set is much more perceptible, as the latter is so

EXAMPLE 12a-d: Firebird motive 0126 in conjunction with its inversion at the minor sixth or I_8.[36]



EXAMPLE 13a-b: *The Enchanted Garden of Kastchei,* mm. 2-3. Dashed slurs denote sets 012.

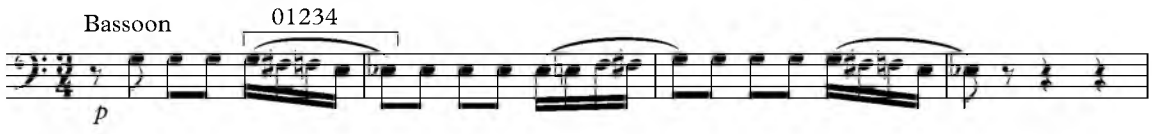


disjunct in its interval content (see EXAMPLE 13b below). Note that the E-natural in m. 2 is an octave-displaced member of the semitone set 012 (E^b-E-F) in the reduction.

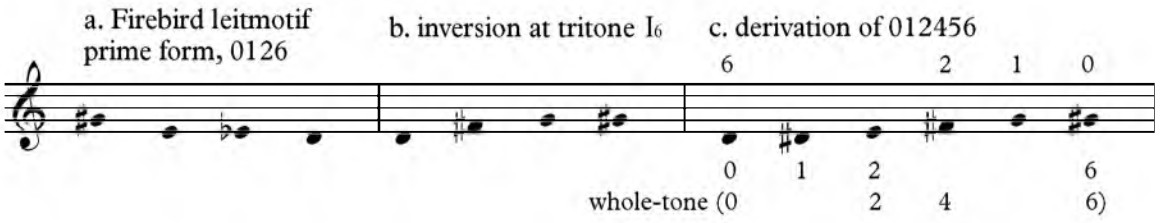
To go beyond what Taruskin has stated on the subject of the mirror-inverted set, often it is treated as two sets 012 in two separate voices (e.g., divided violins in contrary motion). In the EXAMPLE 13b reduction, the F tied over between the two iterations of 012678 (celesta to violins) is a common tone between the two occurrences of 012 in the top voice. A related technique Stravinsky uses to extend the melodic aspect of the set is to use two or more 012 overlapping sets in whole-tone sequence, therefore producing other melodic elements, sets 0123 and 01234. The next measure (m. 4) features 01234 in the solo bassoon as a second *leit-harmonie* of the evil Kastchei. See EXAMPLE 14 below. This will be treated further in the chapter on Kastchei.

Another permutation of the Firebird source set not mentioned by Taruskin is achieved by using set 0126 in conjunction with its inversion at the tritone, I_6. In this way Stravinsky preserves two common tones (the outer tritone) and derives set 012456, a collection that also has whole-tone properties, as it contains the subset 0246. See EXAMPLE 15 below.

EXAMPLE 14: The Enchanted Garden of Kastchei, mm. 4-7.

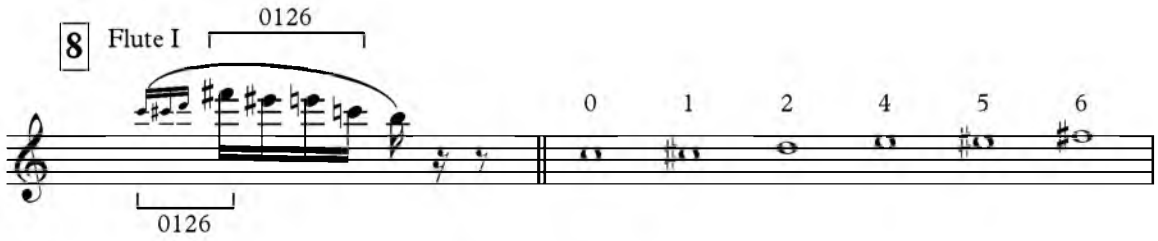


EXAMPLE 15: Firebird motive 0126 in conjunction with its inversion at the tritone.

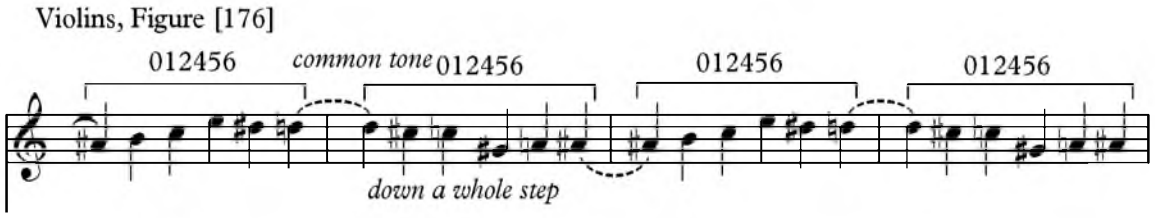


One example of the use of this pitch collection is at Figure [8], where the woodwind entrances with grace notes all have iterations of it (more about this particular excerpt to come later in the paper). See EXAMPLE 16a below. Another prime example of the use of set 012456 is at Figure [176] in *The Infernal Dance of All Kastchei's Subjects* (see EXAMPLE 16b below). In this excerpt, there are two sets 012456 a whole tone apart, which connect with each other by common tones shown as dashed slurs across the barlines. The true genius of Stravinsky shows when he is able to combine set 012456 (derived from the Firebird motif) with the Kastchei *leit-harmonie* set 0236, representing perhaps the struggle between the two supernatural characters. See EXAMPLE 16c below.

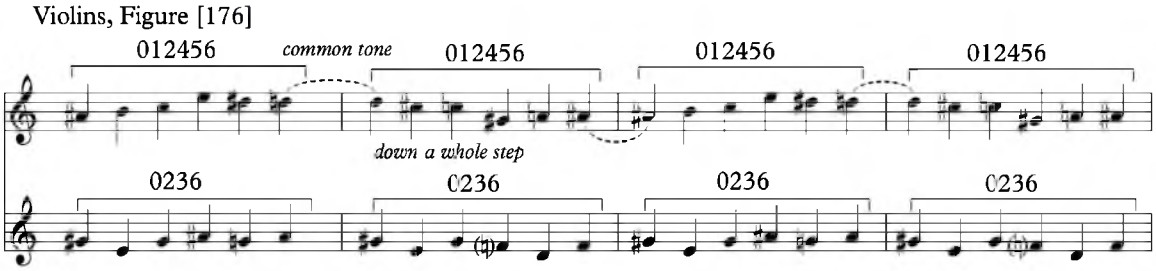
EXAMPLE 16a: Figure [8], first flute part showing pitch set 0126 with its inversion at the tritone, I_6



EXAMPLE 16b: *The Infernal Dance of All Kastchei's Subjects,* Figure [176] (mm. 229-32). Sets 012456 formed by inversion of set 0126 at the tritone. Dashed slurs show common tones between two sets 012456 a whole tone apart.



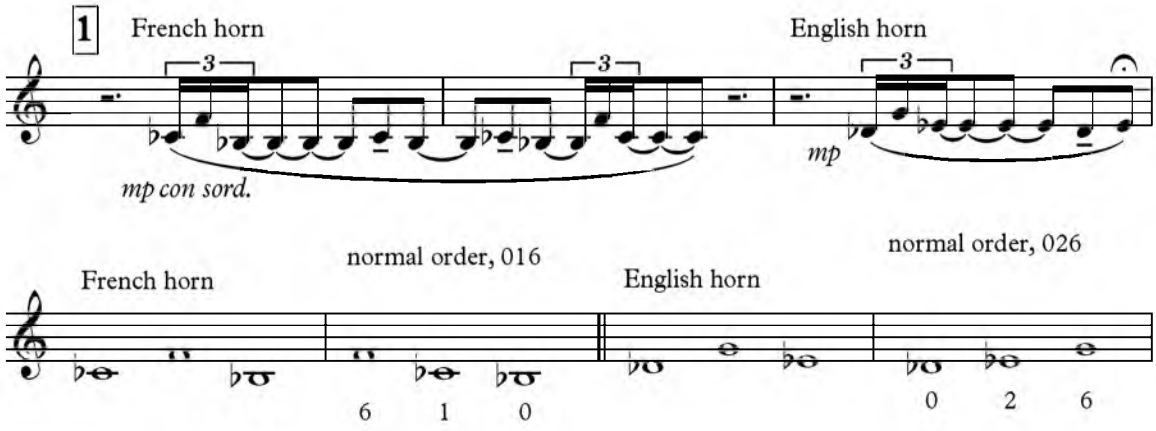
EXAMPLE 16c: *Infernal Dance of All Kastchei's Subjects*, Figure [176], violins. Sets 012456 (Firebird-derived) and 0236 (Kastchei's *leit-harmonie*) used simultaneously.



Two other pitch sets that trace their genesis back to the source sets not mentioned by Taruskin are sets 016 and 026, both subsets of the Firebird and Kastchei *leitmotifs.*[37] These are showcased prominently in *The Enchanted Garden of Kastchei* movement, in the solo French horn and English horn figures. See EXAMPLE 16d below.

[37] 026 is a subset of *both* the Firebird (0126) and Kastchei (0236) pitch sets.

EXAMPLE 16d: Figure [1], pitch sets 016 and 026 in French horn and English horn melodic figures.



MANIPULATING SOURCE MATERIALS

The Tritone as Point of Departure

Most of the pitch sets Stravinsky uses in *The Firebird* span a tritone in range and, therefore, tend to naturally accentuate it. Other theorists have commented on the fact that Stravinsky generally favored pitch sets that span a perfect fourth or fifth. Countless passages from his Russian period (*The Firebird, Petrushka, and The Rite of Spring)* contain melodies in this category. These tendencies were also reinforced by his common usage of Russian folk melodies in his early music. These folk melodies tended to have a more limited intervallic range. Often the fourths or fifths would be subdivided into smaller intervals like major seconds and minor thirds.[38] White elaborates on this idea:

> Close examination of his output shows that it is the narrower intervals—particularly thirds and seconds—that fascinated him. When a wider interval, like a fourth or augmented fourth, seems to play an important part in his composition, it will usually be found that it really splits up into smaller component intervals, e.g., the division of the augmented fourth in *The Firebird* into interlinked major and minor thirds, and the division of the fourth in *The Wedding* into a major second and minor third.[39]

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[38] In *The Rite of Spring*, for example, there is frequent use of the tetrachord 0235, sometimes termed the "minor" tetrachord as it corresponds to the first four notes of a minor scale.

[39] White, p. 556.

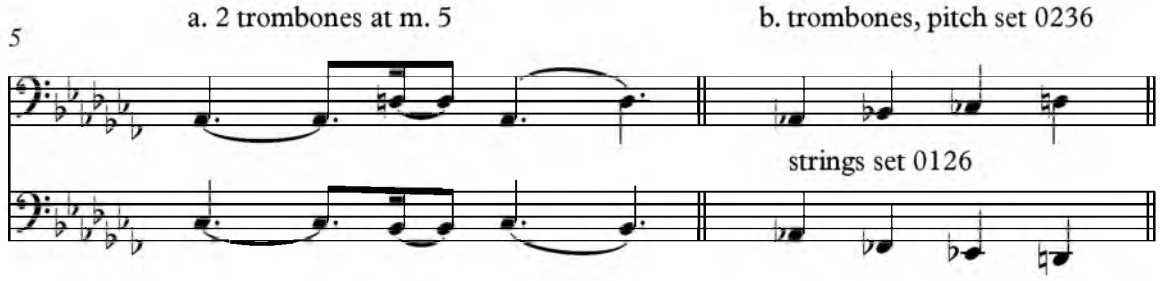
Accentuating the Tritone

Though it is common knowledge that Stravinsky generally favored pitch spans of a fourth or fifth, there is not much mention among theorists of his accentuation of the tritone, or augmented fourth, in *The Firebird.* There is a plethora of examples of how Stravinsky accentuates the interval of the tritone. The most obvious of these is the opening string *ostinato*, as mentioned already (see EXAMPLE 1). The *ostinato* is essentially two sets of pitches that play back and forth, whose outer pitches are A^b and D (a tritone apart). This tritone is driven into the listener's consciousness in two ways. The first is because these pitches are the highest and lowest ones heard in the first opening four bars.[40] The second is that the descending and ascending pattern of the *ostinato* is repeated eight times (in the first four measures of 12/8 time) before anything else of importance happens. The opening A^b *descending* to D ladder thirds in the strings is then mirrored or inverted by the trombones' entrance at m. 5, whose pitch sets from ladder thirds range from A^b (incidentally in the same register) *ascending* to D, a tritone higher. The way Stravinsky pits these opening motives against each other sets a strong precedent of tritone-spanned motivic figures as well as for intervallic symmetry for the duration of the work. It also presents incisive arguments for Stravinsky's choice of the A^b minor key signature (7 flats!) for the outset of the piece, as both pitch sets have inversional symmetry with A^b as their axis (see EXAMPLE 17a-b below).

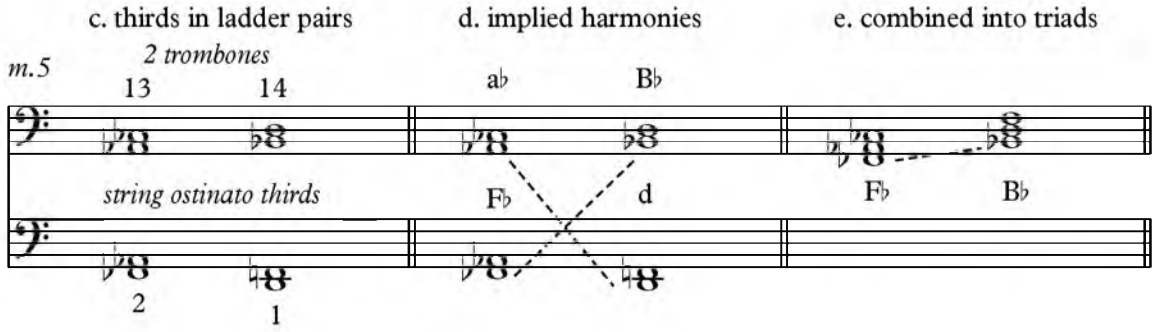
Concerning the use of the tritone, that is only the beginning. In addition to the A^b-D, tritone-spanned pitch sets, the implied harmonies of pitches in dotted-quarter-

[40] Because the eighth-note pulse is so slow in the *Introduction,* these opening four bars, in 12/8 time, pass by much slower than one would think, and probably equate to 16 measures in 3/4 time.

EXAMPLE 17a-b: *Introduction*, m. 5 trombones' entrance. Axis of symmetry between A^{b} and D in both motivic pitch sets formed (the trombones' Kastchei *leit-harmonie* and the strings' opening four notes of the *ostinato)*.



EXAMPLE 17c-e: Tritone relationships between roots of pairs of ladder thirds in trombone figures and string *ostinato*. Dotted lines denote tritone-root relationships. Ladder thirds labeled in EXAMPLE 17c.



note rhythms from beat to beat also show tritone relationships. Take a look, for example, at the ladder thirds used in measure 5 (see EXAMPLE 17c-e below).

In addition to the A^{b}-D axis of symmetry in each pair of ladder thirds, there are tritone relationships across the roots of thirds of the different instrument groups. EXAMPLE 17d (above) shows how the A^{b}-rooted third in the trombones (top staff) is followed by a D-rooted third in the strings (lower staff). Similarly, the F^{b}-rooted third in the strings is followed by a B^{b}-rooted third in the trombones. A third relationship comes from the sum of the vertical harmonies produced by both pairs of thirds from the

trombones and the strings, shown in EXAMPLE 17e above. These yield triads with roots F^{b} and B^{b}, which are also a tritone apart.[41]

Another instance of tritone accentuation comes a few measures later in the *Introduction* where, at mm. 13-14, an A^{b} dominant seventh chord changes harmonically to a D dominant seventh.[42] The tritone root progression is distant harmonically, though the inherent tritone of each of the two dominant seventh chords is enharmonically the same. In other words, the C-G^{b} tritone of the A^{b} dominant seventh chord (the G^{b} spelled enharmonically as an $F^{\#}$) is the same tritone native to the D dominant seventh ($F^{\#}$-C). Stravinsky must have considered this a decisive moment in the *Introduction,* as he highlights it orchestrationally with the inception of one of his most inventive of all orchestral colors—natural string harmonics in *glissando* in the violins and violoncellos.[43] In the 1910 version of *The Firebird*, this effect must have been even more striking than in later versions, as he originally calls for the first violins to retune their E strings to a D (notated *Mi muta in Re* in the score) and play the *glissandi* in octaves with the second violins, who play the figure an octave lower on their D strings.[44] Many other examples of accentuating the tritone will be shown in other sections of this dissertation.

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[41] Taruskin does briefly mention the tritone relationship of the D-F thirds numbered 1 on the ladder and the key signature of A^{b} minor with the A^{b}-C^{b} third of the trombones at m. 5; however, he erroneously shows in his EXAMPLE 9.10 that ladder thirds 1 and 13 are used together to form a diminished triad as well as 2 and 14 to form a French-sixth chord, when, in actuality, 1 is used with 14, and 2 is used with 13, forming minor and major triads.

[42] Another reinforcement of the significance of pitch centers A^{b} and D.

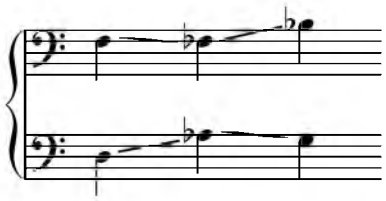
[43] This is not a very loud moment, as it is also marked *con sordino.*

[44] For a violinist, it is not surprising to note that Stravinsky changed this in the 1945 *Suite*. A retuning of this magnitude in the middle of a movement is extremely risky, and there is not much time during the rests to test it. To make matters worse, the E string would have to be retuned with the peg, instead of a fine tuner because it is a whole step down, inviting even more variables. Stravinsky must have learned by experience that it was a bit unrealistic because in the 1945 *Suite*, for the first violins, the harmonic *glissandi* are written

Voice Leading Considerations--How the Tritone Factors In

While Stravinsky developed the ladder system of alternating major and minor thirds to use as harmonic basis in *The Firebird,* he does not always place the top pitch of each resultant third in the top voice. He alternates the voicing of the pitches as well, having the lower voice of a pair cross over the top voice. This allows for each voice to first skip a tritone away and then step a semitone away in the opposite direction while still cycling through subsequent thirds on the ladder. Taruskin shares what he terms "the only technical description of his music Stravinsky would ever publish:"

> Thus in *The Firebird,* all that relates to the evil spirit, [Kastchei], all that belongs to his kingdom—the enchanted garden, the ogres and monsters of all kinds who are his subjects, and in general all that is magical, mysterious or supernatural—is characterized musically by what one might call a *leit-harmonie.* It is made up of *alternating major and minor thirds*, like this: a minor third is always followed by a major third, and vice versa.[45]



Note how the top voice carries the higher pitches in the first and third harmonies (F and B^b), while the lower or second voice contains the higher pitch in the second harmony (the A^b crossing over the F^b in the upper voice). It is curious that Stravinsky

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down an octave and are played on the D string instead. Another change in the 1945 version is that the first violins are doubled by the violas instead of the second violins. This is perhaps indicative of an orchestrational decision to compensate for the *glissandi* in the first violins being lowered an octave, as the violas have a more penetrating sound than the second violins. This would ensure that the figure could be perceived by the listener. The second violins instead are given 32nd notes *tremolando* between high harmonics D and A, which adds texture to the mix.

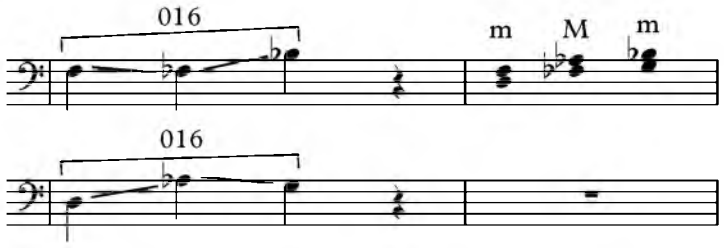
[45] Taken from technical notes Stravinsky wrote in his Aeolian piano-roll notes. Printed in Taruskin, p. 589, emphasis added.

describes the interval content of this voice leading technique only by "alternating major and minor thirds." Taruskin calls this "peculiar voice leading," but his only explanation is that Stravinsky wrote the passage "in such a fashion that each instrument alternately plays the higher and the lower component of successive thirds."[46] What appears to be missing from both Stravinsky's and Taruskin's explanations of this "peculiar" voice leading are the tritone skips alternating in each voice. These are significant because it strengthens the assertion that for Stravinsky, the most important interval is the tritone. It seems as though if there is any way he can call musical attention to it, he will. EXAMPLE 18b shows how thirds numbered 1, 2, and 3 from the "ladder" result vertically from this type of treatment. Also, not mentioned by Taruskin is how this type of voice leading generates linearly in both voices another important set in this work, pitch set 016 (see EXAMPLE 18a).

EXAMPLE 18a-b: Resultant thirds and set 016 from Stravinsky's "peculiar" voice leading.

a. pitch sets 016 form with "peculiar voice leading"

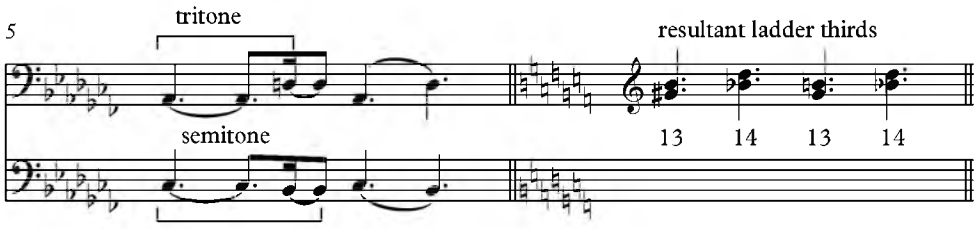
b. ladder thirds result (numbers 1, 2, and 3 from the ladder)



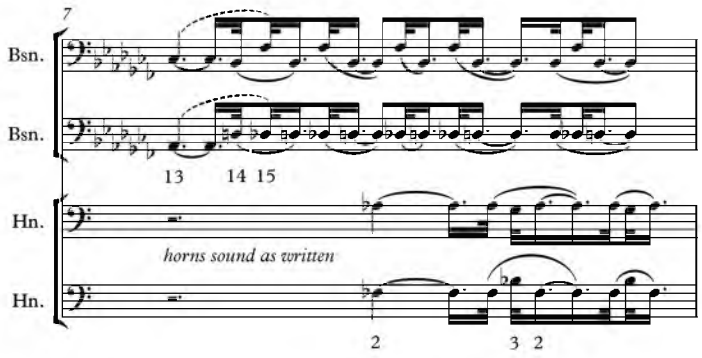
[46] Ibid., p. 482.

There are multiple occasions in *The Firebird* where Stravinsky uses this voice leading technique of semitone-tritone-semitone-tritone. The most notable is in the *Introduction*, m. 5 (see EXAMPLE 19a below). The two trombones, perhaps seen as harbingers of evil, announce the *leit-harmonie* of Kastchei by revealing his set of thirds, minor third A^b-C^b and major third B^b-D (together forming pitch set 0236). Stravinsky voices this by having the first trombone play the outer notes of the set, tritone A^b-D, and the second trombone the inner semitone C^b-B^b. Note that resultant thirds produced by the voice leading are numbers 13 and 14 from the ladder (number 13 being notated enharmonically). This same voice leading idea continues 2 measures later at the entrance of the bassoons and horns at m. 7. See EXAMPLE 19b below.

EXAMPLE 19a: *Introduction*, m. 5.



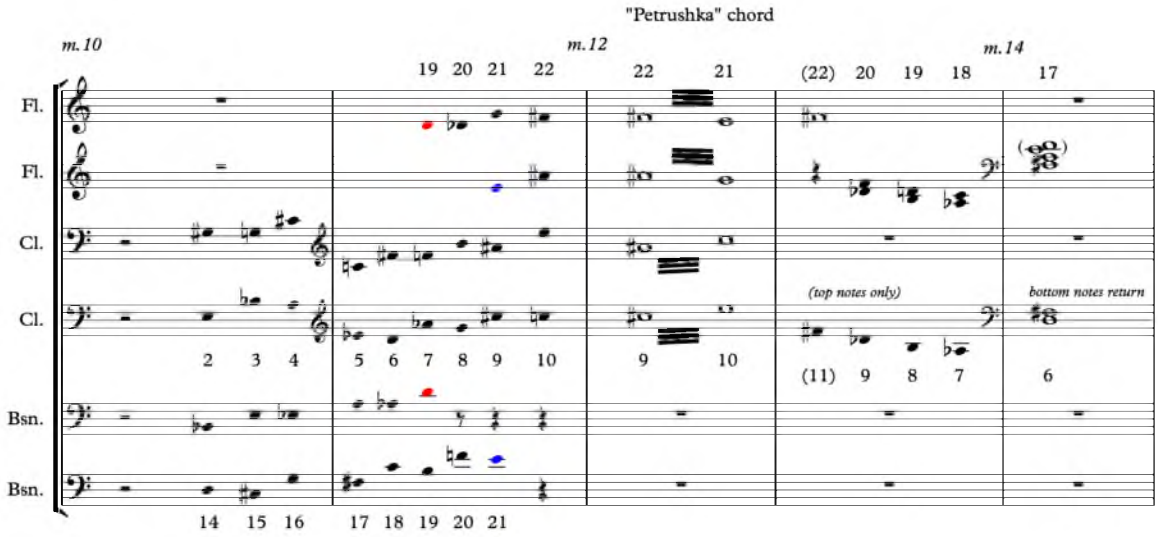
EXAMPLE 19b: *Introduction,* m. 7, entrance of bassoons and horns. Alternating tritone and semitone voice leading through "ladder of thirds" steps.



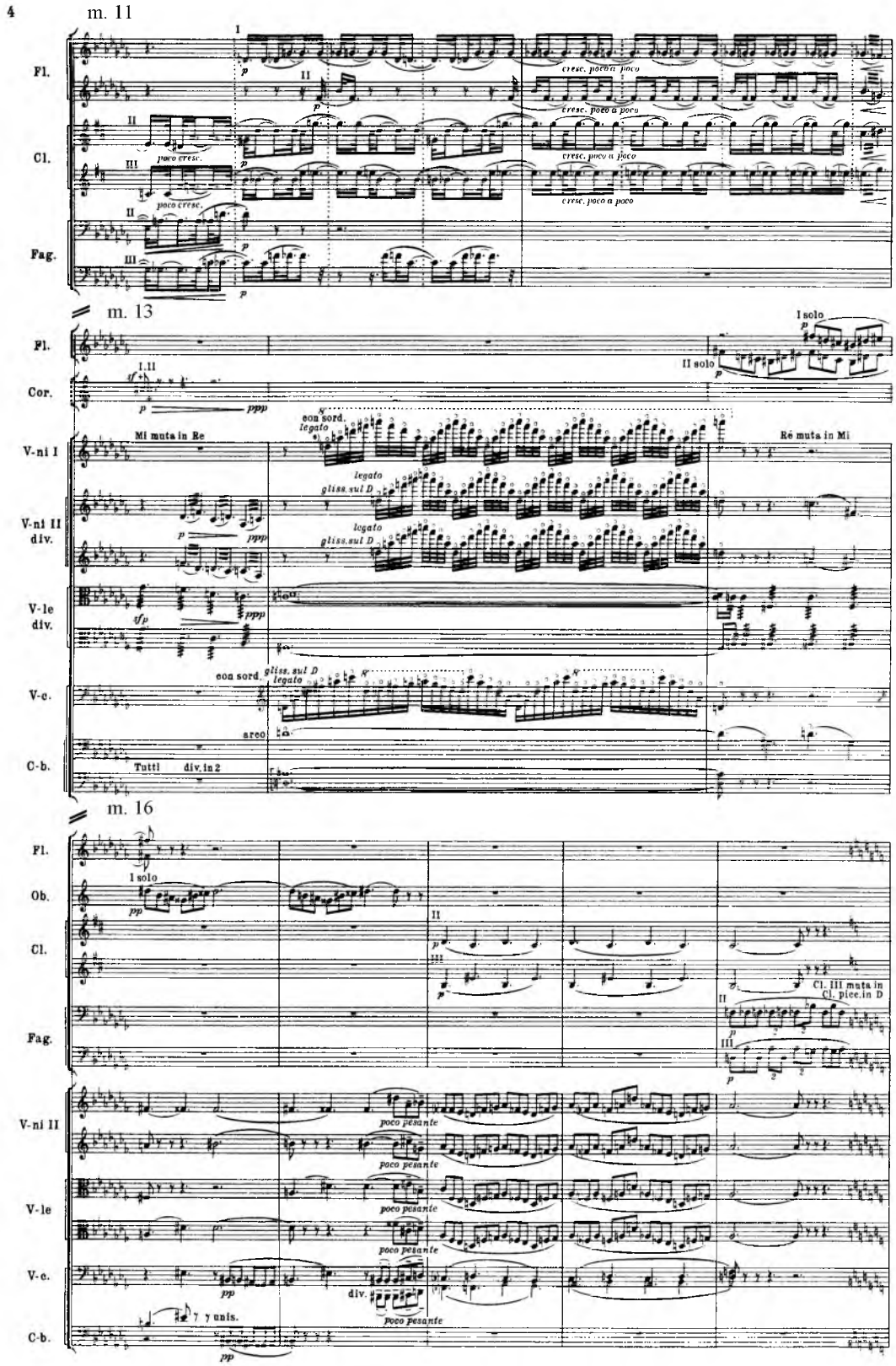
This example (19b above) is like the one at m. 5 because there are two "unfoldings" of the ladder simultaneously. As in the trombone example, one voice of each pair moves by tritone while the other moves by semitone. Also, at the entrance of the bassoons, pitch set 016 is present (see dashed slurs) as they cycle through steps on the ladder of thirds. Here the bassoons are alternating between steps 14 and 15 while the horns are 12 steps away, on steps 2 and 3. In the next few measures, the dotted rhythms are developed and passed from one instrument section to another. The texture remains four-part, as the thirds from two different steps on the ladder alternate back and forth as two groups of two and then continue forward through the order of the ladder. The two pairs of thirds from the ladder for the most part remain 12 steps apart on the ladder, though they move at slightly different times, forming essentially alternating French-sixth chords (when the thirds are major) and diminished-seventh chords (when they are minor). To go beyond Taruskin, as the register of the pitches gets progressively higher, the clarinets take over the melody from the horns (m. 10), just as the bassoons relinquish theirs to the flutes (m. 11). The dotted rhythms give way to *tremolos* at the end of m. 12, and form the "*Petrushka* chord," which, using the ladder of thirds may be seen by combining steps 9 and 10, with 21 and 22.[47] See EXAMPLE 20a below. For a look at the original orchestration of mm. 10-14, see also EXAMPLE 20b below.

[47] The existence of the "*Petrushka* chord" here (a chord that is most often constructed by combining a C major chord with an $F^{\#}$ major chord) suggests that Stravinsky was already experimenting with all of the possibilities of the ladder of thirds and that it was already in his harmonic language. The fact that both chord roots are a tritone apart also strengthens arguments for claims in this dissertation for that fact.

EXAMPLE 20a: *Introduction*, mm. 10-14, reduction. Bassoons and clarinets both contain sequential thirds from the ladder 12 steps apart (on the ladder). Voice transfers between bassoons and flutes are shown in color. The red note from the first bassoon transfers to the first flute, and similarly the blue notes transfer from the second bassoon to the second flute. Measure 14 is the D dominant seventh "string harmonics chord."



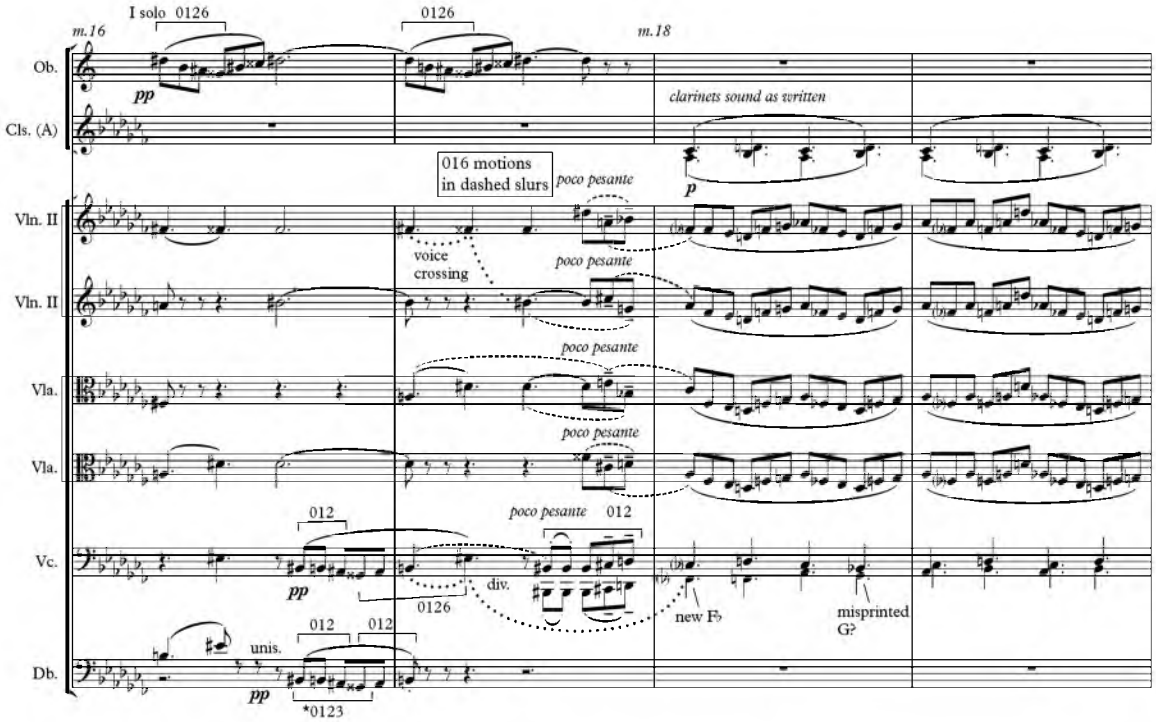
EXAMPLE 20b: *Introduction*, mm. 11-18 (Dover edition score, p. 4).



One item of note is the tritone root progression in m. 18 (F^{b}-B^{b}). This occurs through an unexpected F^{b} (E) in the lowest voice of the cellos. This F^{b} is somewhat unexpected because it is the return of the opening *ostinato*, and the opening *ostinato* did not have the F^{b}, or any harmony when it was first heard. The passage at mm. 16-19 also contains one of the most intriguing examples of voice leading in the work. See EXAMPLE 21a below.

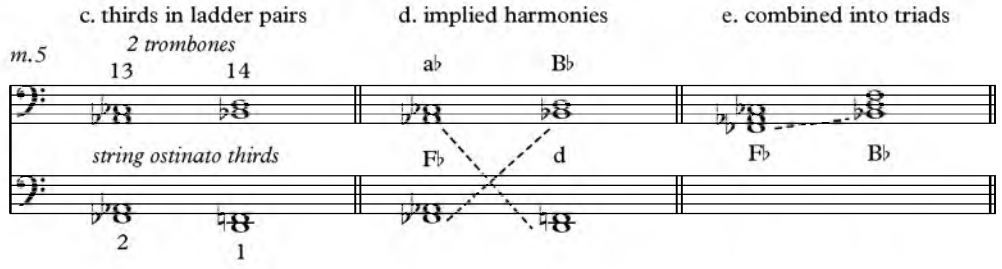
Measures 16-17 feature several instances of voices moving by tritone in all of the string parts. The last dotted-quarter-note beat of m. 17, marked *poco pesante*, features *stretto*-like overlapping iterations of pitch set 016 not only in each voice of the divided violins and violas, but has them in multiple serial-style permutations across all of the

EXAMPLE 21a: *Introduction,* mm. 16-19. Tritone voice leading and pitch sets 016, their spans shown with dashed slurs. Dotted slurs denote 016 relationships across voices or over longer ranges.



string parts: prime form, inversion, retrograde, and retrograde inversion. One statement of 016 happens across the divided second violin parts (m. 17, *dotted* slurs). As mentioned previously, in the cellos at m. 18, there is an unexpected F^{b} at the recurrence of the opening *ostinato*. The F^{b} is unexpected because it was not present on the downbeat of the opening notes of the *Introduction.* One reason why it may be here is two-fold. First, the F^{b} is part of the ladder third pairs that are used in the opening *ostinato* (A^{b}-F^{b} and D-F), and though, in the opening, it is not present on the downbeat, instead creating harmony with the A^{b}, it is the second pitch heard and so forms the first melodic interval (a major third). This also implies the harmony of F^{b} major. See EXAMPLE 17c-e below. A second reason for its existence may not be immediately apparent unless one sees that, in the case of all of the string parts except the cellos in m. 17, each was given at least two iterations of set 016 in *stretto* which concluded at the return of the opening ostinato in m. 18.[48] See EXAMPLE 21a. Perhaps the F^{b} may be considered the "delayed conclusion" of overlapping statements of 016 that began at the beginning of m. 17 (B-$E^{\#}$), and which was interrupted by the appearance of set 012 $B^{\#}$-$C^{\#}$-D (see *dotted* slurs in the cello part).

EXAMPLE 17c-e (reprinted): Tritone relationships between roots of pairs of ladder thirds in trombone figures and string *ostinato*. Dotted lines denote tritone-root relationships. Ladder thirds labeled in EXAMPLE 17c.

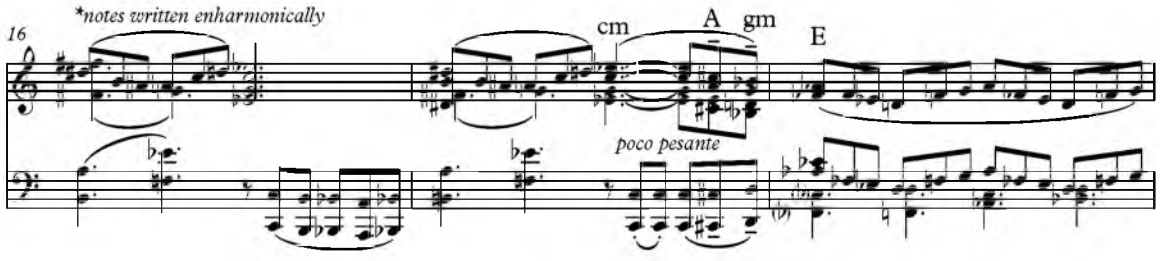


[48] The top viola part has 3 overlapping iterations of pitch set 016 (see EXAMPLE 18, mm. 17-18).

Surprisingly, the sonorities formed by all of the voices moving in 016 statements at the end of m. 17 are simply minor and major triads. The reason for this is found in the nature of the thirds ladder. If each voice of a triad that is part of thirds on the ladder is moved in the same 016-type motion, it will always progress to the next corresponding step in the ladder either by progression or retrogression, remaining in triadic form with its counterparts. This is why the resultant chord progression at the end of m. 17 (cm, A, gm, E) results. Note the nontraditional chord doublings (third of each triad doubled) that come from the two sets of thirds that the ladder produces. Also note that chord roots D-C-A-G (m. 14) produce an 0257 tetrachord as was shown earlier (also roots A-G-E-D if the first and second beats of m. 18 are considered as the return to D). See EXAMPLE 21b below.

Perhaps the best example of tritone voice leading and overlapping 016 pitch sets *en masse* is the subtle conclusion to the *Khorovod*, just before the *Infernal Dance*. For this example, the 1945 *Suite* is preferable as the voice leading is more evident (Figures [84-87]). The strings (without cellos) are divided into seven parts, marked ***p***, *sul tasto,* and *con sordino,* and the first violins play *tremolo* (but without mutes). Ultimately, at Figure [86], the first violins also play harmonics, which continue until the end of the

EXAMPLE 21b: *Introduction,* mm. 16-19, piano reduction. Tritone voice leading, exchanges, and sets 016.



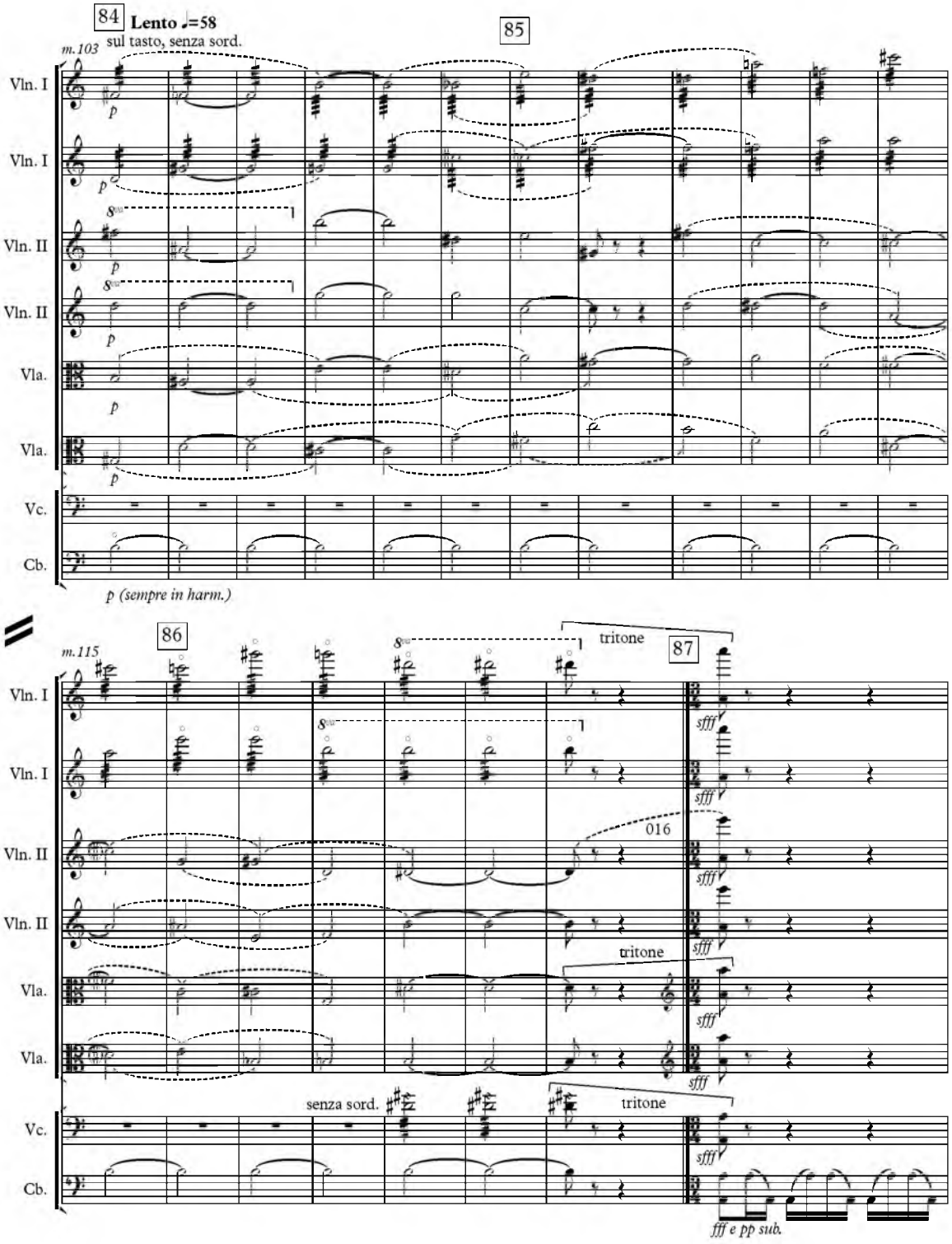
section. The orchestrational effect acts as backdrop to short solos in the oboe, clarinet, horn, and flute (not present in the example). See EXAMPLE 22 on the next page.

In this excerpt, pitch set 016 abounds in all parts, which are marked with dashed slurs. Stravinsky was not content to only move continuously up the thirds ladder in this case either, however, and there are subtle deviations in the interval skips used. Observe how from [84-85], the upper staff of the second violins has alternating linear minor sixths and semitones, and the lower second violins have descending perfect fifths. These last two intervals are also related to the Firebird pitch set 0126 as interval classes 4 and 5.

Another compelling factor in the area of hearing tritone skips is how Stravinsky retains this idea from large section to large section in the work. At the end of the *Khorovod* in the last examples, the violins play as their last note a high $D^{\#}$ harmonic, the third in the chord of B major, which ends the section.[49] The cellos, which have been silent thus far in this section, join the violins (see EXAMPLE 22) on the $D^{\#}$ harmonic for the last three measures, sounding an octave lower than the violins. This doubling reinforces the sound of the harmonic and with its extreme register also helps it establish its prominence as the most important sounding pitch, being the highest one sounding, and also being at the cadence. The next thing that is heard is startling to say the least. The full wind (except bassoons), string, and percussion sections (complete with harp and piano) enter with a striking, *fortissimo,* open fifth A-E, with the A spanning seven octaves. This is significant because the uppermost pitch of the previous section, $D^{\#}$ (played in the violin tremolos) forms a tritone in the same octave with the uppermost high piccolo pitch A

[49] Though the conclusion of this section implies B major because of the third B-$D^{\#}$ produced by the strings, there is no fifth to complete the triad. Unexpectedly, the $F^{\#}$, which was the most important pitch in the outer voices that began the *Khorovod* movement (in B major), is conspicuously missing. See Figure [75].

EXAMPLE 22: *Firebird,* 1945 *Suite, Khorovod,* mm. 103-121 (Figures [84-87]). Pitch sets 016 and tritone voice leading shown by dashed slurs. Voices that do not follow tritone voice leading move in perfect fourths/fifths, semitones, or major thirds, all related interval classes of the Firebird pitch set 0126. Wind solos are omitted.



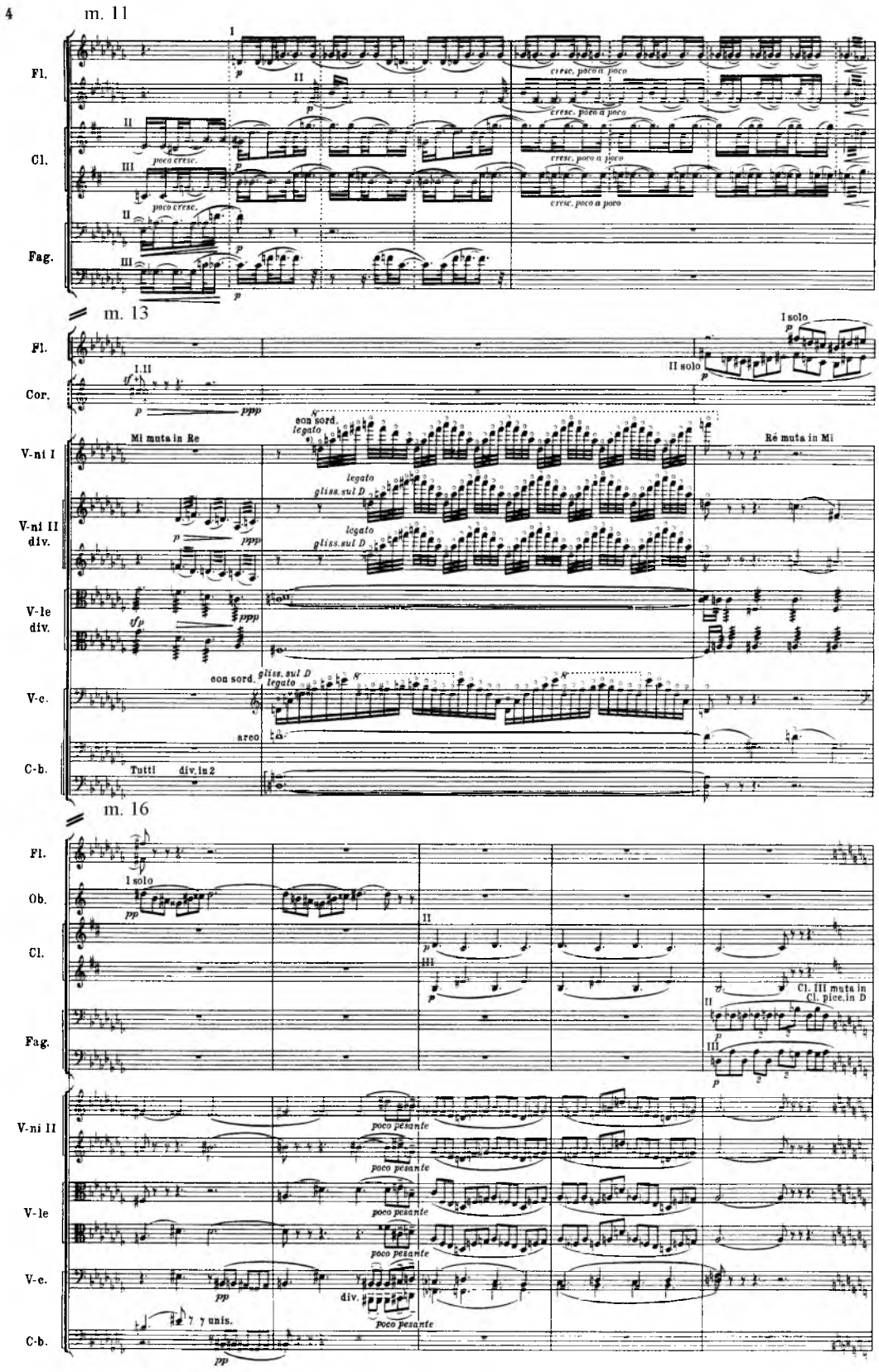
of the ensuing section. Furthermore, if the pitch E is included in the analysis, another pitch set 016 is formed.

Disguising and Varying the Use of the Ladder

Taruskin discusses a number of ways in which Stravinsky uses the ladder in simple steps, either in forward or backward motion, or even in conjunction with other thirds, but he does not attempt to explain some of the less straightforward ways he uses ladder of thirds progressions. One of these excerpts is the same passage of the *Introduction* mentioned in EXAMPLES 20a-b and 21a, where the apparition of the "*Petrushka* chord" at the end of m. 12 brings about an orchestrational and formal change. See EXAMPLE 20b on the next page. The incessant dotted rhythms give way to *tremolos,* and the advent of the stopped, solo French horn, in unison with the violas[50] at m. 13, marks an imminent paradigm shift. Up until this point the ladder of thirds has progressed through practically all 24 thirds in the sequence. With only 2 steps left to complete the full cycle, the pattern turns completely around. The ladder of thirds for the next six measures now moves in retrogression until it returns back to its point of origin. Beginning at m. 13, the muted violins and violas commence their retreat with steps 20 and 9 of the ladder respectively, now only 11 steps apart, a combination which produces alternating minor and major triads. The violas are given the upper notes only, which form unisons with the lower notes of the thirds in the second violins. At m. 14, when the D dominant seventh spoken of previously is stated in the orchestra, the lower notes from ladder thirds omitted previously return, yielding the D that is the much needed root of the

[50] These are two of the most penetrating *timbres* in the orchestra. Also, at the downbeat of m. 13, they are the only two instrument groups sounding, calling attention to a great textural and orchestrational change.

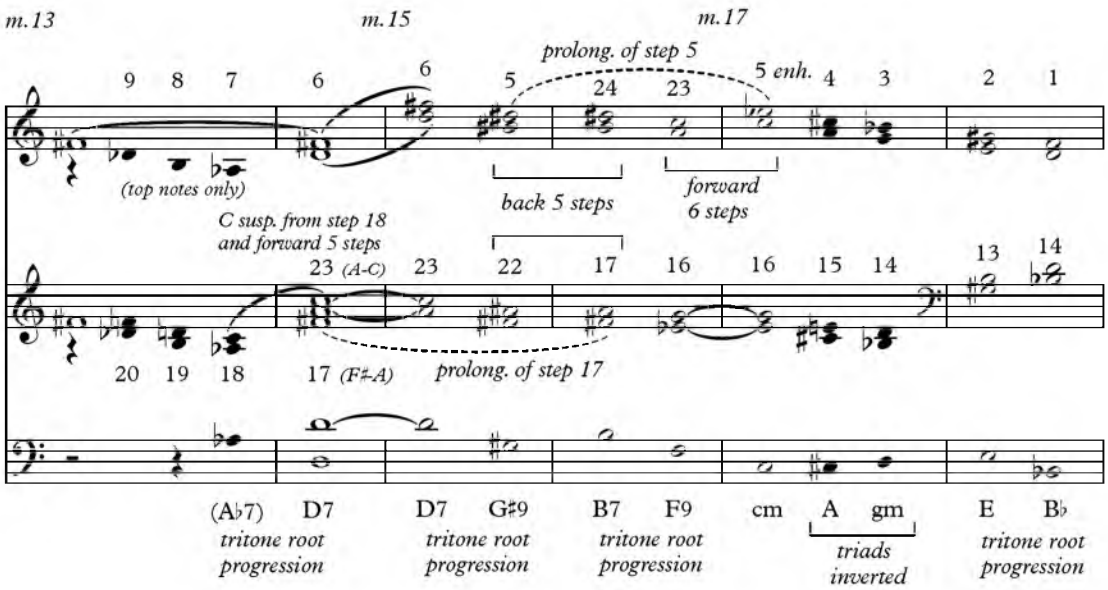
EXAMPLE 20b (reprinted): *Introduction*, mm. 11-18 (Dover edition score, p. 4).



dominant seventh chord and part of the tritone root progression from A^{b}. At that moment, the ladder of thirds is on its steps 17 and 6. The following example reduces what happens from mm. 14-18, which is the complete return to steps 1 and 13, where the sequence began at the opening *ostinato*. This section is a bit complex, as Stravinsky does not regress in the same, strict way he did in the section with dotted rhythms that precedes it. One theory, in reduction form, of how this retrogression may work is set forth in EXAMPLE 20c (below).

First, the C-natural in m. 13, last beat (see also EXAMPLE 20b, violins and violas), originates as a member of the thirds A^{b}-C (step 18) of the ladder. With the $F^{\#}$ whole note in the horn, it equates to the enharmonic tritone of an implied A^{b} dominant seventh chord (incomplete) on beat 4 of m. 13. In measure 14, the C and $F^{\#}$, both suspended over the barline, remain as part of a tritone root progression to a complete

EXAMPLE 20c: *Introduction,* mm. 13-18, reduction.



D dominant seventh chord with pitches from steps 6 and 17 of the ladder (D-$F^{\#}$ and $F^{\#}$-A). See EXAMPLE 20c, m. 14. The suspended C, not being part of either steps 6 or 17 in m. 14, forms step 23 with the top third of step 17 (pitch A). This may be seen as producing a chromatic shift (lower note of the third) as step 18 from m. 13 (A^{b}-C, a *major* third) progresses not only to 17 ($F^{\#}$-A), but also to step 23 (A-C, now a *minor* third). As both of these ladder steps are 5 steps away, one would expect the semitone change (as explained earlier in the dissertation in EXAMPLE 9c). This permits Stravinsky to diverge slightly from the systematic way he has regressed through the steps of the ladder. Instead of immediately progressing steps 6 and 17 (11 steps apart) to 5 and 16 from the ladder, he uses the newly-formed step 23 to form a temporary alliance with step 6 (only 7 steps apart).[51] These two then step to thirds 5 and 22 on the ladder in m. 15, and harmonic familiarity is preserved by the bass motion back a tritone, now forming a $G^{\#}$ dominant major ninth chord, the enharmonic equivalent of the previous $A^{b}7$. Now Stravinsky moves both ladder thirds 5 and 22 back 5 steps, creating a second chromatic shift in each of their thirds, thus changing them to thirds 24 and 17, step 17 being where the ladder thirds of the middle staff were just a few progressions before. The thirds continue on to steps 23 and 16, landing the ladder thirds of the middle staff back on their previous track, and in the next measure, the ladder thirds of the upper staff move forward 6 steps from 23 to step 5, where they had been just a few progressions previously as well (m. 15). With the ladder thirds back to where they had been at steps 5 and 16 (11 steps

[51] Ladder thirds 7 steps apart form alternating dominant seventh chords and half-diminished chords. If the bass note moves by tritone between the two chords, the half-diminished chords become dominant major ninth chords, which is what happens in this section.

apart), they form a C minor chord (or enharmonic $B^{\#}$ minor as Stravinsky notated it)[52] and are ready to begin their triadic descent back to not only the beginning of the ladder steps, but also to the recapitulation of the opening *ostinato,* at steps 2 and 1 alternating with 13 and 14 in m. 18.

A question arises. How is it that Stravinsky is able to diverge from the ladder and not get off track harmonically? This progression is a testament to Stravinsky's compositional craft in its variety of harmonic devices. One reason is through the use of common tones, which help to smooth over any harmonic bumps in his more and more common tritone root progressions. The melodic figure in m. 16 may be seen also as a simple transposition of the material in m. 15, a minor third lower. Common tones $D^{\#}$ and $F^{\#}$ help bring this about as the root shifts from a $G^{\#}$ dominant ninth to a B dominant seventh. See EXAMPLE 20d below. Dashed slurs in EXAMPLE 20c show how pitches $F^{\#}$ and $D^{\#}$ (at times spelled as Eb in the example) are prolonged through the passage, even at times present in another voice (see the downbeat of m. 15 where the $F^{\#}5$ is in the top staff, and then moves to $F^{\#}4$ in the middle staff, or how the $D^{\#}5$ of the downbeat of m. 16 in the top staff moves to the middle staff (spelled as $E^{b}4$) as part of the third of step 16). The conclusion of the passage following the return of the retrogression of ladder thirds, from the last three eighth notes of m. 17 to the downbeat of m. 18, is a very straightforward progression from steps 5 to 2 (upper voice) and 16 to 13 (lower voice), occurring at an eighth-note pace. See EXAMPLE 20d below.

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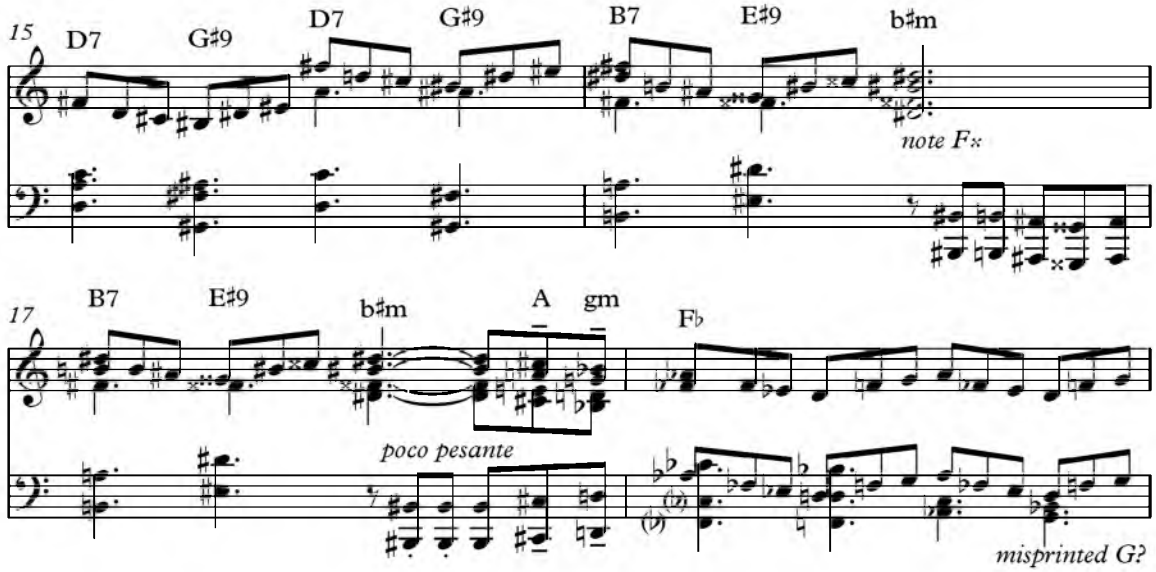
[52] The 1945 *Suite* has multiple enharmonic note-spelling changes that may have been made to facilitate easier sight reading and performance. In the 1910 version, Stravinsky exhibits a strong preference for sharps and a frequent use of double-sharps. The passage in m. 15 was respelled with flats and naturals instead of sharps and double-sharps.

EXAMPLE 20d: *Introduction*, mm. 15-18, piano reduction.

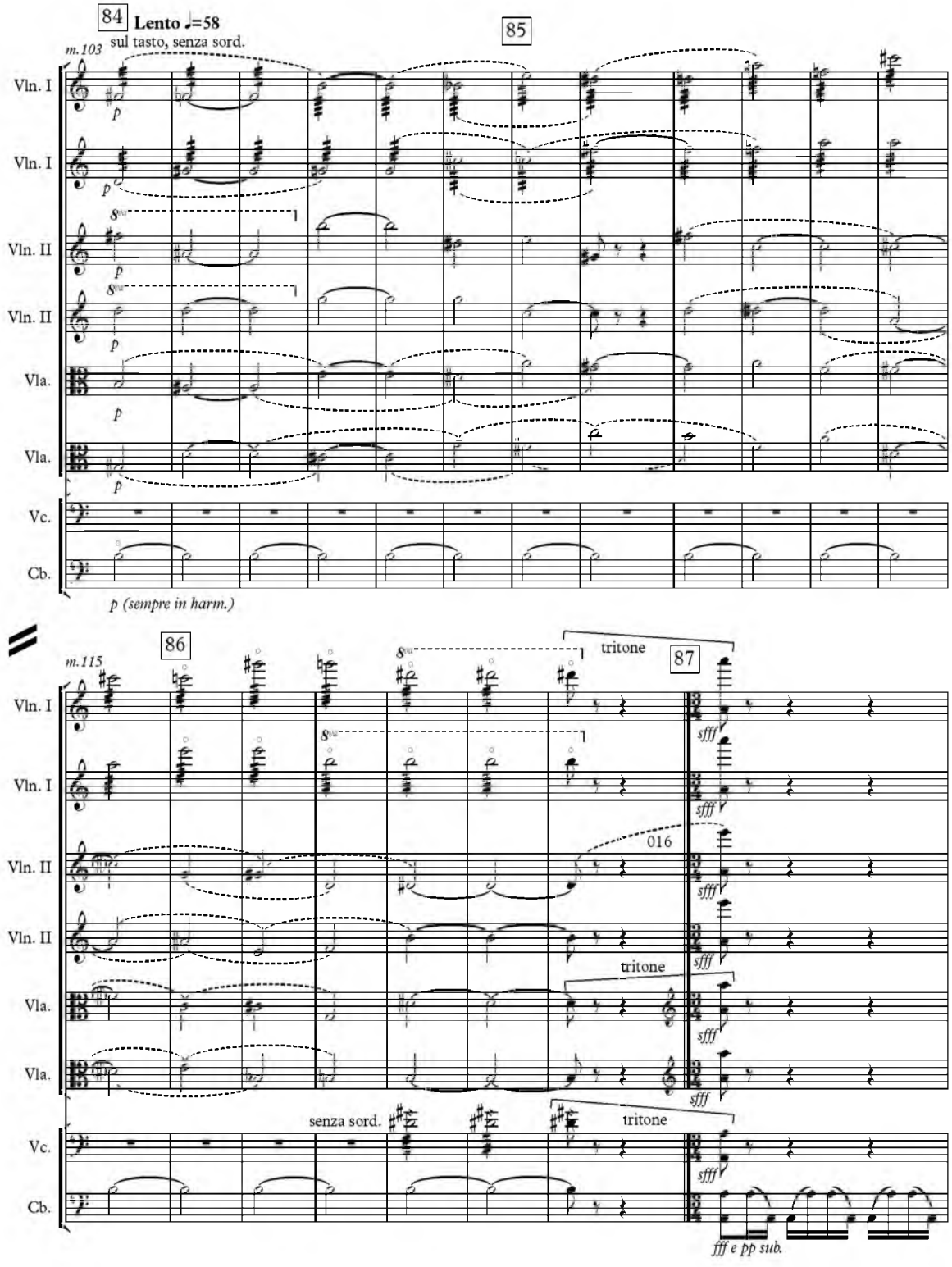


A second passage where Stravinsky manipulates ladder thirds in more complex ways is that at the conclusion of the *Khorovod,* previously mentioned in EXAMPLE 22 on the next page. The chords produced by this same passage are alternating half-diminished chords and dominant seventh chords, whose chord roots move alternately by whole step or by minor third.[53]

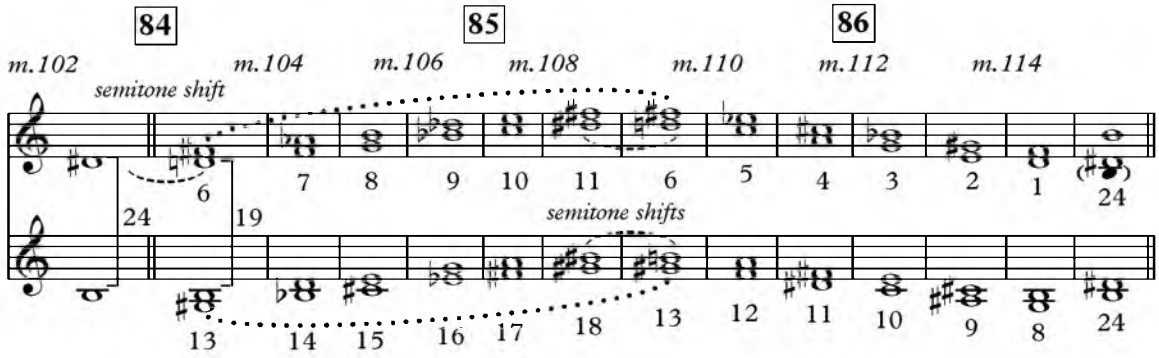
A closer look into the piano reduction offered below (see EXAMPLE 23a below) reveals that thirds from the ladder explain this progression. The pitches of step 24 (B-D#) are prolonged over 12 measures as ladder thirds ascend an octave and then descend through different steps on the ladder to their point of origin. It is helpful to omit two of the violin parts for the time being for the sake of clarity (they will be explained later).

[53] This results from the overlapping 0257 pitch sets formed by the lower notes of the ladder of thirds.

EXAMPLE 22 (reprinted): *Firebird,* 1945 *Suite, Khorovod,* mm. 103-121 (Figures [84-87]). Pitch sets 016 and tritone voice leading shown by dashed slurs. Voices that do not follow tritone voice leading move in perfect fourths/fifths, semitones, or major thirds, all related interval classes of the Firebird pitch set 0126. Wind solos are omitted.



EXAMPLE 23a: *Firebird,* 1945 *Suite, Khorovod,* mm. 102-121 (Figures [84-87]) 2-staff reduction (some violin parts omitted). Dashed slurs and brackets show semitone shifts in the ladder thirds. Dotted slurs show long-range third relationships.



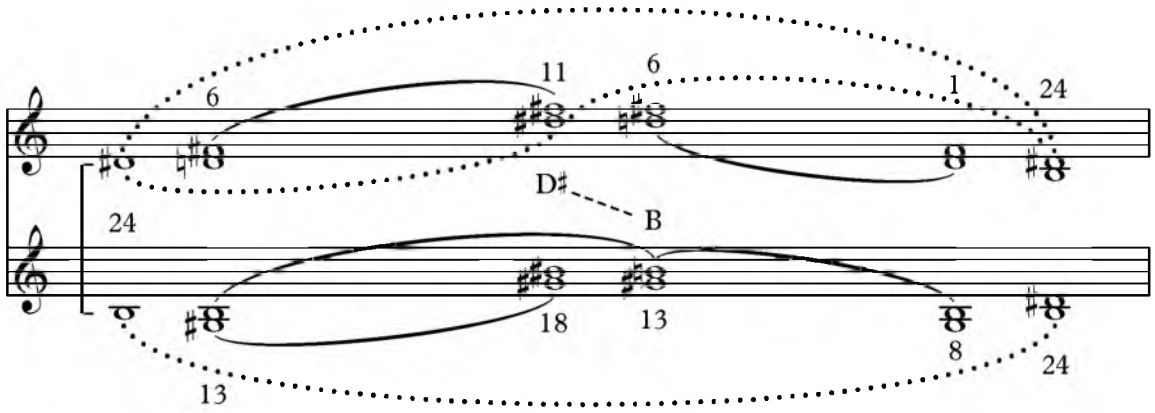
At m. 102, the *Khorovod,* a movement that essentially feels in B major, concludes its middle section in E major (key signature not shown in this example) on a B major chord, which becomes the tonic for the concluding section of the movement. Ladder third number 24 (B-D$^{\#}$) is naturally present in the upper strings. Stravinsky then abandons the E major key signature[54] for one with no sharps or flats, and a semitone shift results from regressing 5 steps on the ladder. The D$^{\#}$ of step 24, becomes a D-natural and forms third step 19 from the ladder with the B from the first viola part (see Figure [84] in EXAMPLE 23a). In this same measure, third 19 splits, giving impetus for each member of that third (B-D) to become independent and form other thirds from the ladder which can be then used in combination with each other. The upper member of the step 19 third, D, combines with F$^{\#}$ to form step 6 (D-F$^{\#}$), while the lower member of the step 19 third, B, combines with G$^{\#}$ to form step 13 (G$^{\#}$-B). These two thirds, 6 and 13, begin to progress upward through the cycle of the ladder, 7 ladder steps apart, producing half-diminished and

[54] This is most likely because this section is exclusively based on the chromatic harmonies of the ladder thirds.

dominant seventh harmonies. These harmonies are also characteristic of the leitmotif of the Princesses (more about this in the section on Princesses later). Over the next five measures, ladder thirds 6 and 13 begin to progress forward through the cycle normally, until they reach numbers 11 and 18. At this point, one of each of their third members is shifted a semitone down, bringing them both back to their points of origin at steps 6 and 13, 5 steps on the ladder away (see EXAMPLE 23a, mm. 108-109). The ladder thirds at this point now *retrogress* through the cycle until the upper staff thirds return to number 24, B-D$^{\#}$, where they had begun at m. 102 before the semitone shift. At m. 115, the lower set of ladder thirds join the upper ones, though step 24 is out of their sequence.

Two questions arise: Why did the ladder third pairs need to have a semitone shift after reaching numbers 11 and 18 on the ladder? Why did they retrogress? The answers are relatively simple. If ladder third 18 had progressed one step further, it would have become ladder step 19, whose pitches are B-D. Since these are the pitches from whence the progression had originated, this step would have been redundant. Most likely the musical reason for the chromatic shift is because it makes for a longer harmonic progression of ladder thirds in forward and reverse motion, ensuring that the "tonic" third, in this case step 24 (B-D$^{\#}$), is not reached until the conclusion of the movement. Furthermore, and perhaps most importantly, there are long-range pitch relationships and symmetry, which inform Stravinsky's decision to reverse the progression of the ladder thirds after their ascent. In EXAMPLE 23b (above), pitch relationships and prolongations are apparent. It is important to note how pitches from step 24 (B-D$^{\#}$) each ascend an octave, though they commonly alternate whether they are the upper or lower third member of each ladder third as they become octave displaced. The "tonic" third,

EXAMPLE 23b: Long-range pitch relationships and prolongations from EXAMPLE 23a reduction. Note octave transpositions of pitches $D^{\#}$ and B, as well as D and $F^{\#}$.

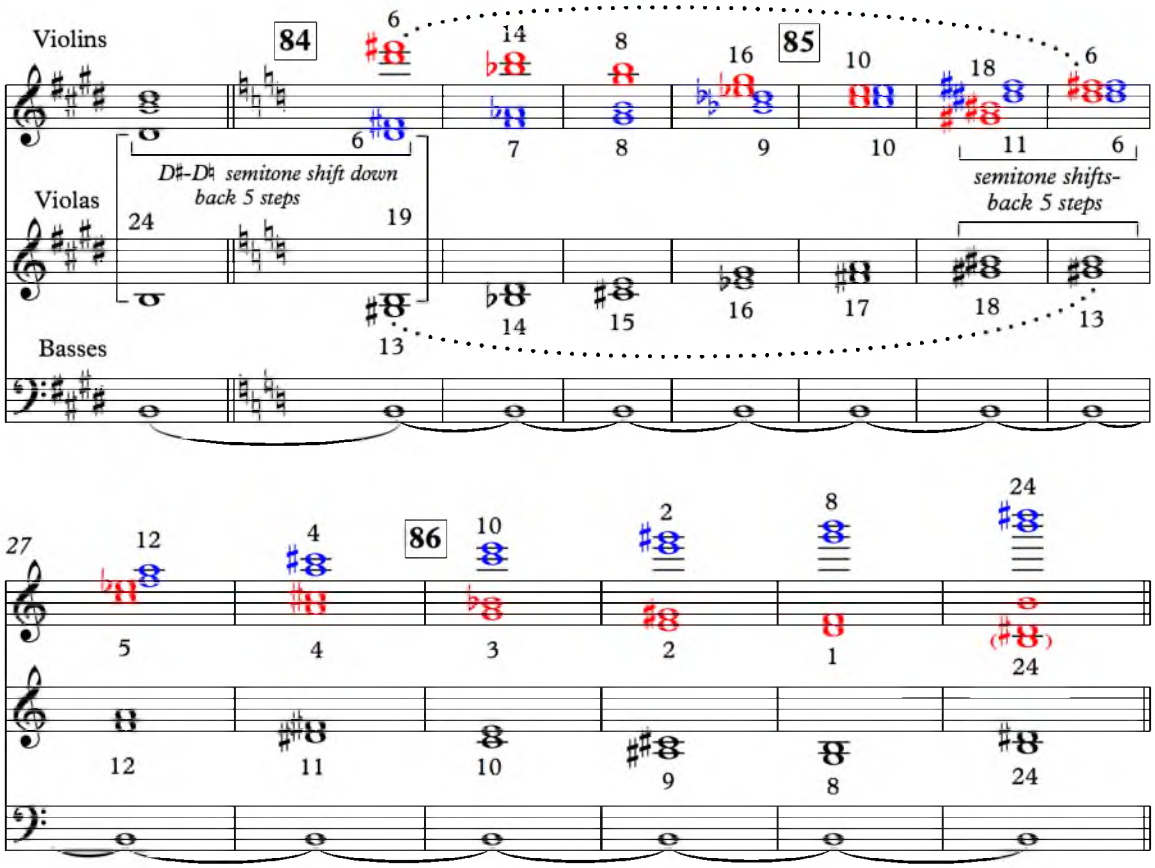


step 24 (B-$D^{\#}$) is indicative of B major, the principal key of the opening of the *Khorovod*, though in this concluding section there is no functional tonal or triadic harmony. Registrally, these two pitches are placed nearest to middle C (see beginning of EXAMPLE 23b). The B (lower staff) ascends an octave and appears chromatically changed to $B^{\#}$, which is then immediately altered at the semitone shift (to step 13) to B-natural. It then descends back to its original octave position as part of step 8 (upper member, B). It then joins step 24 (lower member) as it is a common tone to both. Similarly, the $D^{\#}$(upper staff) also ascends an octave through ladder thirds, reaching step 11 (as the lower member of the third). The chromatic shift to D-natural allows the resultant third to retrogress normally through ladder steps until it reaches the $D^{\#}$ (upper member of the "tonic" third, step 24) at the conclusion of the movement. Identical motions can be seen in pitches $F^{\#}$ and D in the upper staff of the example, and $G^{\#}$ in the lower staff of the example. Overall, the passage may be seen as essentially a horizontally-symmetrical progression of thirds bookended by "tonic" thirds (step 24, B-$D^{\#}$). The two

members of the "tonic" third (B-D$^{\#}$) make appearances in the middle of the progression (where it turns around, see middle of EXAMPLE 23b), though they do not occur sounding together. The D$^{\#}$ occurs in step 11 of the upper staff thirds, while the B occurs in step 13, a measure later, in the lower staff thirds. Also numerically significant is that there are 12 progressions between the two bookends of "tonic" thirds, 6 steps forward and 6 steps backward, making a sum of 12, exactly half of the amount of the 24 total thirds in the ladder. Lastly, each of the ladder steps containing prolonged pitches in EXAMPLE 23b is 5 steps apart from each other, the upper staff thirds being steps 6 - 11 - 6 - 1 and the lower staff thirds being 13 - 18 - 13 - 8. All of these ladder step numbers are 5 steps apart.

A closer look at the omitted violin parts from this same passage (see EXAMPLE 22 on page 49 above) reveals even more registral-symmetrical relationships. EXAMPLE 23c (below) shows the complete array of thirds with all of the pitches present in both violin parts. The second violin ladder thirds are shown in red, and the first violin ladder thirds in blue. The thirds of the violas are shown in black, as well as the bass B pedal that is constant throughout the passage. Once again, an axis of symmetry is used, in typical Stravinskian fashion. This time it is a vertical one, in conjunction with the horizontal one just described, in which the first and second violin pitches exchange extreme registers.

EXAMPLE 23c: *Firebird,* 1945 *Suite, Khorovod,* mm. 102-121 (Figures [84-87]) reduction.



Note how the first and second violins both begin on F$^{\#}$, the seconds being two octaves above the firsts, and both end on a D$^{\#}$, three octaves apart.[55] What is happening here is actually quite simple, though it may appear complex at first glance. At Figure [84], the viola and first violin (blue) thirds ascend in ladder sequence, as mentioned previously. The second violin (red) thirds begin two octaves above the first violin ones, and descend, alternately doubling either the first violin (blue) or viola (black) ladder thirds. This causes a new intervallic pattern for the highest sounding thirds, that of *all*

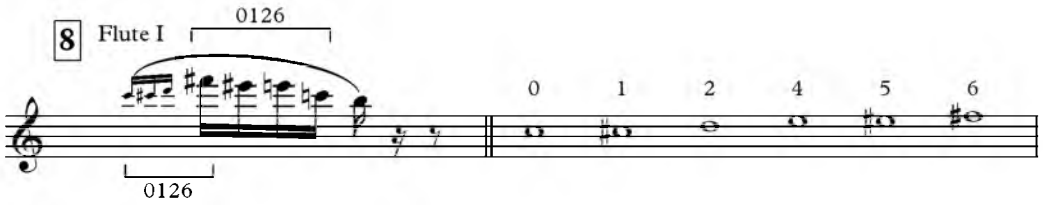
[55] The extreme registral difference is made possible by the use of artificial harmonics in the first violins, which Stravinsky was expert at conceiving and notating.

major thirds which descend in intervals of alternating major and minor thirds. This continues for six measures. When both violin sections reach ladder third 6 in unison at the semitone shift (three measures after Figure [85]), they switch roles. Now the second violin (red) thirds descend with the viola ladder thirds, and the first violin (red) thirds ascend, alternately doubling the viola and second violin ladder thirds. The treatment of the higher groups of violin ladder thirds in this last case is proof that Stravinsky was a master of composition, as he was able, while using a very simple construct, the ladder of thirds, to successfully vary it in so many ways, and even disguise it to the point where it becomes difficult to recognize.

Variations of the *Leit-harmonies*

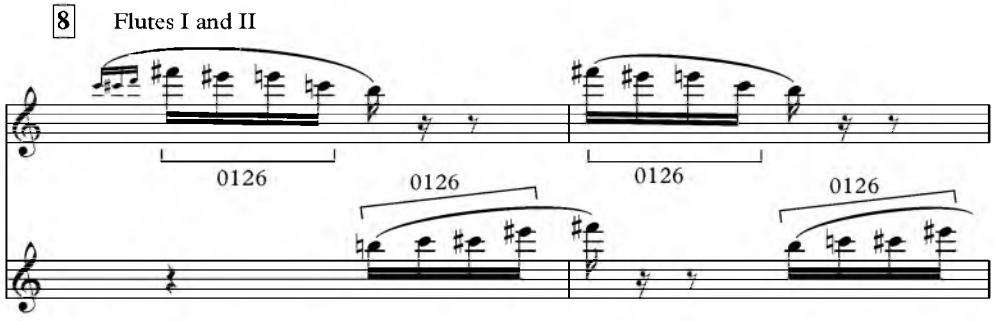
Over time, Stravinsky changed the way he used the two *leit-harmonies* of the Firebird and the Kastchei sets. Evidence of this is seen in comparing two instances of the *Appearance of the Firebird,* one from the original 1910 version and one from the 1945 *Suite* (renamed *Prelude and Dance of the Firebird).* In the 1910 version, the Firebird motif 0126 is set in alternating groups of instruments, which play the motif in alternating descending and ascending patterns, which are inverted at the tritone (I_6) or at the perfect fifth (I_7). The effect is perhaps representative of the quick fluttering of wings of the Firebird (see EXAMPLE 24a below). At Figure [8], there are two different iterations of pitch set 0126, bracketed in the example, one with the three grace notes and the high $F^{\#}$ on the downbeat, and the other beginning with the $F^{\#}$. The combination of both yields pitch set 012456, shown at the measure on the right. The extension of this musical motif down to the B5 (see slurs in the flute part) suggests the composer may be using set 01267

EXAMPLE 24a: 1910 version, *Appearance of the Firebird,* Figure [8]. Two iterations of pitch set 0126 form set 012456.

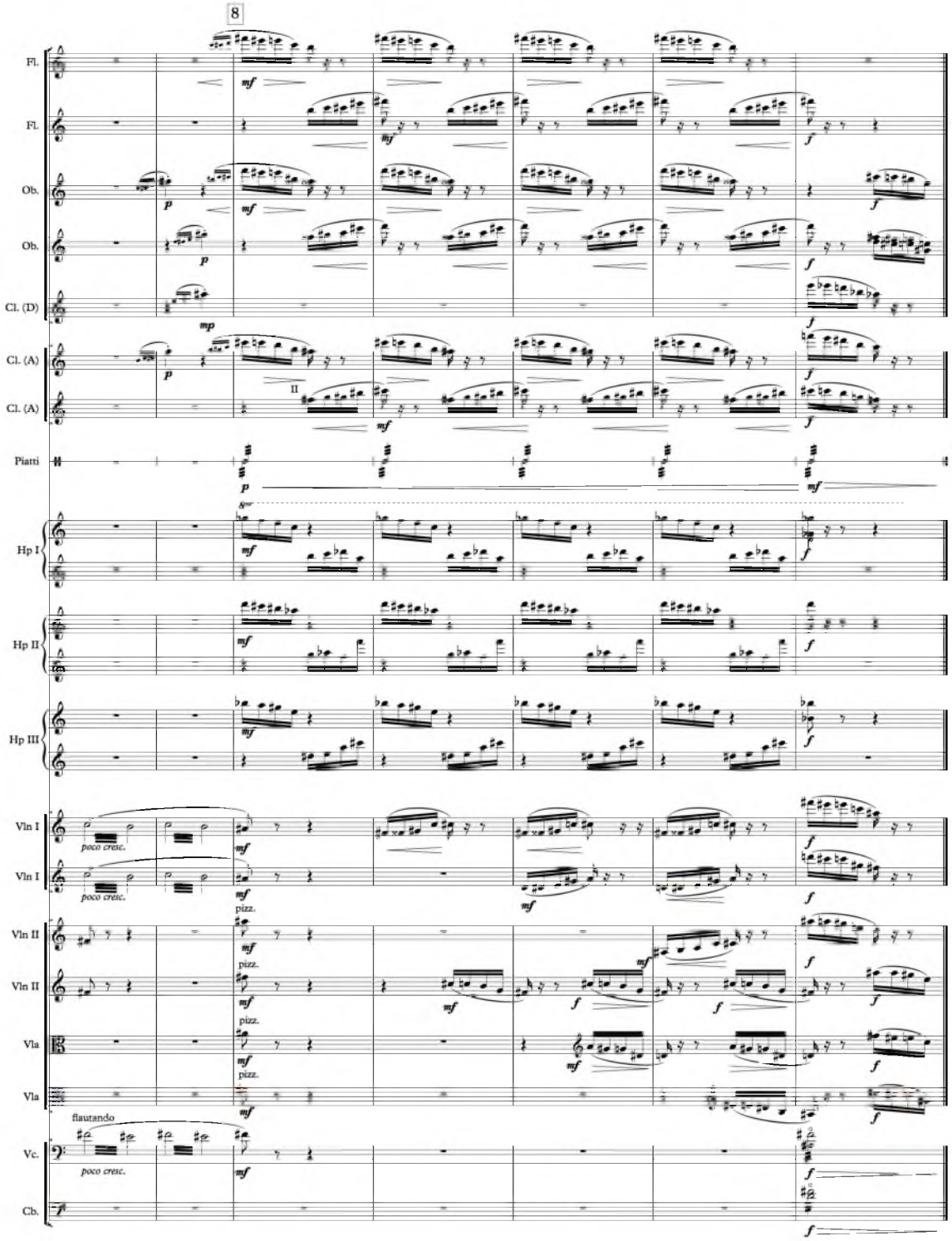


instead of solely 0126, though the grace notes help to justify thinking otherwise, as well as how the set is used in the 1945 version. This excerpt, in the majority of the other instrument parts after Figure [8], features several pitch sets 0126, "answered" by their instrument group counterparts, and always inverted at the perfect fifth (I_7). The two forms of the set are placed, so that their outer tritones are a semitone apart. Their interval content is inverted, the half-steps sometimes being at the bottom or top of the tritone. It appears that the set 01267 extensions down to a perfect fifth, mentioned previously, may also be explained as motivic elisions smoothing over the entrances and exits of each member of each instrument group. See EXAMPLE 24b below. See also EXAMPLE 25 on the next page for the original orchestration.

EXAMPLE 24b: 1910 version, *Appearance of the Firebird,* Figure [8]. Two iterations of pitch set 0126 inverted at the perfect fifth (I_7).



EXAMPLE 25: 1910 version, *Appearance of the Firebird*, Figure [8]. Sets 0126 with their inversions, whose tritones are a semitone apart, prime form and I_7.



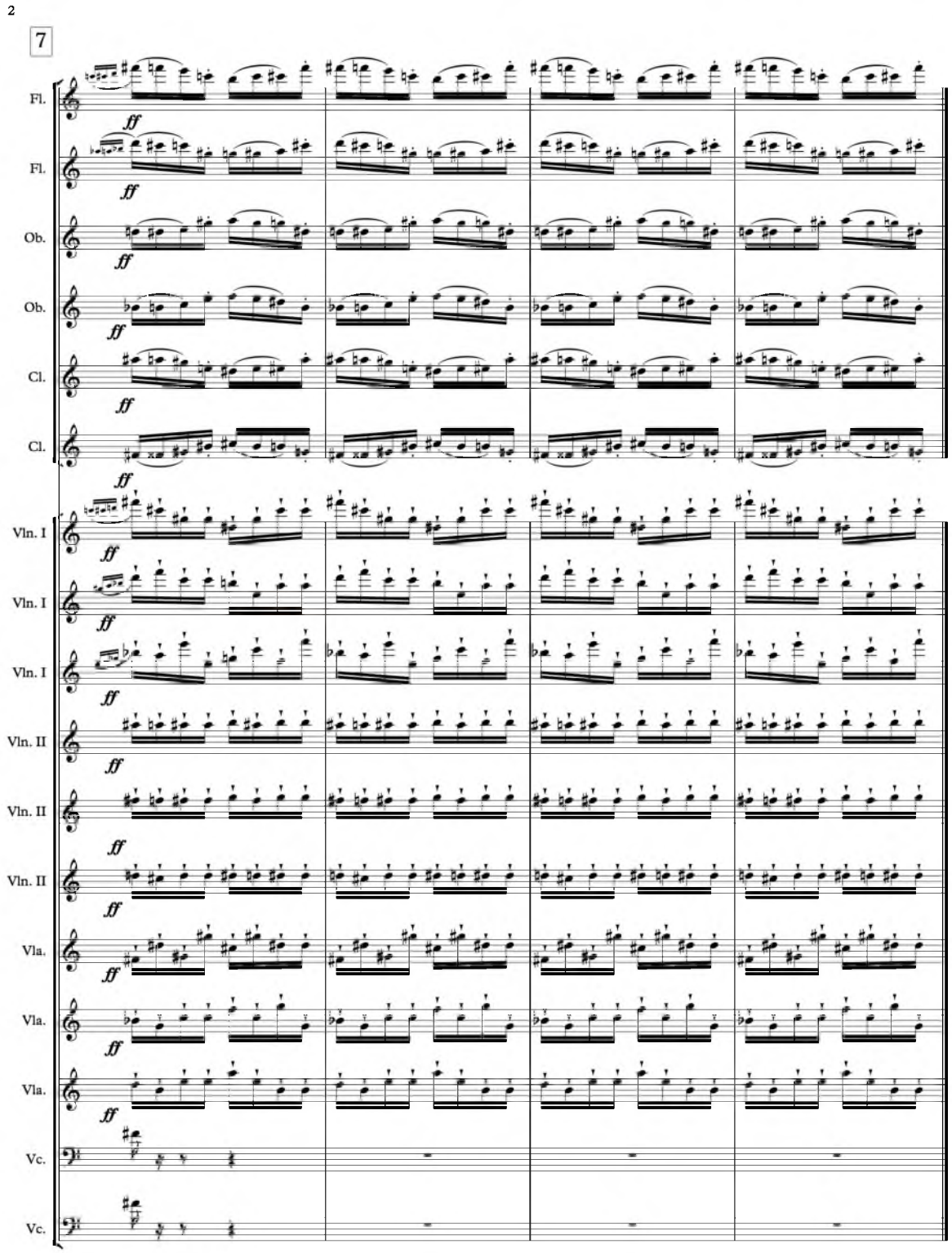
The principal harmonic element in the passage in EXAMPLE 25 (above) is augmented triads, readily visible in the score. The orchestration of the excerpt is also intriguing. Each instrumental group is divided into two, even the strings (two flutes, oboes, clarinets, two first violin parts, second violin parts, viola parts, etc.). Even the *piatti* (cymbals) are divided. The pitches from one member from each instrumental group of the winds descend while the pitches from the other member of each group ascend. Similarly, the pitches in each right-hand staff of each of the three harp parts ascend, while the pitches of each left-hand staff descend. The three upper string instruments (first violin, second violin, and viola) are also each divided into two parts and treated similarly. These also ultimately help to accomplish an orchestral *crescendo,* as their entrances are staggered. Note the uncommon orchestration for three harps, which double the pitches in the winds and strings. Even more unusual are the configurations of pitches in the harps. The descending figures double those of the other instruments, but not the ascending ones. At first glance this may seem odd, but because of the idiosyncrasies of the harp, Stravinsky was not able to always give them the complete ascending figures to match those of the other instruments. In most cases, the two semitones in a row would have been impossible to manage as the harp would have to retune "same letter" pitched strings too quickly. His solution was to redistribute the pitches between the three harps, achieving essentially the same effect.[56]

The changes Stravinsky made in this same passage in the 1945 *Suite* at Figure [7] (EXAMPLE 26a, next page) point to how much more invention and compositional skill

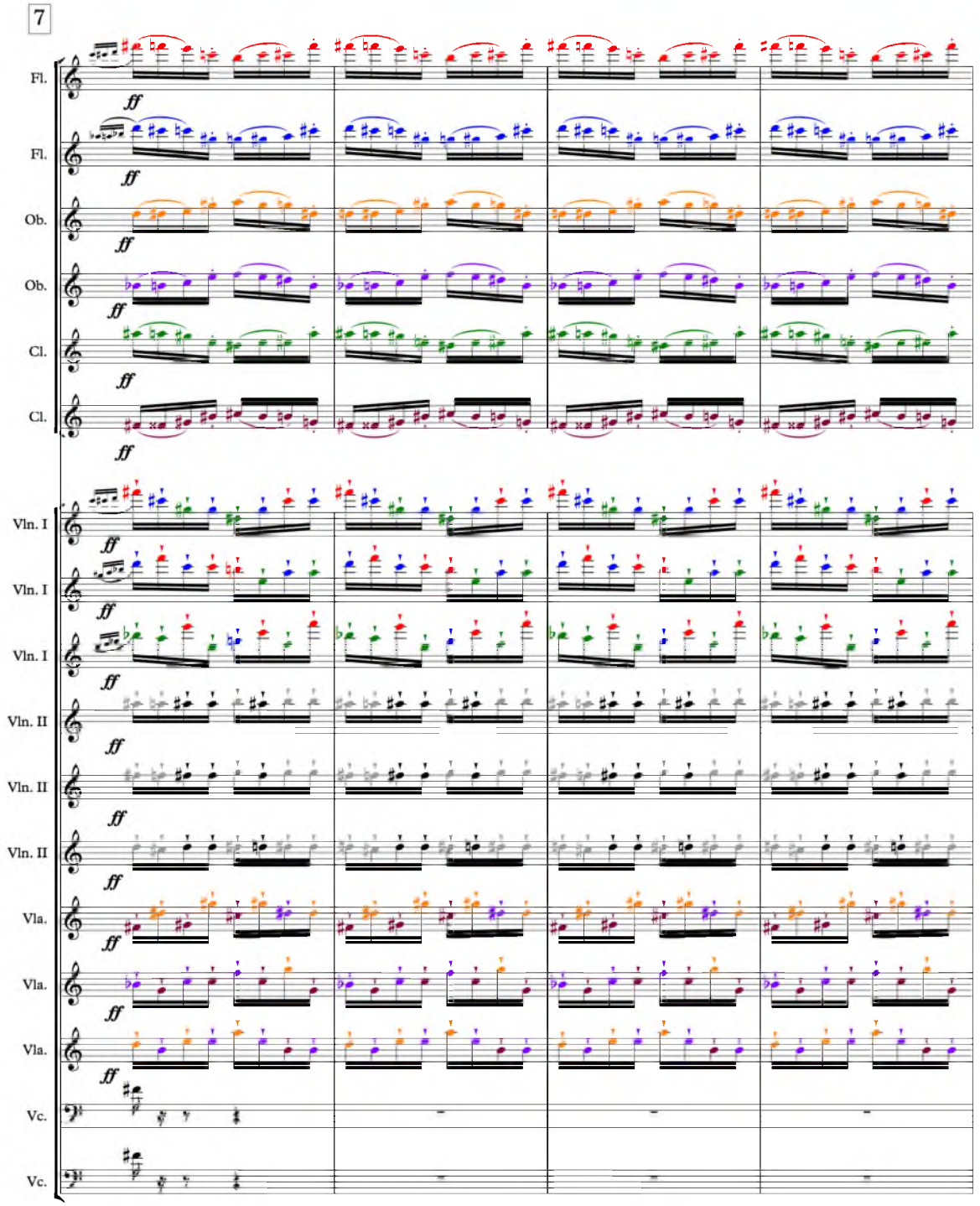
[56] Looking at the second harp part, for example, in the lower treble staff, the third sixteenth note should be an A-natural if it is to form the pitch series G-Ab-A-C# (0126), which would be next to impossible to perform if the harp is already pedaled for A^{b} in the top treble staff.

he developed over a period of 35 years (the amount of time in between both versions). Orchestrationally, harps and the *piatti* have been taken out. In addition, now *all* of the voices are sounding instead of only half at a time, the dynamic is *fortissimo,* in contrast to the *mezzo-forte* with *crescendos* and *decrescendos,* and even the articulations have changed. With three sixteenths slurred for the winds and one tongued separately, there is also an implied dotted rhythm (dotted-eighth note, sixteenth note). The strings, instead of slurring their sixteenth notes, now play them with separate bows. These changes give the music a more agitated mood. The most important intervallic part of the reorchestrations, however, are two-fold. First, now the winds emphasize even more the set 0126 as their parts have been changed. They now *all* alternate between two statements of 0126, inverted at the perfect fifth. Second, the strings blur the lines. It may appear that their pitches are unrelated to the sets 0126 in the winds, but they, overall as a group, are indeed sounding all of the same pitches simultaneously as the winds (with a few exceptions which shall be noted), but the pitches have been redistributed throughout the individual string parts, so that no one voice contains all four pitches of the Firebird tetrachord 0126. EXAMPLE 26b (two pages ahead) shows this is a color-coded fashion. Note how the first violins, now divided into three parts instead of two, are sounding the pitches of the flutes and first clarinet, in what may seem like an aleatoric pattern. The three viola parts sound the pitches of the two oboes and second clarinet, etc. The above passage (EXAMPLE 26b), in contrast to that of the 1910 version, has become much more harmonically complex. Not only are three woodwind voices descending and ascending now in the *same* voice (e.g., both flutes and first clarinet), producing augmented triads, but now three other instruments are sounding simultaneously in mirror motion with them

EXAMPLE 26a: 1945 *Suite*, Figure [7], sets 0126 voiced in strings as other sets across divided sections.



EXAMPLE 26b: 1945 *Suite*, Figure [7], sets 0126 voiced as other sets across instrument sections. Colored notes in the violins and violas show how Stravinsky distributed the woodwind pitches from the set 0126 into other arrays. Clarinets sound as written.

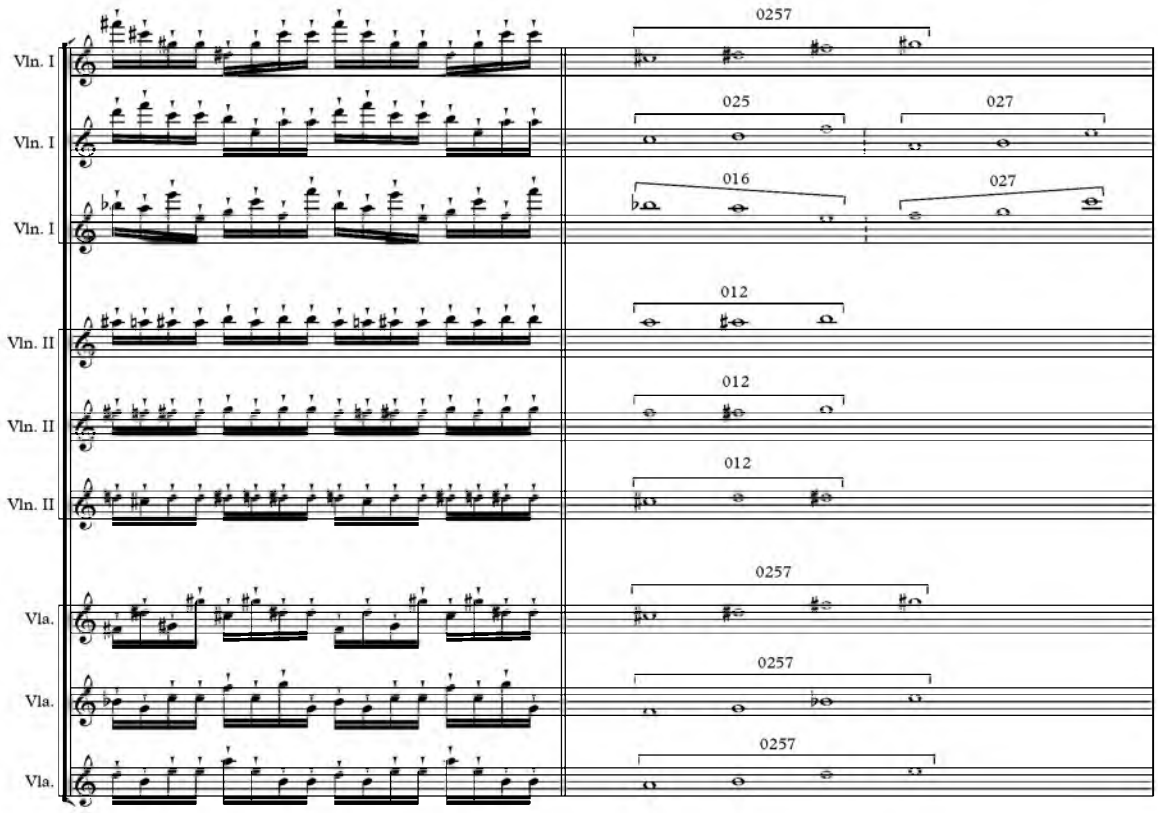


(both oboes and second clarinet), beginning on the same pitches of the augmented triads as their counterparts (B^{b}-D-$F^{\#}$), but moving in opposite directions and stating the 0126 sets inverted at the tritone.[57] The result is that B^{b} augmented triads, which suggest whole-tone sonorities (pitch sets 048), sound on every downbeat. During the other seven 16th-notes that occur after the downbeat in each measure, all six pitches of the whole-tone collection are sounding. The effect is intensely dramatic. The pitch patterns created in the divided string parts during this passage are also of consequence. The pitches in the upper first violin staff and all three of the viola parts produce individual 0257 sets, a derivation from the ladder of thirds (lower pitches only, see EXAMPLE 10 on page 20). The middle first violin staff contains two different sets, 025 and 027 in each measure, both subsets of 0257, and the lower first violin staff has both pitch set 027 (another subset of 0257) and set 016 (a subset of 0126) in each measure. All three of the divided second violin parts contain exclusively pitch sets 012 (another subset of 0126). See EXAMPLE 26c on the next page.

Lastly, from EXAMPLE 26b (color-coded example), the pitches highlighted in gray in the second violins double those sounding in other voices. The pitches left in black "help" by adding in any "missing" pitches the other parts did not sound in order to produce a complete whole-tone collection.

[57] This technique was actually conceived in Stravinsky's 1910 version (see string entrances in EXAMPLE 26a) but did not achieve its full development until the 1945 *Suite*.

EXAMPLE 26c: Pitch sets formed by strings in example 26b. Note prominent set 0257 and its subsets and pitch set 016.



ENTER THE PRINCESSES AND KASTCHEI: ANALYSIS

Background

There is a subtle difference between the language of theorists White and Pople quoted in the section of this dissertation entitled *The Russian Tradition: Human vs. Magical Elements*. Both analysts posit definite differences in the harmonic treatment of both groups of characters in the work (the supernatural and the human characters). White mentions that the music for the human characters (i.e., Ivan Tsarevich and the Princesses) is "strongly diatonic in character" and that the music for the magical characters (Firebird and Kastchei) "is conjured out of one chromatic interval, the augmented fourth."[58] Taruskin, 30 years later, has a more nuanced view. He clarifies the issue by stating that the music for the Princesses is "tinged with [Kastchei's] octatonic influence,"[59] a statement more truly descriptive than White's "strongly diatonic," or Pople's "chromatic inflections."[60] In addition, he states that the music for the Princesses does not use the same harmonic scheme as that of the "unalloyed supernatural" elements (Firebird, Kastchei), which use primarily the chromatic diminished-seventh and augmented triad harmonies. He mentions the use of the dominant seventh and half-diminished seventh as diatonic harmonies that also are "referable to a single octatonic collection."

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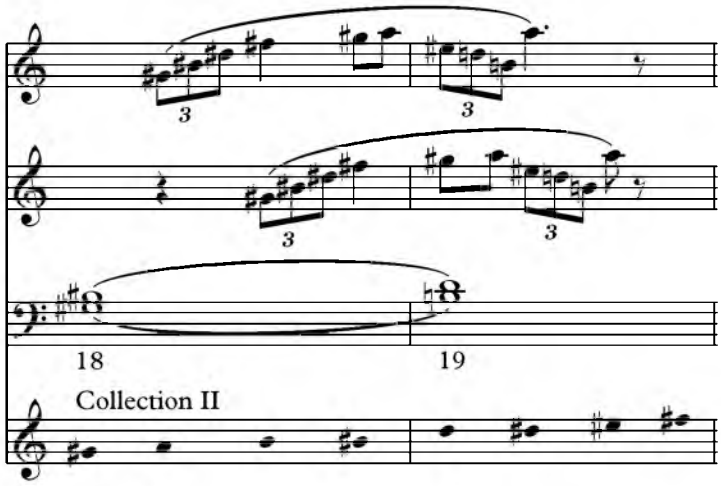
[58] White, p. 186.

[59] Taruskin, p. 602.

[60] Pople, p. 75.

EXAMPLE 29a: *The Firebird,* Figure [50] (Princesses).[61] Ladder of thirds steps shown on the third staff.



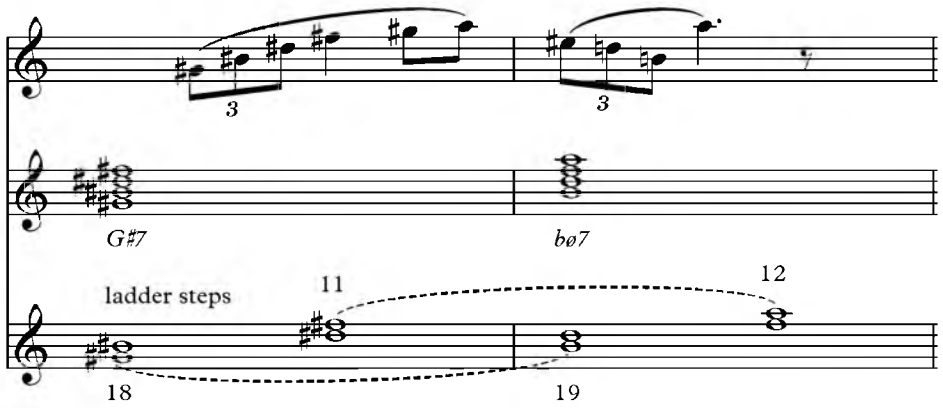
This is important because these are harmonies that are functional in both worlds. It is also fortuitous that the pitches produced in both arpeggios form a complete octatonic collection II. Lastly, the progression can be explained as based on steps 18 and 19 on the ladder of thirds. See EXAMPLE 29a above.

What is unfortunate, however, is that Taruskin has few other musical examples to show exactly what he means by the phrase "tinged with [Kastchei's] octatonic influence." He describes the Princesses' motif simply as "a chordal extension of the [Kastchei] thirds,"[62] implying that the Kastchei ladder thirds are only present in the lower two notes of the seventh chords in the Princesses motif (as shown by the third line of EXAMPLE 29a), when in reality, the $G^{\#}$ dominant seventh and the B half-diminished chords can be derived from two sets of ladder thirds, employed 7 steps apart. Note how the lower thirds

[61] Taruskin, p. 605.

[62] Ibid., p. 602.

EXAMPLE 29b: Princesses harmonies (from EXAMPLE 29a), dominant seventh and half-diminished seventh chords, shown as two statements of ladder steps, employed 7 steps apart. Lower thirds in both chords correspond to steps 18 and 19 of the ladder while upper thirds correspond to steps 11 and 12.

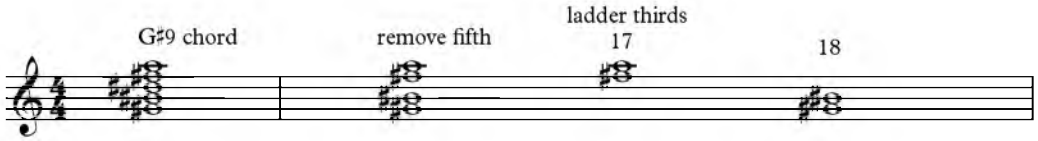


in both chords correspond to steps 18 and 19 of the ladder, while the upper thirds correspond to steps 11 and 12. See EXAMPLE 29b below.

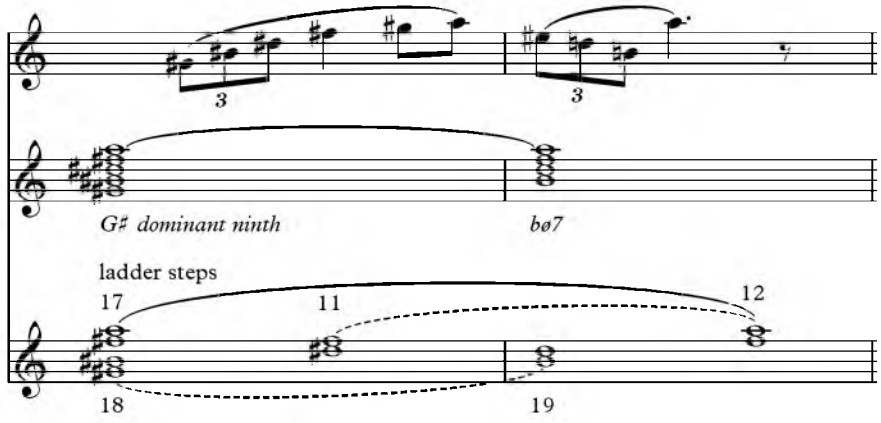
Another item of importance Taruskin fails to mention is that the dominant-seventh arpeggio extends harmonically to a dominant ninth (extending the figure up to the high A5). This dominant-ninth chord therefore contains two "Kastchei" ladder thirds, steps 17 and 18. See EXAMPLE 29c below.

Also of importance, the high A5 (highest note in the motif) may be heard as a common tone to both arpeggios. Note that when the A5 of the dominant ninth chord is added, it forms a common tone with step 12 of the half-diminished chord in the next measure. These two ladder thirds are 5 steps apart, and so have the characteristic

EXAMPLE 29c: Derivation of ladder thirds from $G^{\#}$ dominant ninth chord.



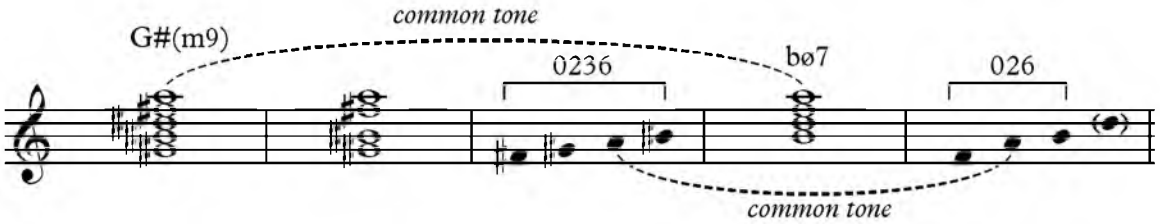
EXAMPLE 29d: Princesses ladder steps shown now with $G^{\#}$ dominant ninth, forming step 17 simultaneously with steps 18 and 11. Note common tone A5 in between steps 17 and 12 (next measure) and the resulting semitone shift between them, bringing the $F^{\#}$ down to F-natural.



semitone shift between the lower members of the two thirds ($F^{\#}$-F), similar to what was seen earlier in the paper in EXAMPLES 23a-23c. See EXAMPLE 29d above.

In addition to the above connections between the two Princesses chords (the $G^{\#}$ dominant ninth and the B half-diminished chord), both also contain pitch set 026, a subset of the Firebird motif at the opening (0126) and the Kastchei ladder thirds set 0236 (see EXAMPLE 29e below). The 026 contained in the $G^{\#}$ dominant ninth chord is spelled $F^{\#}$-$G^{\#}$-$B^{\#}$. The 026 contained in the B half-diminished chord is spelled B-A-F, an inverted 026. This is interesting because the outer tritones of both sets are a semitone apart, the B set's normal order being inverted from the F# set's. This is significant because it relates back to the technique Stravinsky used at Figure [8], at the *Appearance of the Firebird*, spoken of in EXAMPLES 25 and 26a-b and represents one of Stravinsky's most often-used compositional devices in the work—that of tritone transposition and inversion.

EXAMPLE 29e: Pitch set 0236 in the "Princesses" arpeggios

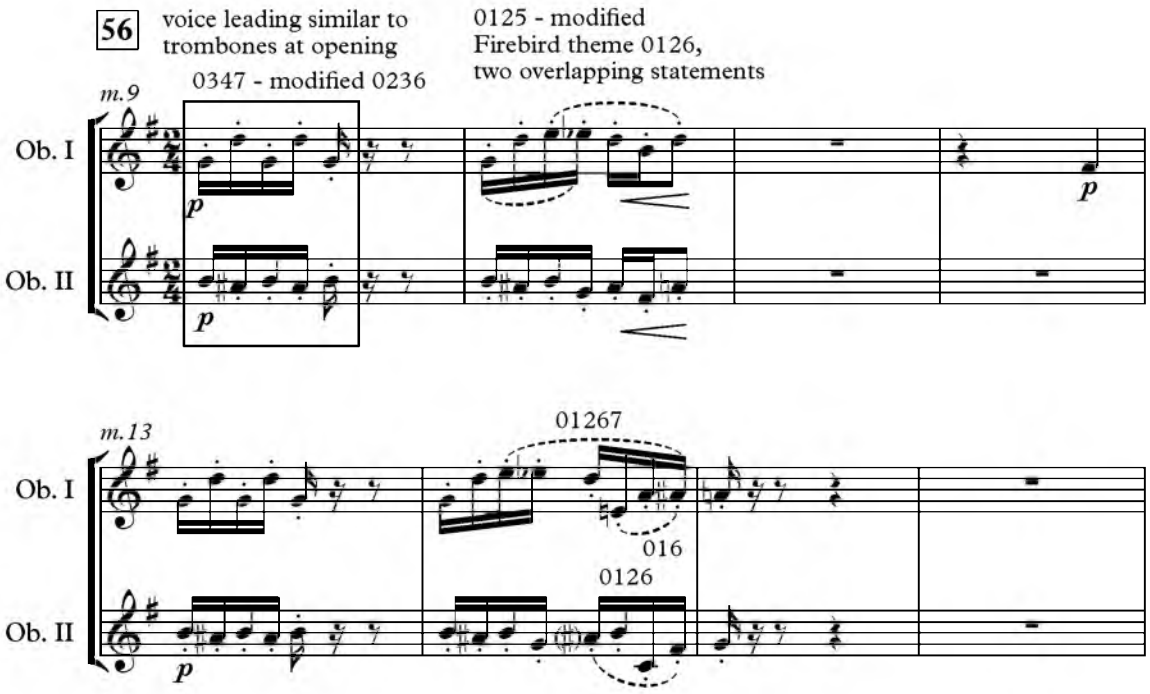


With the addition of the A as a ninth in the $G^{\#}$ dominant chord, what would have just been subset 026 becomes set 0236, which is the Kastchei *leitmotif.* The fact that the A is common to both chords gives them added harmonic unity.

Tonal Variants of the Firebird and Kastchei Motifs: Dance of the Princesses

The Firebird *leitmotif* is probably the most commonly spun thread through the tapestry of the entire *Firebird* score. It and its subsets or variants find their way into the music of other characters as well. This is something theorists have generally failed to note. In *The Princesses' Game of the Golden Apples: Scherzo*, Stravinsky frequently uses "diatonic" variants of both the Firebird and Kastchei pitch sets. In both cases, the tritone of each set is "softened" into either a perfect fourth or fifth. Though Stravinsky never commented on this particular aspect of the work, he could be using the music of the Princesses in a hybrid harmonic symbolism. Since they are innately human characters under Kastchei's magical spell, it makes perfect sense that their music should not be generated exclusively in a diatonic way. In fact, it should have elements of *both* the diatonic "human" and the chromatic "supernatural" harmonies. Taruskin states "thus the

EXAMPLE 30a: Princesses' Game of the Golden Apples: Scherzo, Oboes I and II, mm. 9-15.



musical representation of the Princesses bridges the gap between the human (diatonic) and enchanted (chromatic) worlds of the ballet.[63]

The Firebird variant 0125 (the tritone shifted a semitone down to a perfect fourth) appears first at m. 10 of *The Princesses' Game of the Golden Apples: Scherzo* in the first oboe part (see EXAMPLE 30a above).

In m. 10, two overlapping statements of 0125 occur, shown by dashed slurs. In m. 14 of the first oboe part, set 01267 appears, containing the original Firebird set 0126 and its variant 0127 (the tritone augmented a semitone to a perfect fifth) as subsets. Also present combining other pitches is prominent 0126 subset 016 as shown with pitches E-

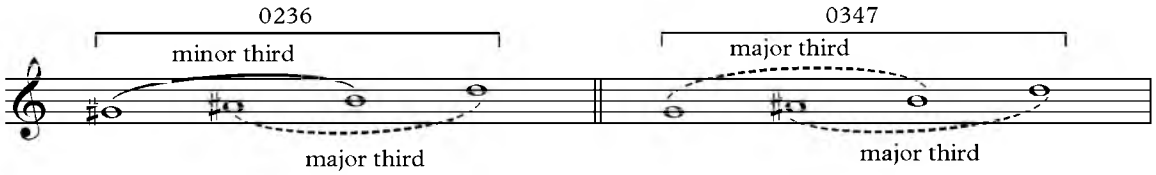
[63] Ibid., p. 602.

A-A$^{\#}$ that end the phrase. The second oboe part also contains the Firebird set 0126 with pitches F$^{\#}$-A$^{\#}$-B-C at the end of the phrase. Note the "peculiar" voice leading of the two oboes at m. 9 (see EXAMPLE 30a). The first oboe alternates back and forth between the outer notes of the set, now augmented to a perfect fifth instead of a tritone, while the second oboe plays the alternating semitones.

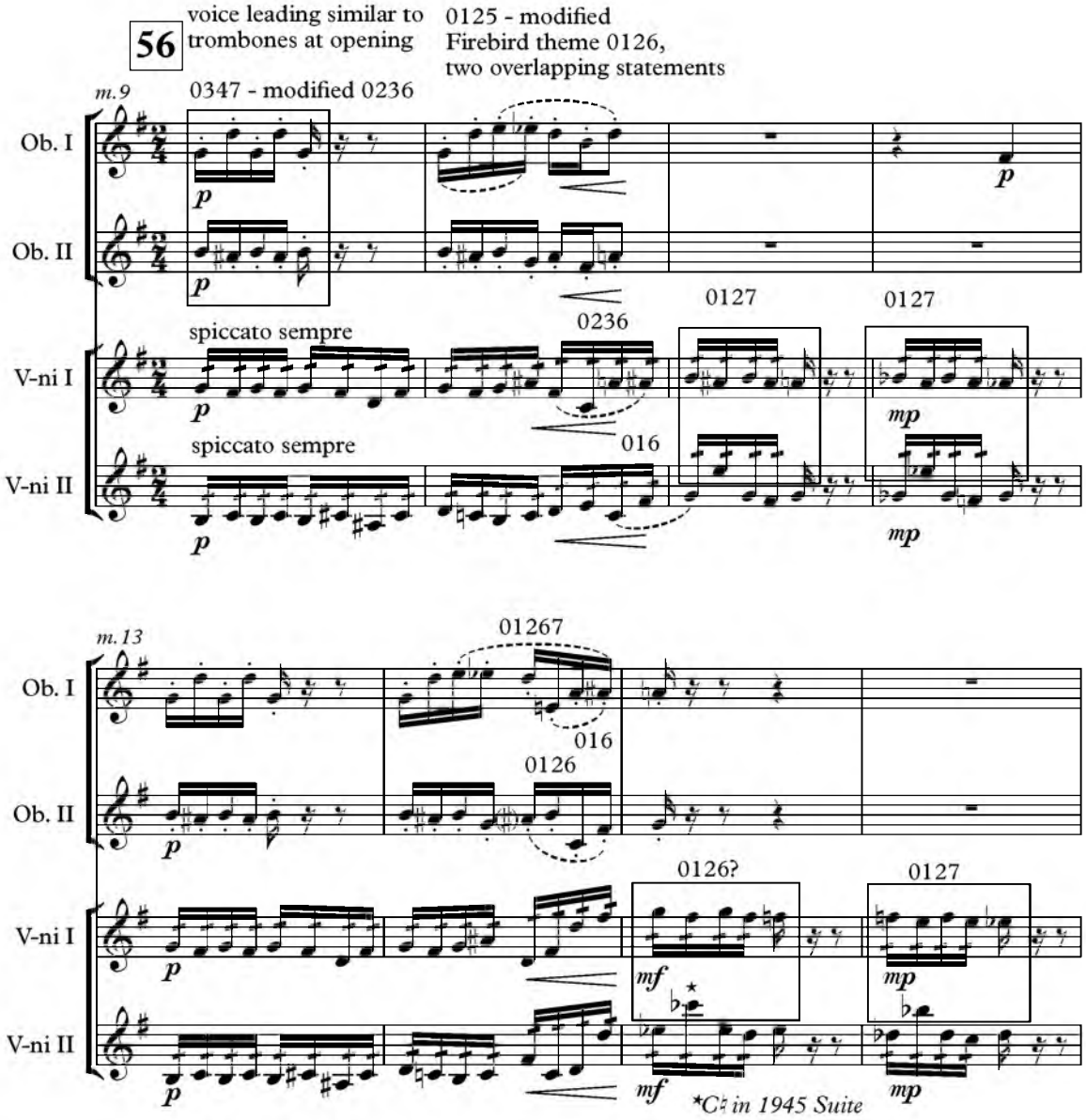
The treatment of the two oboes should resonate with theorists, as it is the same the two trombones had with the Kastchei thirds (tritone and semitones) at m. 5 of the *Introduction.* The result of this particular voice leading is a melody that combines the highest notes of both oboe parts. In m. 9 of the example above, what is heard as the melody, is B-D-B-D-B.

Of interest also is the presence of the "diatonic" variant of the Kastchei set 0236, or set 0347 at m. 9 (see EXAMPLE 30a above). EXAMPLE 30b (below) shows the derivation of this tetrachord. It is essentially the same as 0236, with the exception of the tritone being extended to a perfect fifth. In this example, the G$^{\#}$ is lowered to a G-natural, allowing it to form a perfect fifth with the D. In this way, the alternating minor *and* major thirds of the Kastchei set 0236, overlapping by semitone, become two *major* thirds, overlapping by semitone, to form pitch set 0347. In the same passage as explained above, but now in the first and second violin parts, the Firebird set's diatonic complement (0127) also comes into play. See mm. 11-12, and 16. See EXAMPLE 31a below.

EXAMPLE 30b: Derivation of Kastchei "diatonic" variant 0347 from 0236.



EXAMPLE 31a: 1910 version, *Princesses' Game of the Golden Apples: Scherzo,* oboes and violins, mm. 9-16.

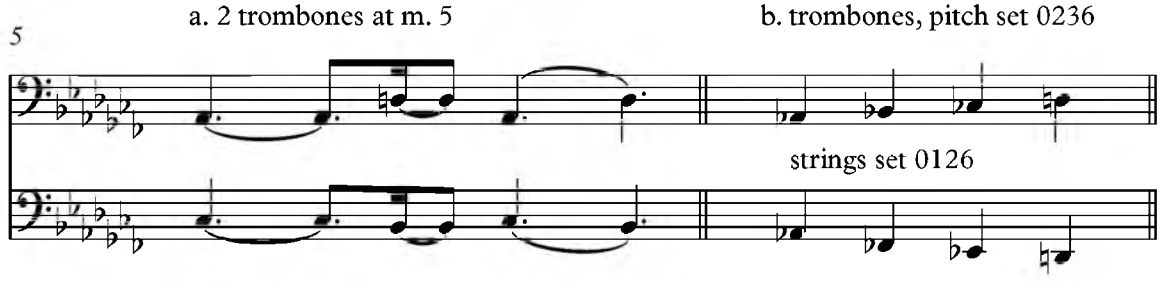


In m. 11 of EXAMPLE 31a above, first violin notes B, $A^{\#}$, and A-natural at the end of the phrase combine into a melodic pitch set with the second violin note E that pops out of its register, analogous to what was just mentioned in the two oboes. This "peculiar" way to treat the melody has been a recurring theme throughout the paper, and

whose genesis is derived from the opening trombone figure at m. 5. See EXAMPLE 17a-b below.

The spreading of set 0127 across the two violin parts in m. 11-12 (see EXAMPLE 31a) allows the subset 012 to come into the spotlight (in the first violin part), which is a prominent background and foreground feature of the *Scherzo* in general.[64] All of the pitches combined (see boxes in EXAMPLE 31a) yield set 0127, the diatonic variation of 0126. In m. 15, a curious set 0126 is formed with the C^{b} in the second violin. Though it forms Firebird set 0126, in this context, it sounds wrong for two reasons: one, because the C^{b} is the enharmonic equivalent to B, one of the primary pitches of the *Scherzo* melody and thus provides little departure from its tonic; and two, because it fails to form a tritone with the first violin pitch it is paired with ($F^{\#}$), as the other three sequential figures did. One last mention of motivic material in this section is the existence of the original Kastchei sets 0236 in the violins. In the first violin part of m. 10, beat two, there is a statement of the 0236 tetrachord, with one of the pitches (C4) displaced by an octave. In m. 11, while the violins are simultaneously stating the 0127 diatonic variant of the

EXAMPLE 17a-b (reprinted): *Introduction*, m. 5 trombones' entrance. Axis of symmetry between A^{b} and D in both motivic pitch sets formed (the trombones' Kastchei *leit-harmonie* and the strings' opening four notes of the *ostinato)*.



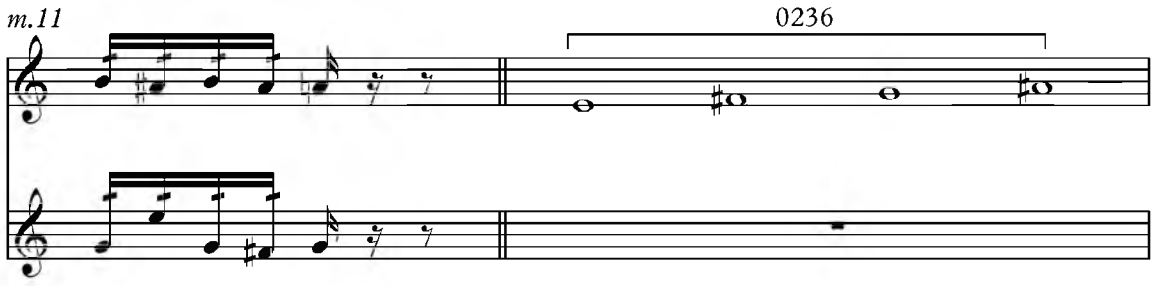
[64] The flute, bassoon, and harp parts in this section are largely made up of the subset 012 or even 0123.

Firebird 0126 set, interestingly enough, 0236 can still be found in the background. See EXAMPLE 31b below. Taking a collection of all the pitches sounding in the first four sixteenths in m. 11, all of them form set 0236 with the exception of the B. Similarly, this also occurs with the violin pitches in mm. 12 and 16.

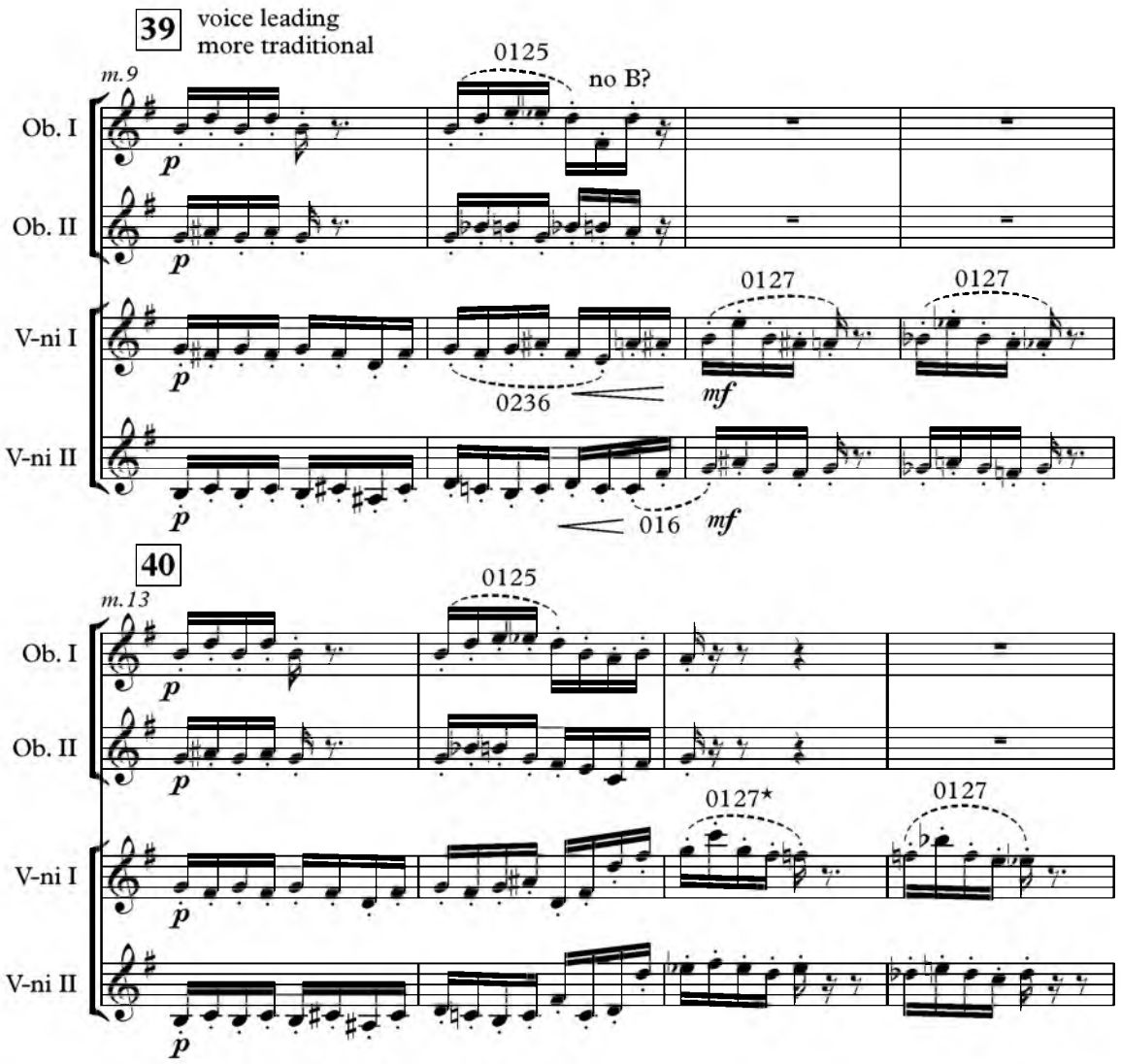
All in all, in a matter of only eight introductory measures of the Princesses *Scherzo*, there are several iterations of 0125 and 0127 (diatonic variants of the Firebird set), the original Firebird set 0126, the Kastchei set 0236 in the foreground and background, as well as the diatonic variant of the Kastchei set (0347, appearing intervallically in similar fashion to other statements of Kastchei ladder thirds), not to mention a few occurrences of one of the Firebird's subsets, 016.

The correlation of pitch sets 0127 across the first and second violin parts must have been Stravinsky's intention from the beginning, as is clear from his reworking of the material in the 1945 Suite (see EXAMPLE 32 below).

EXAMPLE 31b: 1910 version, *Princesses' Game of the Golden Apples: Scherzo,* violins I and II, m. 11.



EXAMPLE 32: 1945 *Suite*, *Scherzo: Dance of the Princesses,* violins and oboes, mm. 9-16.



Notable differences in the oboe (m. 10) and violin parts (mm. 10-12) reveal variants 0125 and 0127, which are not going across sections anymore and are easier to spot. Also note the "correction" of the C-natural (which had been C^{b} in the 1910 version) at m. 15. The Kastchei motive 0236 also appears in the first violin in m. 10, but in a

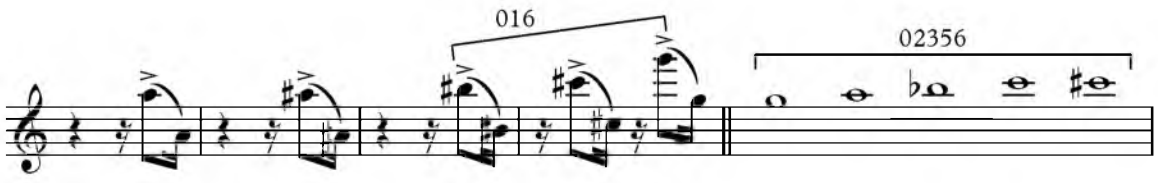
different configuration than in the 1910 version.[65] Notably changed is the "peculiar" voice leading of the oboes at the beginning of the excerpt, and the semitone subsets 012 that were so comfortably in one voice (first violin part, 11-12 and 15-16).

Other Chromatic Harmonies Used in the Princesses Music

A few measures after this section, Stravinsky plays with the subsets 016 and 02356, of which the Kastchei set 0236 is a subset. Note the octaves in the first violin part at Figure [57] (see EXAMPLE 33 below). In the last measure, all pitches of the octaves in the first violin part have been put into their normal order.

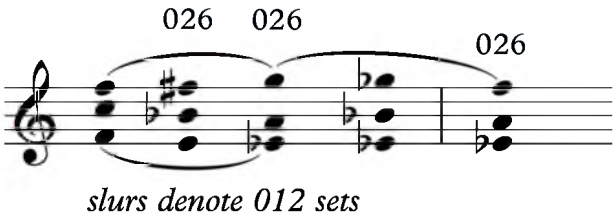
In addition, in the first and second violins at Figure [58], sets 012 and 023, subsets of both the Firebird (0126) and Kastchei (0236) leitmotifs, respectively, appear in eighth notes cleverly placed in contrary motion. Vertically, these subsets (after the downbeat) produce yet another subset of the Firebird motive, 026, which gives the passage a whole-tone quality. See EXAMPLE 34 below. At mm. 29-32, the 012 motive is further spun out, first in 3-note increments, then in 6, producing a chromatic aggregate. See EXAMPLE 35 below.

EXAMPLE 33: *Princesses Scherzo,* Figure [57], first violin part. Sets 016 and 02356 of which 0236 is a subset.

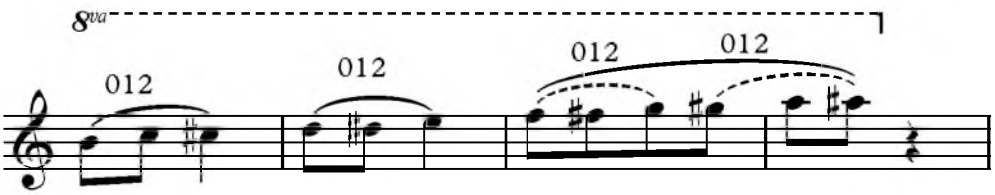


[65] In this version, the sixth sixteenth note of the measure is exchanged across the two violin parts, making it clearly part of the melodic idea, though in performance of the 1910 version, the second violin E was likely heard as part of the melody.

EXAMPLE 34: *Princesses Scherzo,* Figure [58], first and second violins. Sets 012 in mirror motion producing 026 verticalities. Set 023 is visible in the middle voice C-B^{b}-A.



EXAMPLE 35: *Princesses Scherzo,* mm. 29-32. Sets 012 spun out, producing a chromatic aggregate.



Khorovod, or Round Dance of the Princesses

Traditionally, many theorists have overlooked the *Khorovod*, dismissing it as the most tonal and folk-like material in all of *The Firebird.* One particular theorist, Pieter Van den Toorn, describes the material as:

> …not just diatonic but tonal, almost routinely tonal. And seldom shall we again be confronting in Stravinsky's music such compliance with tonally functional processes of (0 3 4/0 4 7) triadic progression and voice leading, relations that so unequivocally partake of that soon-to-be-abandoned universal language of C-scale tonality.[66]

This is a very bold statement, which will be referred to again later. Taruskin adds to this idea: "The two numbers danced by the Princesses are the most traditional in the ballet,

[66] Van den Toorn, p. 29.

and the ones most directly indebted to the work of Stravinsky's Belyayevets seniors."[67] He spends time describing the Russian folk melodies from which this section was derived, but there is no real investment of time in analysis.

Not surprisingly, Stravinsky managed to "work into" the Princesses music the same pitch sets that he used in the "supernatural" Kastchei and Firebird sections. These sets do not often work out melodically, but primarily harmonically, and sometimes subtly in the background. At the outset, though the melody is diatonic in a texture of only a few voices (woodwind solos accompanied by horns and/or strings), subsets 016 and 026 of the 0126 Firebird set, and the Kastchei set 0236 are present. Set 0257 is also present. See EXAMPLE 36a below. Shortly after this, at mm. 16-23 (Figure [77]), these same subsets 026, 016, and the set 0236 are present again (see EXAMPLE 36b below). The folk melody in the first violins is harmonized with 012-set semitones in the second violins, which step in and out of larger sets that are associated with tritones (see dashed slurs in mm. 17-19). In m. 19, as in many later locations, there are *two* subsets to speak of, which share a common tritone $F^{\#}$-$B^{\#}$. The set 016 (see the boxed pitches in the violins) combines the tritone with a $C^{\#}$ and the other combines with E in the violas (follow the dashed lines) to form an 026. Measures 20-22 also have iterations of 0236.

In the case of mm. 20 and 22 (measures that are exact duplicates of each other), set 0236 is a subset of the total seven-pitch set present in the measure, 0134689. This set has qualities of *both* diatonic and octatonic collections. EXAMPLE 37 shows how the seven-pitch collection may be explained as either an incomplete octatonic collection or

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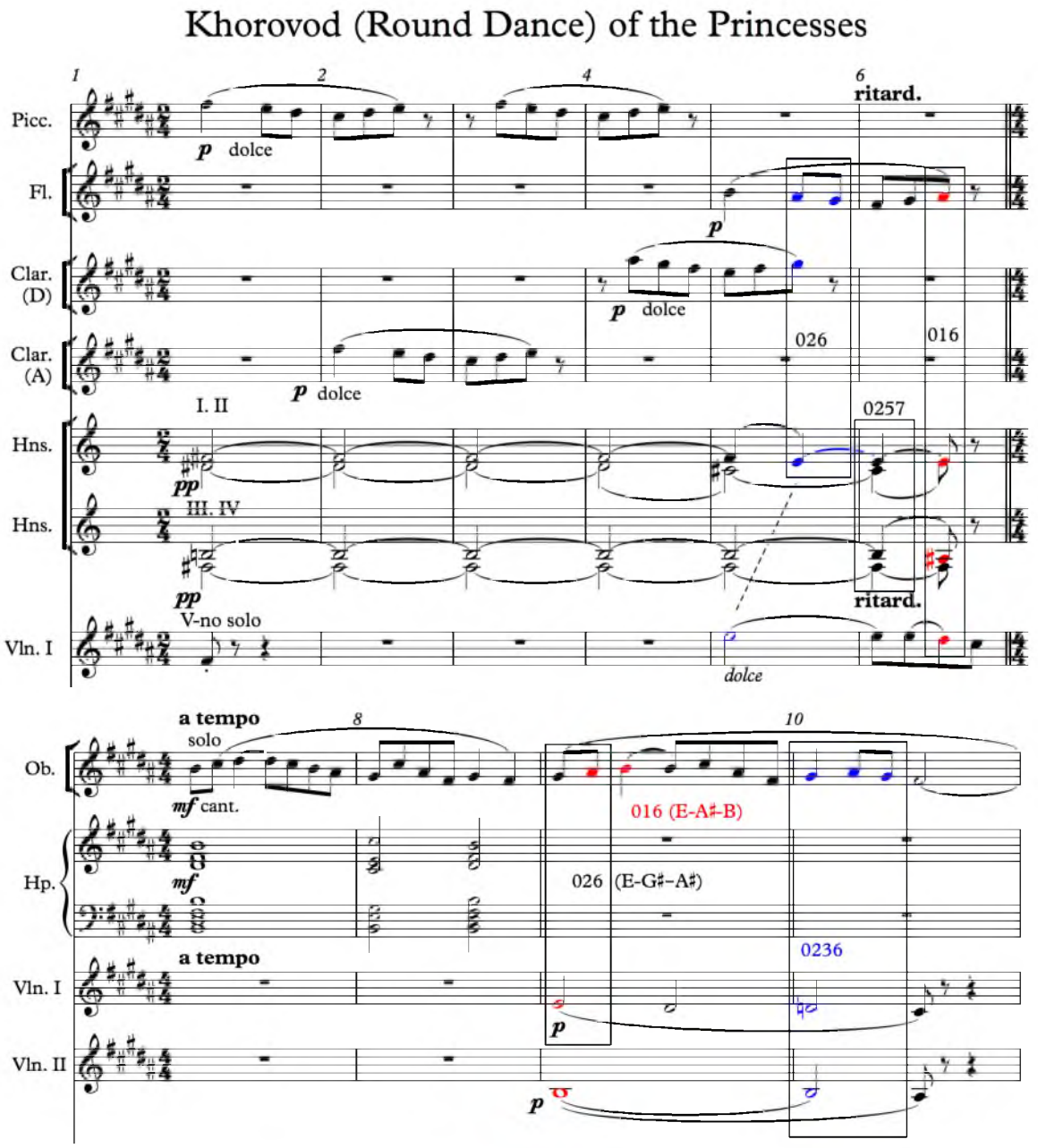
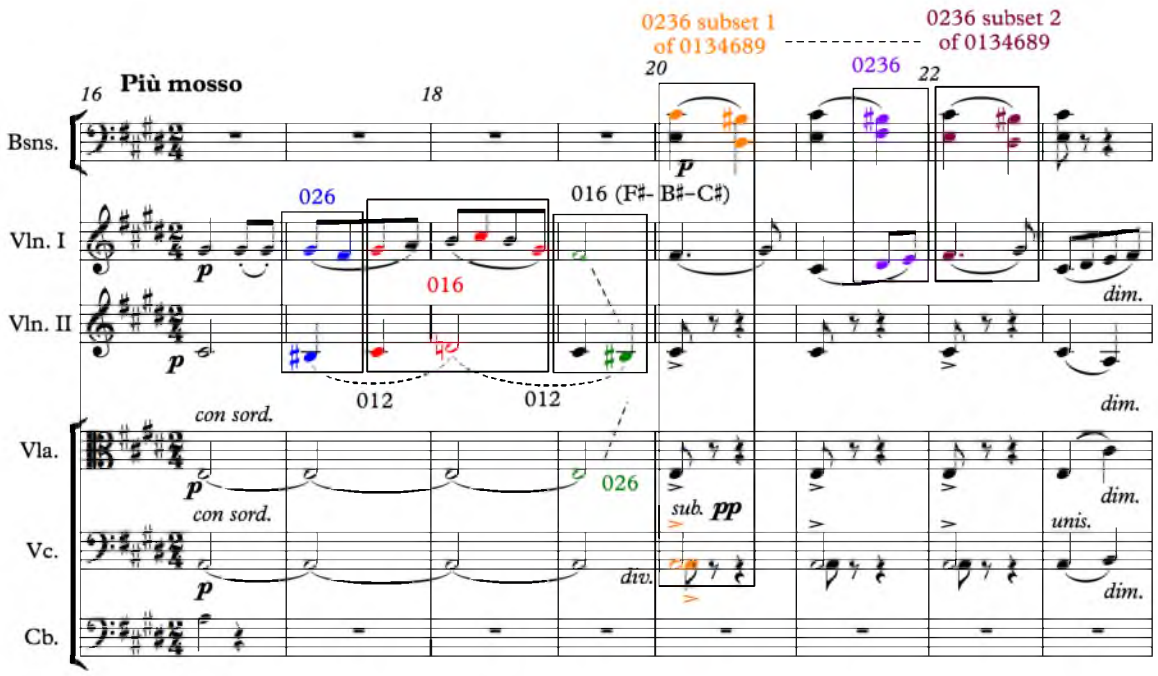
[67] Taruskin, p. 624.

EXAMPLE 36a: *Khorovod (Round Dance) of the Princesses*, opening, Figure [75], mm. 1-11. Horns and clarinets sound as written.

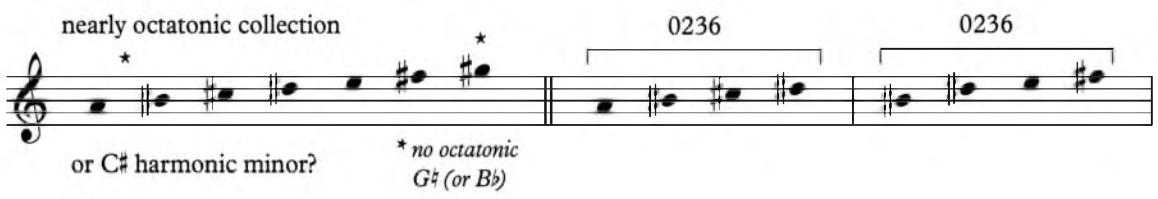


EXAMPLE 36b: *Khorovod*, mm. 16-23. Various iterations of subsets 016, 026 and two versions of 0236, in this case a subset of 0134689.



perhaps even the C$^{\#}$ harmonic minor scale (also consistent with the key signature of four sharps). Both explanations have their holes. If it is seen as based on the octatonic collection, then the G$^{\#}$ is a "wrong" pitch which should have been a G-natural. In addition, pitch B$^{\flat}$ is entirely missing from the collection. If the seven-pitch collection is considered a C$^{\#}$ harmonic minor collection, probably the best classification, then it appears to be contradicted by the A, the bass pedal note, followed by an E pedal after 8 measures. In addition, why do D-naturals also abound in this section in the inner voices

EXAMPLE 37: Seven-pitch collection from *Khorovod*, mm. 20 and 22.

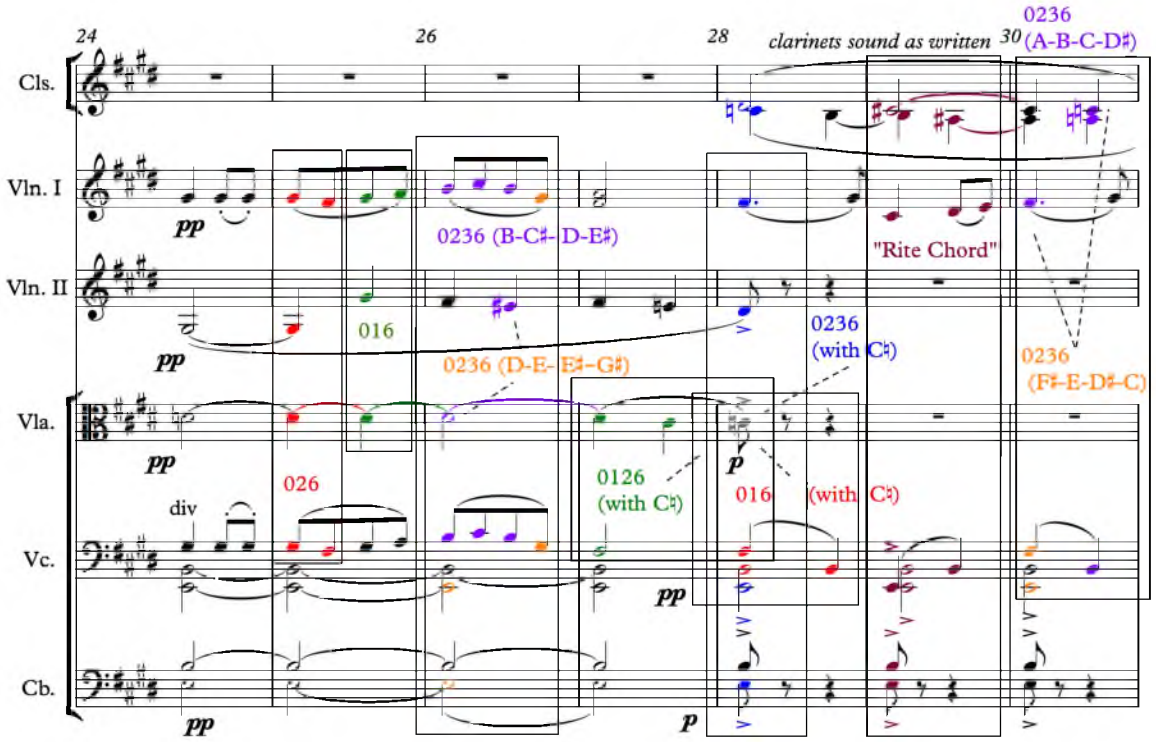


(second violins and violas)? A significant aspect about the collection is that from it may be generated two differing forms of 0236, illustrated in EXAMPLE 37 above.

In the next phrase, motives and subsets happen in quick succession. After two subsets 026 and 016, which occur through the figuration of the main melody over the violas' D pedal, m. 26 works in two sets associated with Kastchei 0236 that both share common tones D and $E^{\#}$ (the set in m. 26 highlighted in orange shares the D and $E^{\#}$ from the set in m. 26 highlighted in purple). In m. 28, a single pitch becomes part of three separate sets. The pedal D in the violas, a common tone for four chromatic pitch sets, finishes its semitone descent (stating again 012) to a C-natural, which becomes common tone to three consequential pitch sets—016, 0126, and 0236. Two measures later, in m. 30, pitches $D^{\#}$ in the first violins and C in the first clarinet are common tones to two more Kastchei pitch sets 0236 (the set highlighted in orange sharing the C-$D^{\#}$ of the set highlighted in purple once again). Measure 29 is notable as perhaps an early occurrence of Stravinsky's "Rite of Spring chord" from the *Dance of the Adolescents*.[68] See EXAMPLE 38 below.

[68] Pitches E and B in the lower strings create a perfect fifth, while the $D^{\#}$, $C^{\#}$, and $A^{\#}$ (enharmonically E^{b}, D^{b}, and B^{b}) in close proximity approximate the Eb-dominant seventh chord above it. All of the pitches are present from the "Rite Chord" except G and $G^{\#}$.

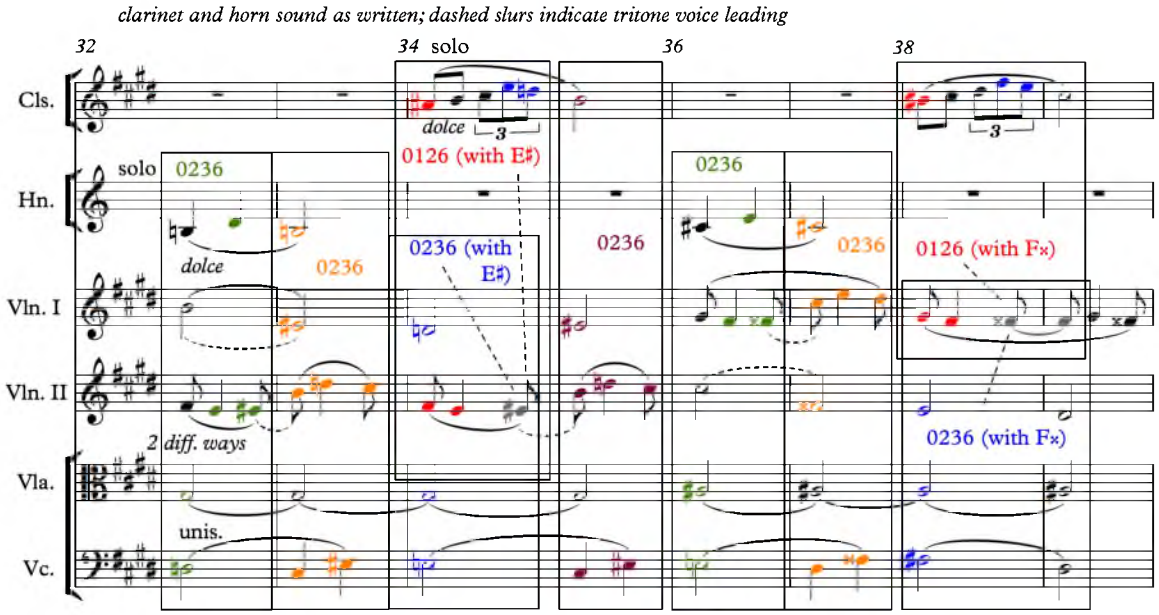
EXAMPLE 38: *Khorovod*, mm. 24-30.



The next example from the *Khorovod* shows Van den Toorn's misjudgment of the "tonality" of this movement in the statement, "And seldom shall we again be confronting in Stravinsky's music such compliance with tonally functional processes of…triadic progression and voice leading."[69] This is perhaps the most harmonically inventive section of the *Khorovod*. Dashed slurs in the four two-measure phrases indicate multiple examples of tritone voice leading. Harmonically, every measure has some statement of 0236, often in connection with a root-position dominant-minor ninth chord. Measures 36-38 are a transposition (whole step up) of mm. 32-34. In addition, the clarinet melodies at 34 and 38 are quintessentially octatonic. See EXAMPLE 39 below.

[69] Van den Toorn, p. 29.

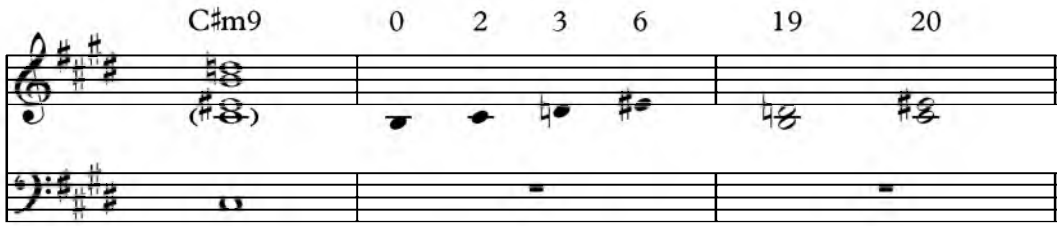
EXAMPLE 39: *Khorovod*, mm. 32-39. Pitch sets 0126 and 0236 abound with tritone voice leading in the violin parts marked with dashed slurs.



This last example (EXAMPLE 39) warrants a bit of simplification. When all of the pitches in each measure are arranged in chordal form, they produce dominant minor ninth sonorities. Returning to the basic idea of the Kastchei thirds ladder, the intervals of adjacent thirds on the ladder are arranged as follows—the inner pitches are a semitone apart, and the outer pitches are a tritone apart. If the thirds are so arranged that a specific minor third (previous to a major one in the sequence) is placed an octave above the major one that follows it, their inner pitches seem to be a tritone apart from each other, and their outer pitches seem to be minor ninths apart (a semitone apart, an octave displaced). These interval relationships imply dominant minor ninth harmony. See EXAMPLE 40.

Going a bit further, all of the pitches in mm. 32-39 may then be reduced to a four-measure phrase of alternating dominant minor ninth harmonies, whose roots are a minor

EXAMPLE 40: *Khorovod*, m. 32 reduction. Kastchei set 0236 in dominant-minor ninth form (5th of the chord is missing). C# minor ninth harmony is implied from ladder thirds steps 19 and 20.



third apart. The second four-measure phrase (mm. 36-39) is essentially a transposition up a whole step of the previous four-measure phrase (mm. 32-35). Of interest is the way that these dominant ninths retain common tones. Between the E and $C^{\#}$ dominant ninth harmonies, there are four common tones $G^{\#}$-B-D-F (the F sometimes spelled enharmonically as $E^{\#}$), which form a diminished-seventh chord. Essentially, the only difference from chord to chord is the bass note. This is possible because of the intervallic symmetry of the diminished-seventh chord. This symmetry also makes it possible for the dominant minor ninth to be a subset of a single octatonic collection. The progression below is well disguised by Stravinsky by his voice leading technique. The common tones between chords rarely stay in one voice, and frequently voices move by tritone or by large skips. The root progression is also obscured by frequent inversion of the chords.

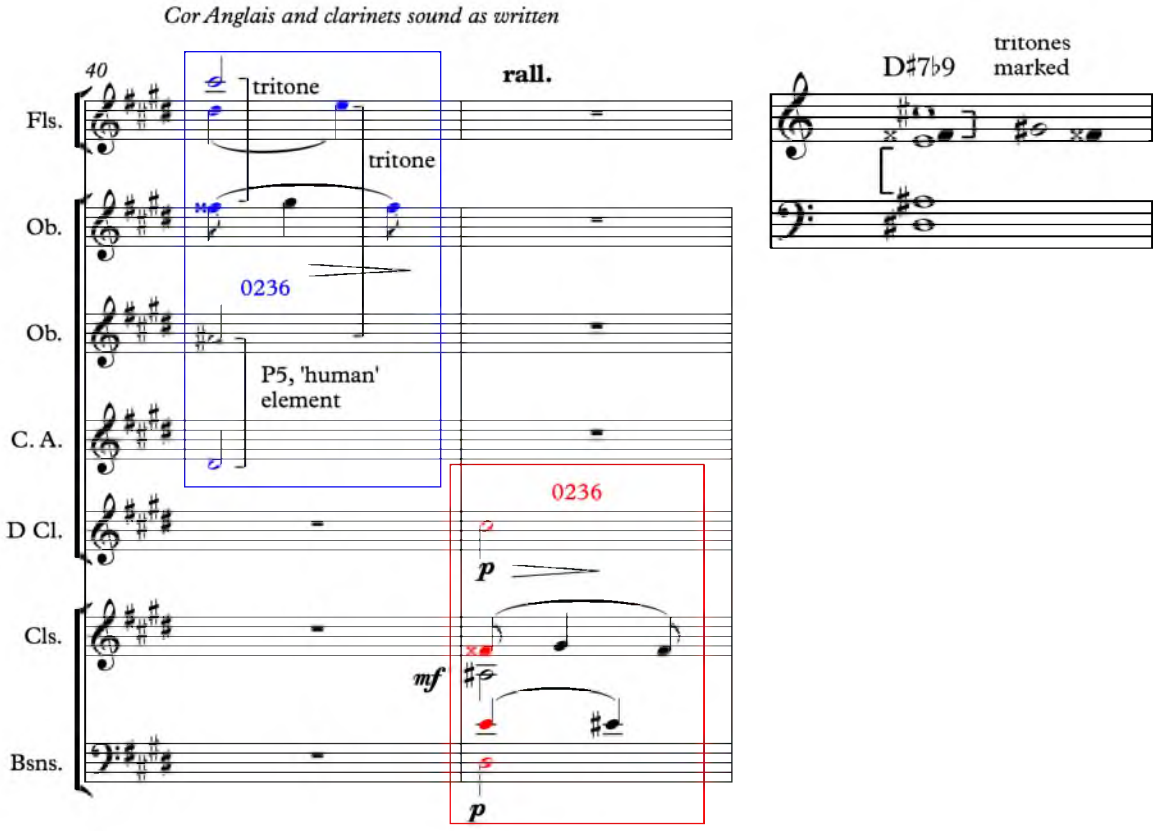
Another example of the same technique is at mm. 40-41 in EXAMPLE 42 below. The dominant minor ninth chord may have been used by Stravinsky to represent the Princesses because of its harmonic duality. It contains the Kastchei 0236 *leit-harmonie*, and also two tritones, proven to be the essence of the "supernatural" sets, which dominate the harmonic landscape of the work. On the diatonic side, it also contains a perfect fifth,

with a major triad as harmonic foundation, perhaps chosen to represent the "human" or diatonic element of the harmony. In this way, the dominant minor ninth chord is the best of both harmonic worlds.

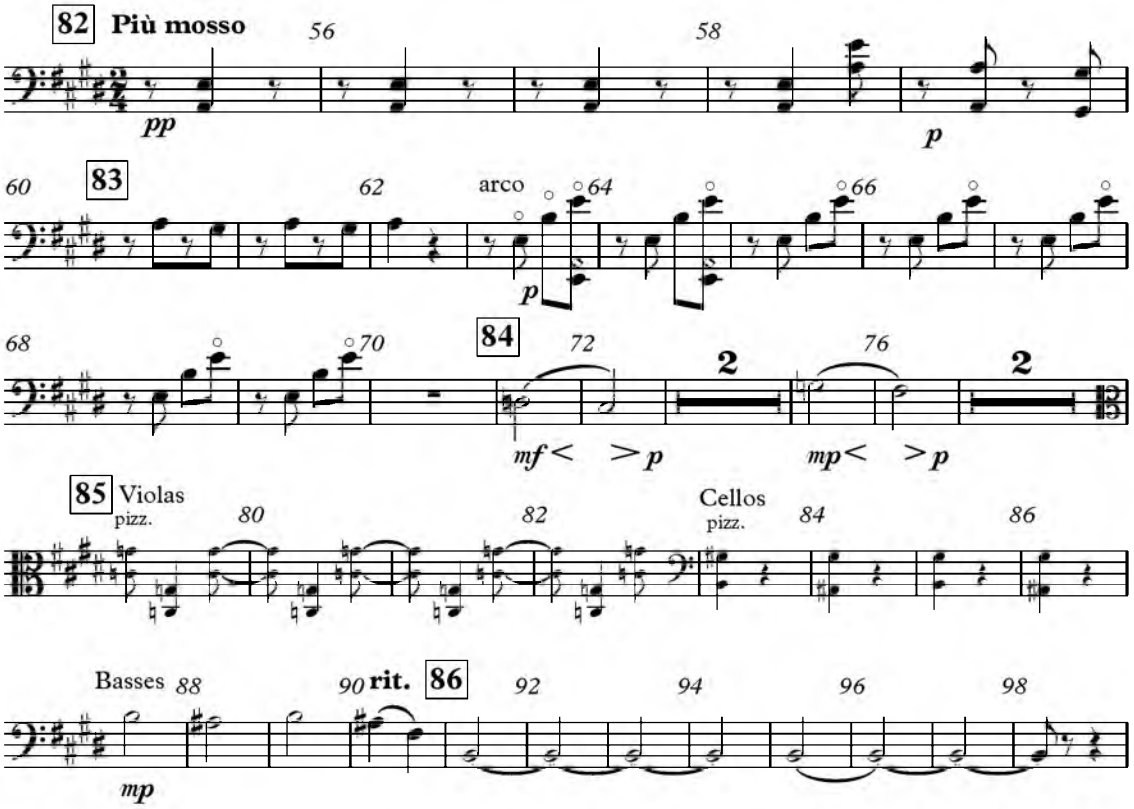
The E Major section of the Khorovod (Figures [82-85]) uses a bass line characteristic of Stravinsky's tritone-semitone voice leading treated earlier in the paper. As the basses do not always sound the lowest pitches, part of the excerpt may be gleaned from the cellos or violas. See EXAMPLE 43a below. A reduction clarifies what is happening harmonically. Essentially this collection of pitches is progressing as Kastchei ladder thirds have been shown to do earlier in the paper, by moving repeatedly by semitone down, tritone up. Once pitch B is reached by the sequence, it is prolonged over about 16 measures, alternating occasionally with its chromatic neighbor, $A^{\#}$. See EXAMPLE 43b below.

As usual with Stravinsky, rarely is there a progression that simply progresses forward or backward on the ladder. At Figure [83], the sequence is interrupted by pitch E, which is prolonged for eight measures. Technically, the E, if it had followed the pattern of semitone, tritone, etc. should have arrived in the bass line after the B-$A^{\#}$ pitch alternations between Figures [85-86], shown in the above example. What in fact happens, is from the moment the E is sounded in the basses, and many other voices from Figure [83] forward, it is prolonged throughout the rest of the passage until at Figure [85]. See EXAMPLES 43c and 43d (sequential score excerpts). Note how A-$G^{\#}$ motions in the cellos and basses are interrupted by E pedals at m. 63 in especially the bass, cello, and first violin parts, in addition to the lowest pitch of the violas.

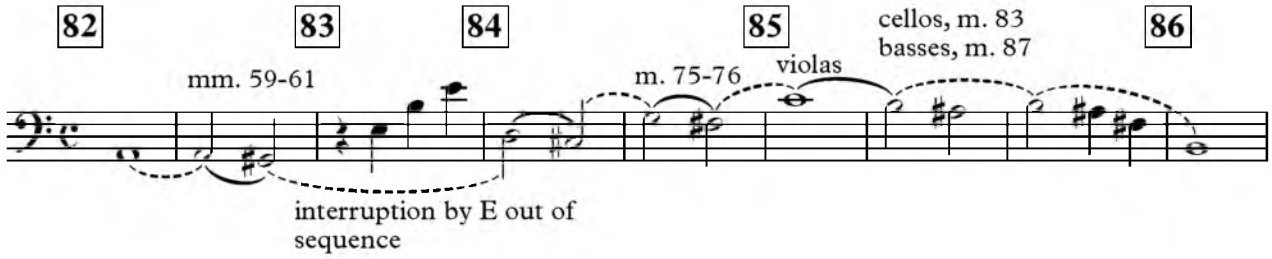
EXAMPLE 42: *Khorovod*, mm. 40-41. $D^{\#}$ dominant ninth harmonies predominate the sonorities, containing two tritones, as well as one perfect fifth. Pitches highlighted in blue or red are members of "Kastchei" sets 0236.



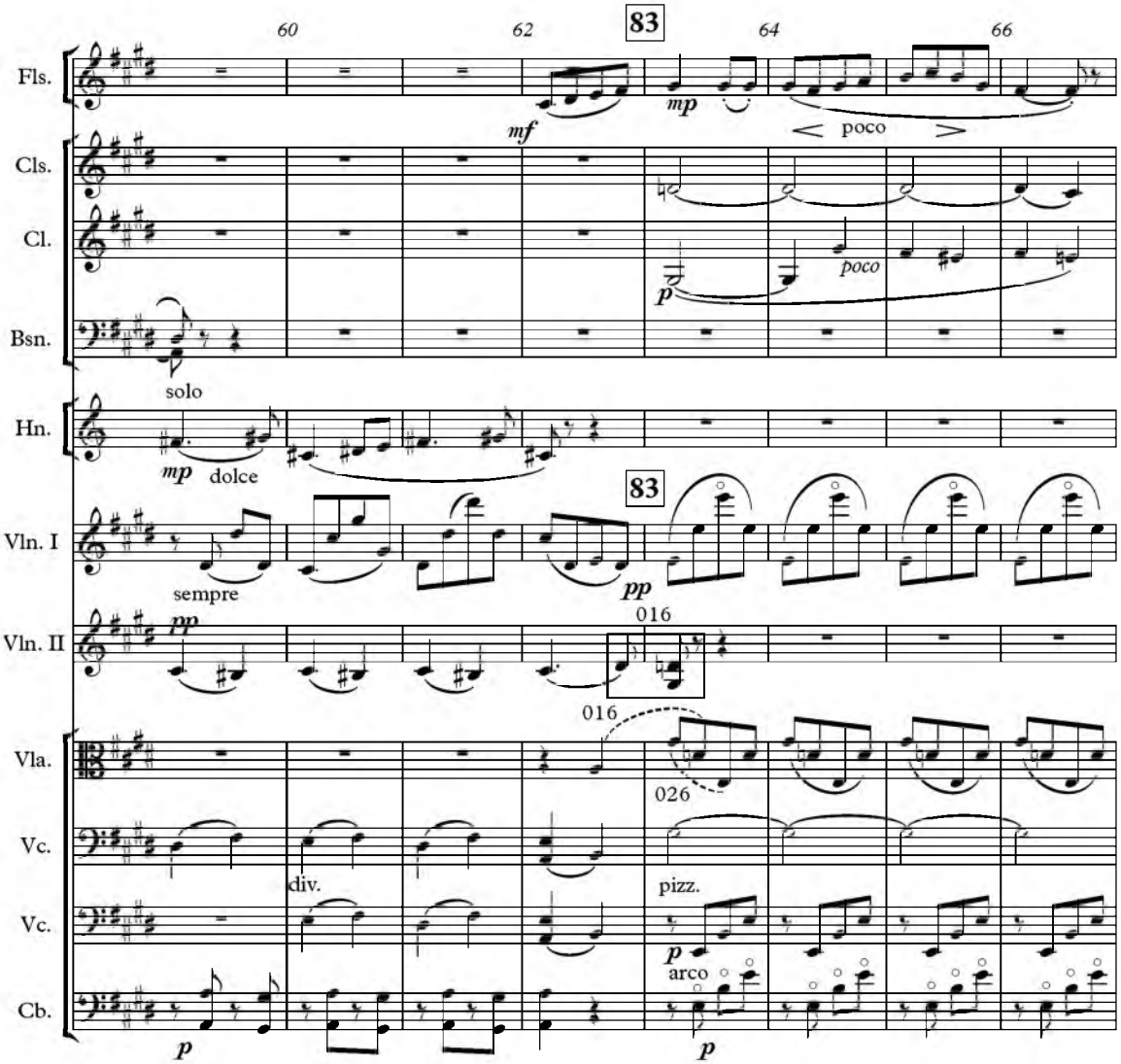
EXAMPLE 43a: *Khorovod,* Bass line gleaned from basses, cellos, and violas, Figures [82-85].



EXAMPLE 43b: *Khorovod,* Figures [82-86], reduced bass line from EXAMPLE 43a to show 016 voice leading and prolongations.



EXAMPLE 43c: *Khorovod,* mm. 59-66. Note E pedals especially the first violin, cello, and bass parts, in addition to the lowest pitch of the violas. Clarinets and horns sound as written.

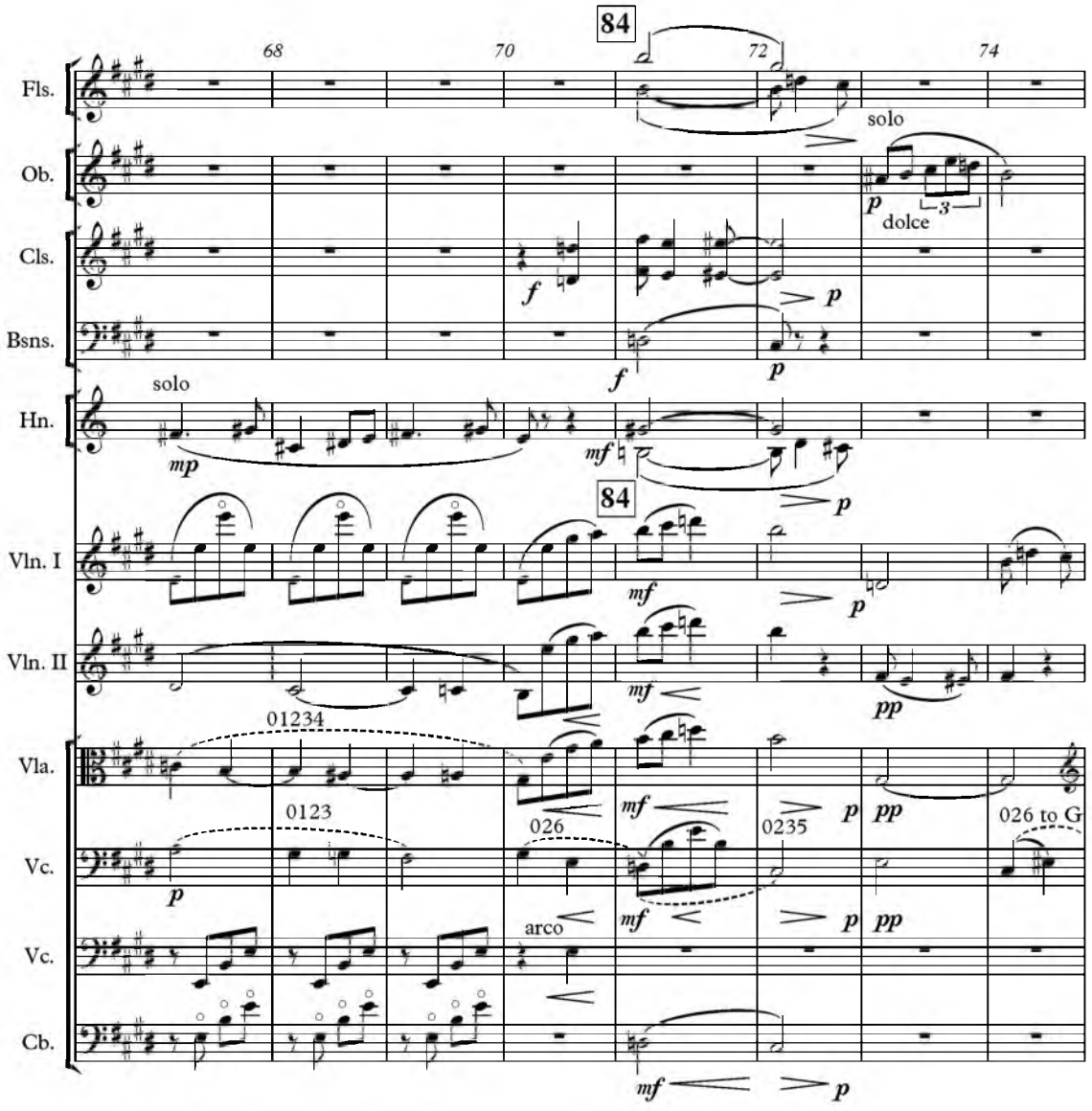


At Figure [84], pitch E occurs every other measure, as E dominant ninth harmonies are alternating with $C^{\#}$ dominant ninths. See the clarinets and the highest pitch in the first cello part in m. 71. In m. 73, see the second violins and oboe (highest pitch). These Es may seem fleeting, but are still noticeable as they are accentuated with either their syncopated rhythms or higher registers, respectively. At m. 71, the basses

recommence with the alternating semitone, tritone skips on pitches D and $C^{\#}$, as previously mentioned in EXAMPLE 43b.

In the next few measures, beginning with m. 75, the basses continue their alternating semitone, tritone skips, now on pitches G and $F^{\#}$, shown in EXAMPLE 43e

EXAMPLE 43d: *Khorovod,* continued, mm. 67-74. Clarinets and horns sound as written.



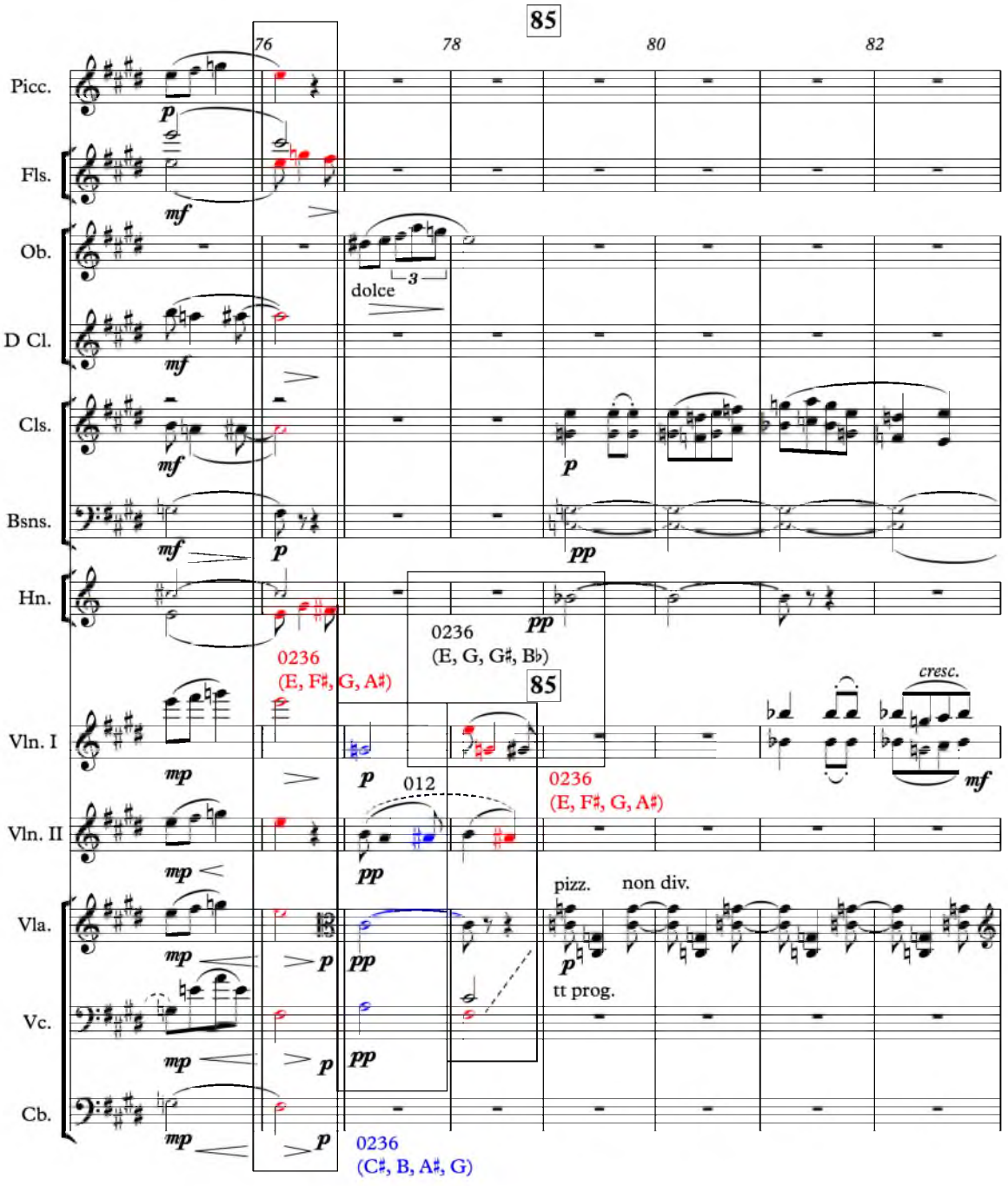
below. Pitch E is still featured, now in each measure until Figure [85]. In mm. 75-76, it is prominent in the piccolo, violins, and viola parts as the first and last note of the phrase. It also is highlighted in the two flutes. In m. 77, the oboe melody sounds the E twice, ending with it in m. 78. The first violins also sound the E in the same register as the oboe, the E being the highest pitch in their last two-measure phrase (see mm. 78). At that point, (Figure [85]), there is a C major chord, with the root of the chord being played notably in the second bassoon and viola *pizzicati.* Pitch C is the next step after $F^{\#}$ in the bass in the tritone, semitone skips, and in this case it forms a tritone root progression from F# dominant seventh to a C dominant seventh. Pitch E, which has been prolonged in the upper voices for many measures, and which is common to both dominant sevenths ($F^{\#}$ and C), is once again the most important sounding pitch, as the melody begins in the first clarinets on E, continuing its prolongation for a few more measures. This E (m. 79) is taken over from the oboe's last phrase in m. 78, and is even in the same exact octave. Other tone prolongations in these measures include common tone $A^{\#}$, used in tritone combination with pitch E form the third and seventh in the $F^{\#}$ dominant ninth chord in mm. 77-78. This tone is prolonged by being followed by its enharmonic equivalent, B^{b}, which in m. 79, still in combination with pitch E, forms the tritone present in the C dominant seventh. These common tone prolongations help to smooth the tritone progression and provide unity in the work. Note how, two measures after the clarinets enter with their melody on E in m. 79, the first violins enter imitatively now on pitch B^{b}, prolonging that pitch yet longer. This is yet another one of Stravinsky's methods of accentuating the tritone, one of the important points of this dissertation.

In this same section (EXAMPLE 43e below), the Kastchei pitch set 0236 is iterated four times in mm. 76-78. In m. 78, there are two occurrences of it. One may be seen with all of the pitches across all of the instruments (highlighted in red) within that measure, including the bass note $F^{\#}$ (see pitches E, $F^{\#}$, G, $A^{\#}$). The second iteration of 0236 is found in two ways—harmonically, with all three pitches in the first violins in m. 78 (E, G, $G^{\#}$), plus the $A^{\#}$ in the second violins, and melodically, with the same three pitches in the first violins (E, G, $G^{\#}$), plus the B^{b} in the horn in the next measure (m. 79).

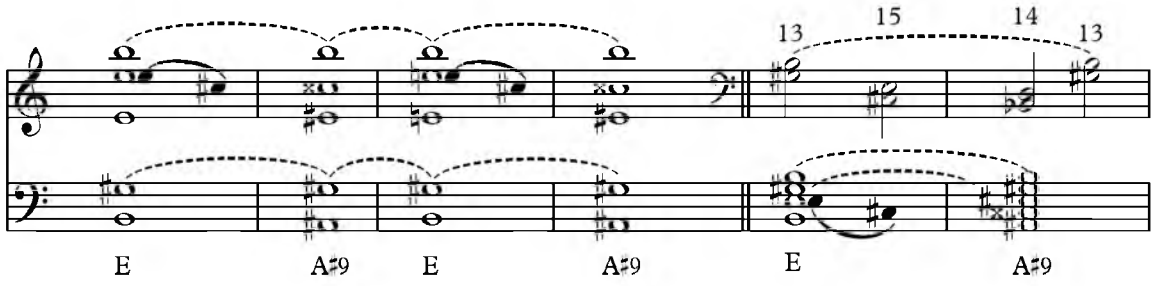
The next few measures (mm. 83-86) after the C dominant seventh (in EXAMPLE 43e) contain an interesting progression, similar to what has been seen before. See also the EXAMPLE 43f reduction below. Two chords, E major and an $A^{\#}$ dominant ninth (a tritone root apart) alternate in very smooth voice leading. This is brought about by placing the E chord in second inversion, with B in the bass. B is also the highest sounding pitch, orchestrated as a high harmonic pedal in the second violins and basses. There are two common tones between the two chords, $G^{\#}$ and B, which also may be seen as step 13 on the ladder. These help to provide a smooth progression, as well as unity in the passage. All of the other voices move by step from chord to chord. After the double bar, appropriate ladder thirds are shown.

One wonders why Stravinsky did not spell the $A^{\#}$ ninth chord enharmonically, as a B^{b} ninth. See EXAMPLE 43g below, mm. 84 and 86. In this case, the A# chord makes the most theoretical sense, though it is spelled with a C^{x} as its third, because of the common tones $G^{\#}$ and B. These would not make sense as part of a B^{b} ninth chord, as they would possibly need to be spelled enharmonically as A^{b} and C^{b}. All theoretical reasoning

EXAMPLE 43e: *Khorovod,* mm. 75-82. Prolongations of pitch E in mm. 75-82. Note four iterations of the Kastchei set 0236 in mm. 76-78. Clarinets and horns sound as written.



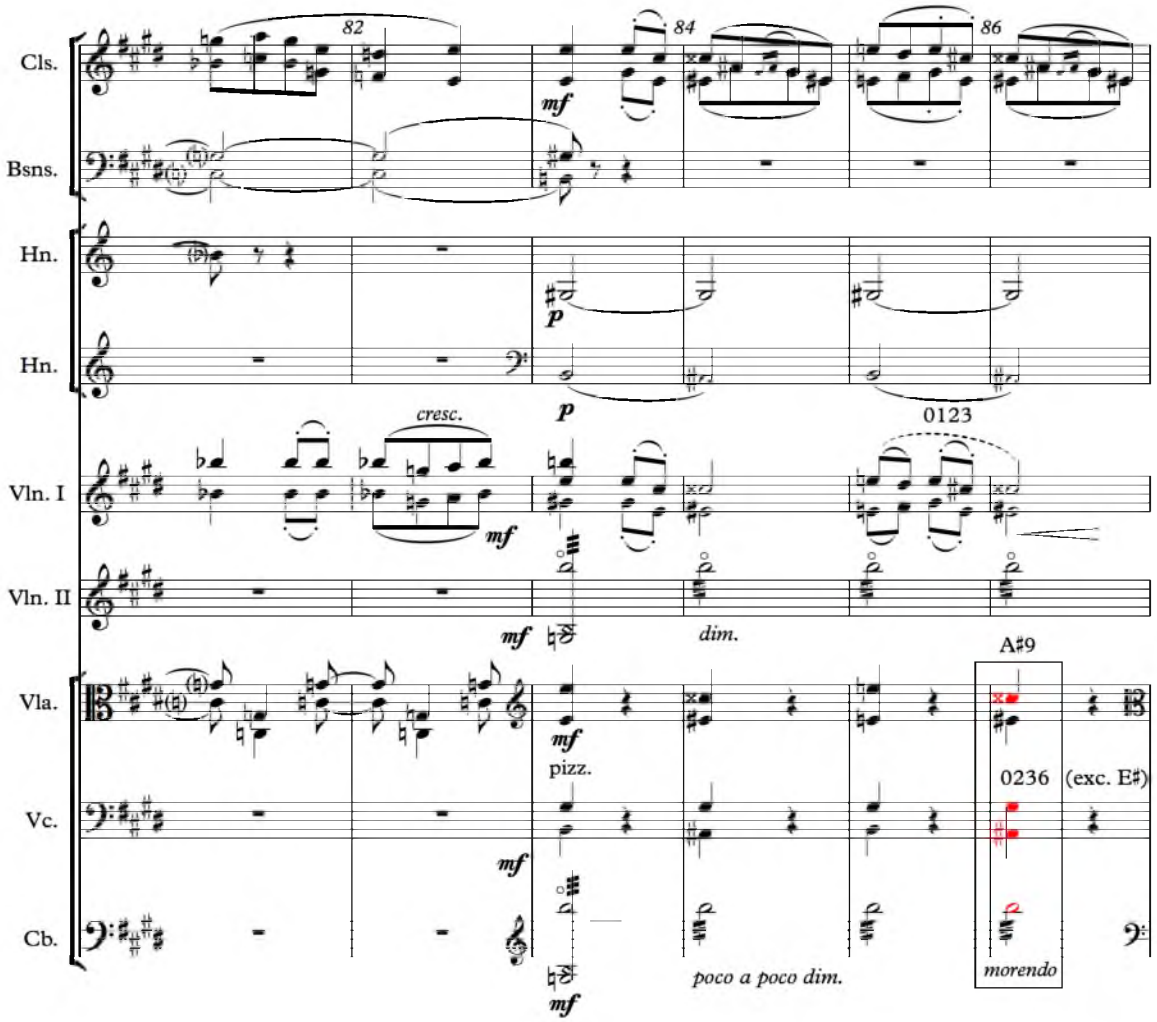
EXAMPLE 43f: *Khorovod*, mm. 83-86, reduction. Tritone root progressions smoothed by placing the E chord in second inversion. The added $C^{\#}$ to the E chord adds another voice in close proximity, a semitone away from its counterpart C^{x}, in the $A^{\#}9$ chord. Common tones $G^{\#}$ and B help provide unity between the two chords. Dashed slurs show pitch prolongations. Appropriate ladder thirds shown after the double bar.



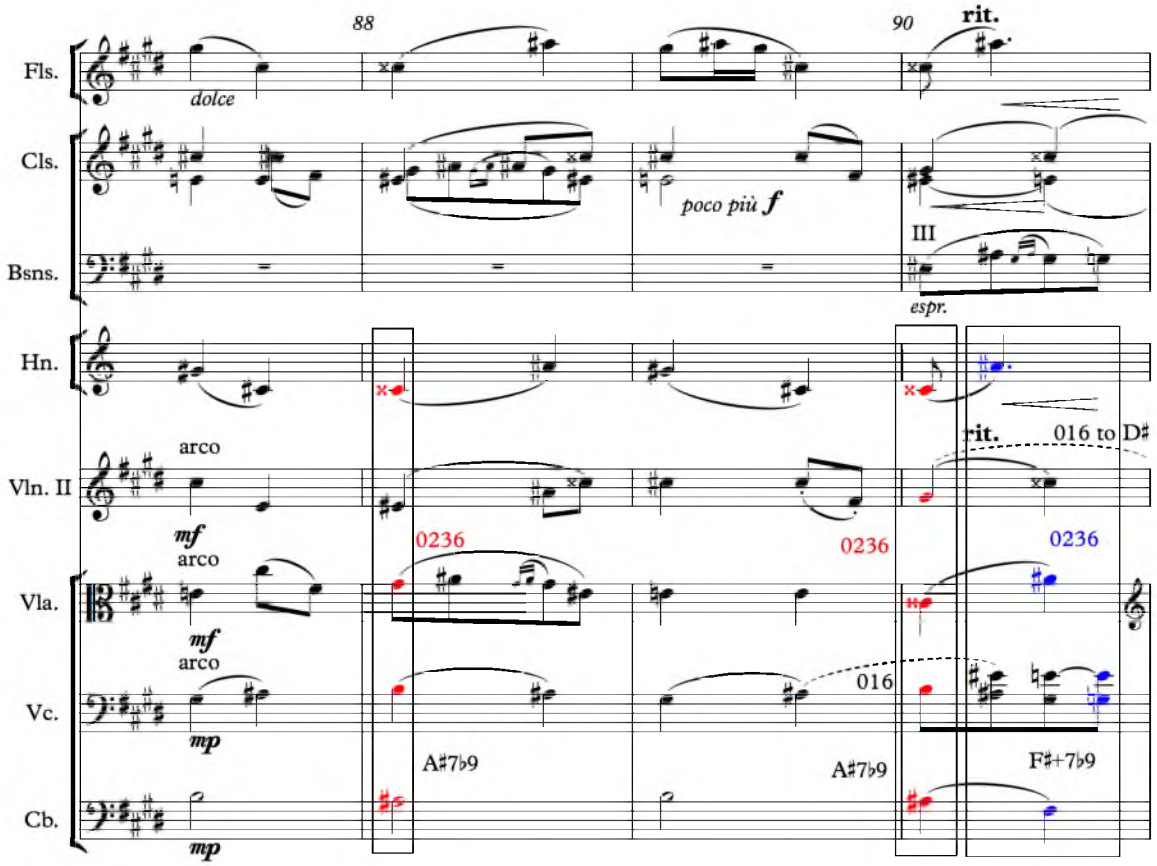
aside, Stravinsky did decide to partially respell the chord in the 1945 *Suite*, though not the $G^{\#}$-B pitches in the strings, most likely because the $E^{\#}$ and C^{x} could be missed in performance.

The Kastchei set 0236 is present in the last example, as is usual with all dominant ninth chords. The high B pedal helps to form sets 0236 at mm. 84 and 86 with the $A^{\#}$-C^{x}-$G^{\#}$ of the dominant ninth chord. The following four measures in the *Khorovod* continue the same alternations between the E and $A^{\#}$ ninth chords (see EXAMPLE 43h below). Finally, at m. 90, after an altered $F^{\#}$ dominant ninth chord (with an augmented fifth), a joyful B major chord erupts, perhaps foreshadowing the celebration in B major at the work's conclusion.

EXAMPLE 43g: *Khorovod*, mm. 81-86. See alternating E and A$^{\#}$ ninth chords in mm. 83-86. Clarinets and horns sound as written.

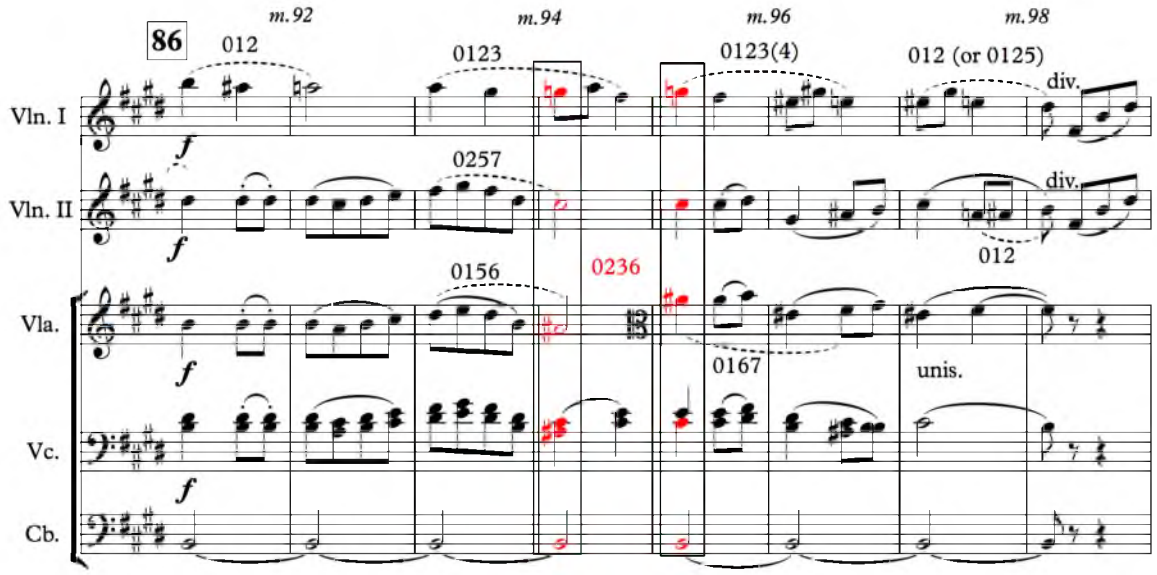


EXAMPLE 43h: *Khorovod,* mm. 87-90.



The music at the end of the Khorovod, at Figures [86-87], provides harmonically some of the most compelling music, mostly functional in a diatonic setting, but also including a plethora of the primary supernatural pitch sets Stravinsky has used all along in the work (including pitch subset 012, from the Firebird set 0126, and its extensions, 0123 and 01234, in addition to the Kastchei set 0236). Other pitch sets include 0257, derived from the ladder, and sets 0156 and 0167, of which 016 is a subset. See EXAMPLE 44a below.

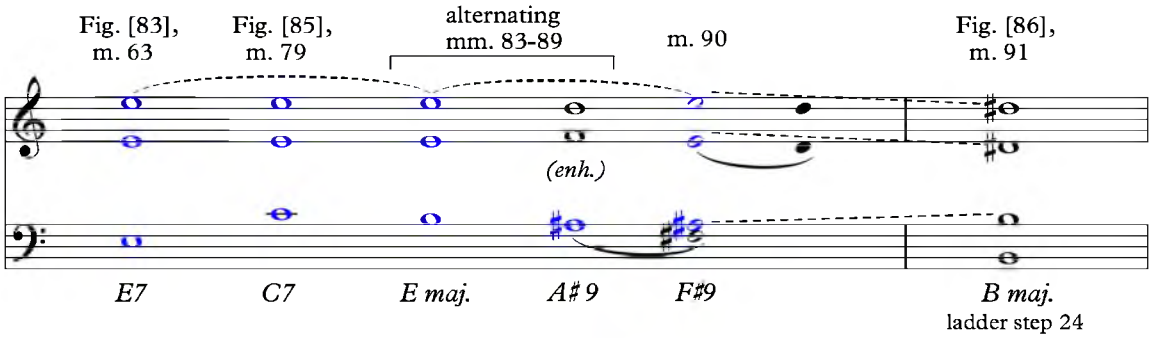
EXAMPLE 44a: *Khorovod,* mm. 91-98, string parts only shown. Note several occurrences of pitch set 012 and its extensions, 0123 and 01234, in addition to two Kastchei sets 0236. Other pitch sets include 0257, derived from the ladder, and sets 0156 and 0167, of which 016 is a subset.



Some interesting pitch correlations may be seen by analyzing pitch prolongations in the music of EXAMPLES 43d-44a. Returning to the idea of the pitch E prolongations at m. 63, which reach all the way to m. 90, shows very strong evidence that E is an important pitch. The bass line at m. 79, where the C-natural comes into the picture, lasts for several measures and then begins a chromatic descent through pitches B and $A^{\#}$, whose prolongations have just been explained. The combination of all of these pitches yields E-C-B-$A^{\#}$, or the Firebird pitch set 0126. See EXAMPLE 44b below.

At m. 90 (see EXAMPLE 43h above), the E-$A^{\#}$ tritone is used in combination with $F^{\#}$ in the bass, creating another ninth chord (with the G-natural in the cello part at the end of the measure), the dominant of B major.

EXAMPLE 44b: Pitch prolongations in the end of the *Khorovod* reveal that prominent pitches E-C-B-A$^{\#}$, highlighted in blue below, form Firebird set 0126. In addition, the tritone E-A$^{\#}$ resolves in true classic convention to pitches B-D$^{\#}$, at Figure [86].

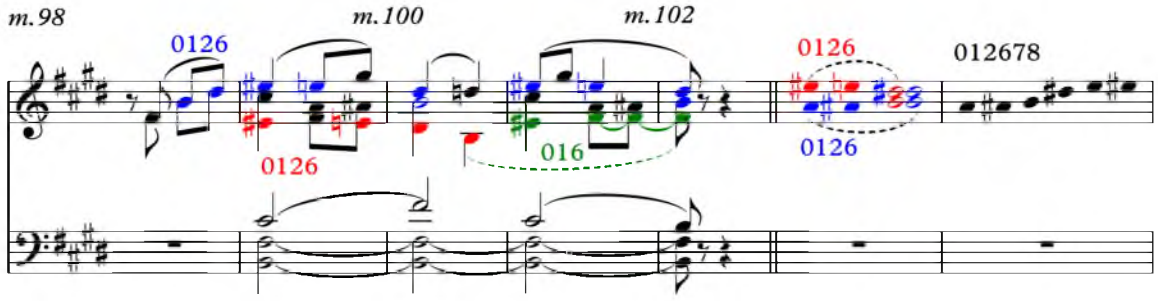


Nonconventionally for this work, the tritone E-A$^{\#}$ resolves in true classic form to pitches B-D$^{\#}$ at Figure [86]. Because the F$^{\#}$ dominant ninth contains an augmented fifth (with pitch C^{x}, spelled as D in EXAMPLE 44b above), there is double chromatic motion as pitches E and D-natural resolve to pitch D$^{\#}$ at m. 91.

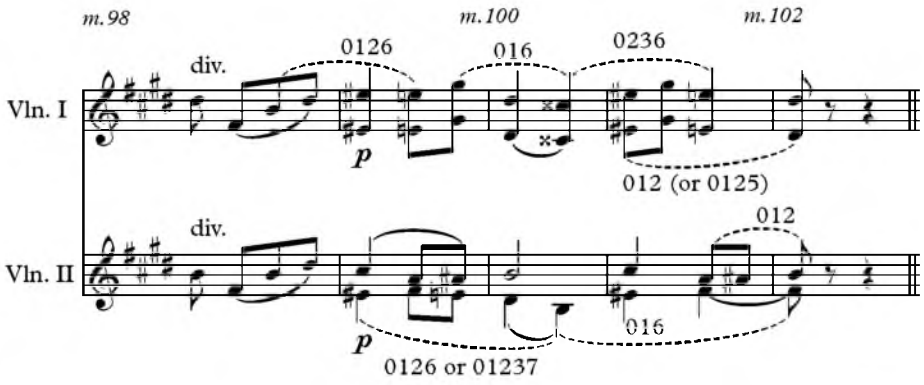
The end of the *Khorovod* is not without its musical symbolisms as well. The alternating E major and A$^{\#}$ harmonies possibly represent the struggle between the human and magical elements once more. The E chord, or the more diatonic chord, is perhaps representative of the "human" element. The A$^{\#}$ dominant ninth, the more chromatic chord having not only two tritones, the interval considered the basis of all of the "supernatural" music in the work, but also the Kastchei ladder thirds embedded in it, is possibly representative of the evil supernatural. The influence of the Firebird, or the supernatural good, is hinted at in the long-term prolongations of E at Figure [83] through the C major section at Figure [85] and through the alternating E major and A$^{\#}$ chords. The culmination of the Firebird's influence is perhaps heard at the jubilant, concluding B

major section, where the Firebird's set 0126 and its subsets 012 and extensions dominate the motivic landscape. Though at downbeats of mm. 94-95, statements of 0236 appear, they quickly dissipate. The measures that follow two references to the 0126 Firebird set and an iteration of subset 016 possibly foreshadow help and deliverance by the Firebird. Also present is a statement of the mirror-inverted set 012678, used most frequently in *The Enchanted Garden of Kastchei* as well as other earlier "Firebird" scenes. See EXAMPLE 44c, mm. 101-102. Pitches $E^{\#}$-E-$D^{\#}$ in the top voice, combined with those of the second voice, A-$A^{\#}$-B, form mirror-inverted set 012678.

EXAMPLE 44c: *Khorovod*, end of section, Figure [86], mm. 98-102. Presence of Mirror-inverted set 012678.



EXAMPLE 44d: *Khorovod*, end of section, Figure [86], mm. 98-102. Note additional pitch sets 0126, 016, and 0236 apparent in the top staff.



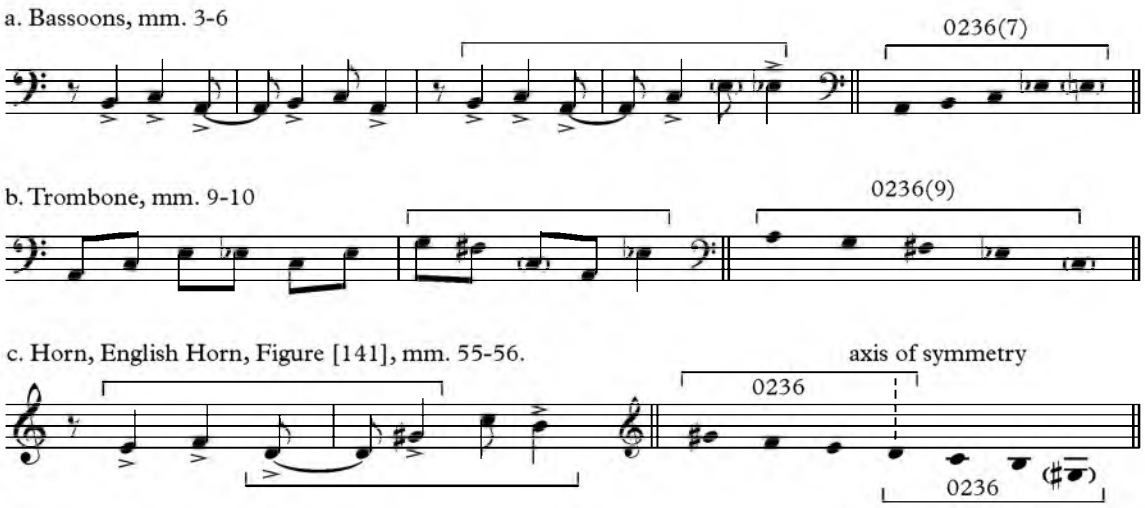
EXAMPLE 44d (above) provides an additional view of possible pitch sets in the same excerpt. Note occurrences of pitch sets 0126, 016, and 0236 in the top staff, and sets 0126 and 016 in the lower staff. At the end of the excerpt underneath the top staff is labeled another possible pitch set, 0125, which may be seen as a diatonically softened variation of 0126.

Kastchei: the Lord of Evil and his *Leit-harmonie*

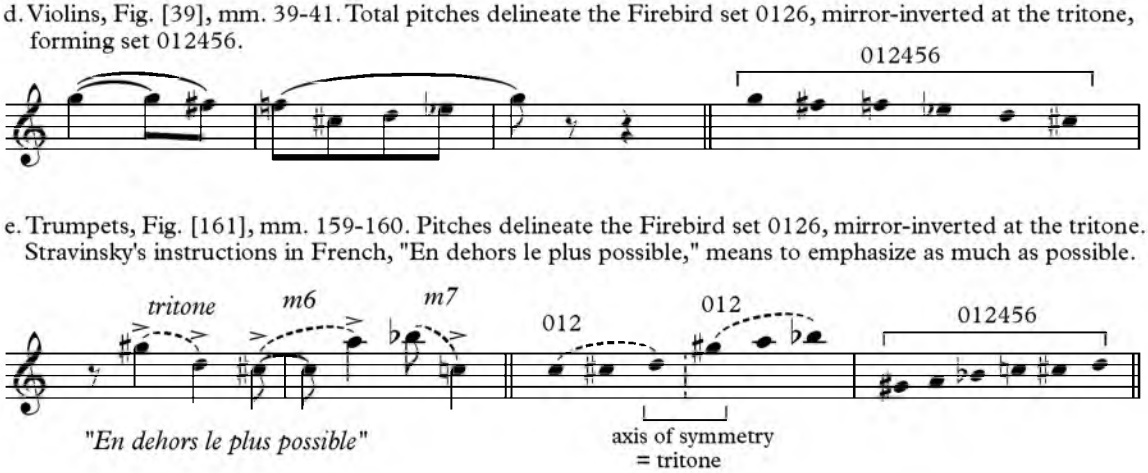
Theorists differ in the way they explain the motives in the *Infernal Dance of All Kastchei's Subjects*, from Figures [133-183] in the score. Some say it is a diminished-seventh chord with semitone appoggiaturas on every one of its four pitches, others some form of mostly octatonic sonority. A better approach may be to derive the pitch collection from Kastchei's own ladder of thirds set 0236. The opening theme in the bassoons (horns and tuba also take turns highlighting the same pitches) at Figures [133-34] is below (see EXAMPLE 45a). Set 0236 can account for all of the pitches except one in the opening passage (the E-natural). This pitch (E) may be seen as an appoggiatura to the E^{b}, as it seems to always occur in the motif.

A second principal motif, representational of the Firebird, appears at Figure [139], this time in the violins, which may be seen as orchestrationally more benevolent than the trombones or horns that represent the evil Kastchei. This Firebird set, 0126, is now mirror-inverted at the tritone, forming pitch set 012456. See EXAMPLE 45d below. This same pitch set, 012456, is also explained earlier in the paper (EXAMPLES 15 and 16a-b). A different form of this motif appears at Figure [161] in the trumpet, marked ***fff***, and placed in its highest register (see EXAMPLE 45e).

EXAMPLE 45a-c: Opening motives from the *Infernal Dance of Kastchei and His Subjects,* Figures [133-141], showing iterations of Kastchei's set 0236.



EXAMPLE 45d-e: Later motives from the *Infernal Dance of Kastchei and His Subjects,* Figures [133-141], show iterations of the Firebird's set 0126, mirror-inverted at the tritone, forming set 012456.

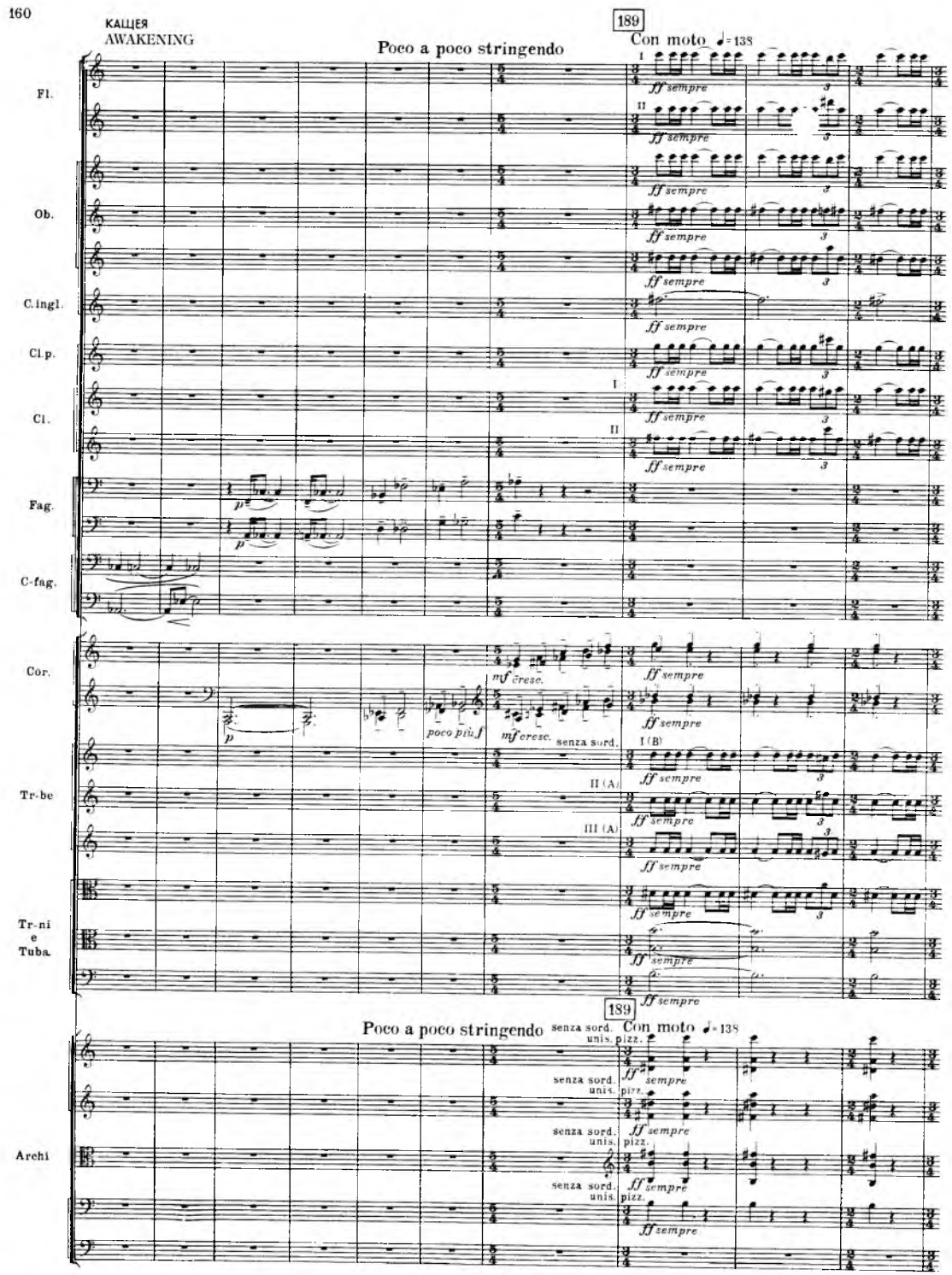


Though it is less recognizable because of its disjunct intervallic structure, it is the same as that of the violins in EXAMPLE 45d. This iteration may also be seen as two pitch sets 012 in mirror-inversion separated by a tritone.

As mentioned above, the arrangement of intervals in this last set is atypical in this work. Typically, the semitones are grouped in close proximity, and the whole set spans a tritone. In this last case, the tritone forms the inner interval, and the semitones spread further apart in contrary motion. Taking each pair of intervals formed by the set, the following sequence is produced: tritone, minor sixth, minor seventh. The angularity of the large skips, along with the orchestrational choice of trumpet, *fortissimo*, and in its highest register, is perhaps representational of the Firebird, poised for battle and ready to strike. Stravinsky's indication in French, *"En dehors le plus possible,"* meaning to emphasize as much as possible, is appropriate in that context.

The opening of the short movement, *Kastchei's Awakening* (the scene that leads to his death), uses primarily the *leit-harmonie* of the dark "ladder of thirds," previously mentioned in EXAMPLE 7. Beginning with the bassoons and horns in the low register, Stravinsky cycles directly and completely through the thirds ladder with two pairs of thirds simultaneously, 12 steps apart, producing alternately the harmonies of the diminished-seventh chord and the French sixth. See EXAMPLES 46 (original orchestration) and 47 (piano reduction) below. The same tritone/semitone motion in each voice used in the *Introduction* is evident in the five measures leading up to Figure [189]. These five measures contain steps 1-10 from the ladder in the lower staff of horns, in pairing with the bassoons and the higher staff of horns, respectively, on steps 13-22 of the ladder thirds. At Figure [189], there is an emphatic orchestrational moment, where the

EXAMPLE 46: *Kastchei's Awakening,* Figures [188-189]. A complete cycle of ladder thirds is evident in the bassoons and horns beginning in the third measure and continuing to Figure [189]. Note the tritone-semitone skips in each voice. See also EXAMPLE 47 for a piano reduction. (Dover edition score, p. 160).

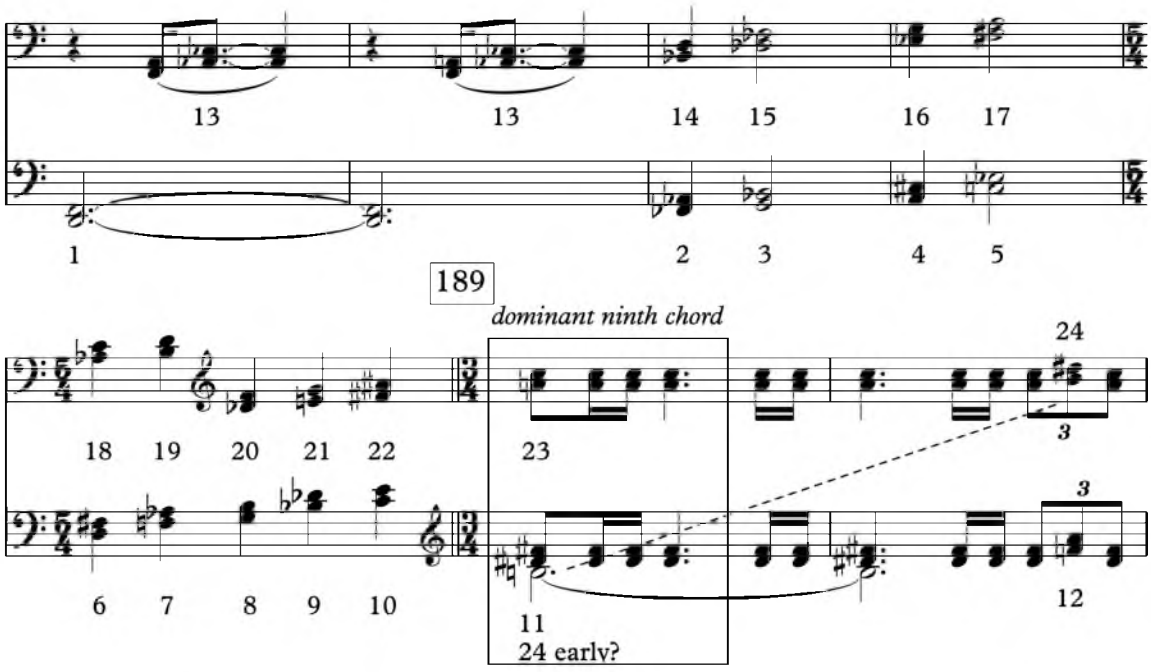


complete woodwind section joins in, with the trumpets, trombones, and tuba, the remaining members of the brass section.

The strings also enter at Figure [189], *pizzicato* and *fortissimo,* in one of their most percussive statements. The chord formed is the B dominant minor ninth, resulting from steps 11 and 23 of the ladder ($D^{\#}$-$F^{\#}$ and A-C) combined with a B pedal, which may also be considered an early occurrence of step 24 (B-$D^{\#}$). Steps 12 and 24 of the ladder, the last two remaining to complete the full cycle of thirds, appear as "neighboring" thirds in the following measure. See analysis in EXAMPLE 47 below.

The question that needs to be answered is this: why does the dominant ninth chord appear at this moment, and with such orchestrational attention? Was a usual ladder of thirds progression not sufficient enough harmonically at Figure [189], so that the B needed to be added as root to it, producing the dominant ninth? As stated earlier in the

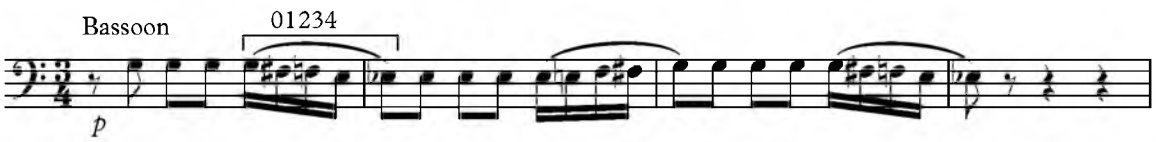
EXAMPLE 47: *Kastchei's Awakening,* reduction and analysis showing ladder steps and possible construction of dominant ninth chord. Ladder step numbers are labeled below.



dissertation, in the Princesses sections, including the *Khorovod*, the dominant ninth chord may be interpreted as a mixed harmony, having both elements of diatonic and chromatic harmonies. The diatonic or "human" element comes from the major triad at its base. This triad also contains a perfect fifth, again indicative of the "human" element. The supernatural elements are represented, as also treated earlier in the paper, by the tritone and the sets of its principal characters, Kastchei (0236) and the Firebird (0126), both containing a tritone as their outer interval. I propose that the reason for the appearance of the dominant ninth chord here is related to what is happening in the story at this point. Prince Ivan, the human protagonist, has been led by the Firebird to find the egg that houses the immortal spirit of the evil Kastchei. Prince Ivan destroys it and ultimately brings about Kastchei's death. The addition of the pitch B at this point adds a perfect fifth (B combines with the $F^{\#}$) to the collection of pitches, which otherwise would have sounded a diminished-seventh chord. Not only does the perfect fifth provide additional harmonic "plot" tension with the dissonance of the minor ninth, but it is symbolic of the "human" element imminently entering into the harmonic world of Kastchei.

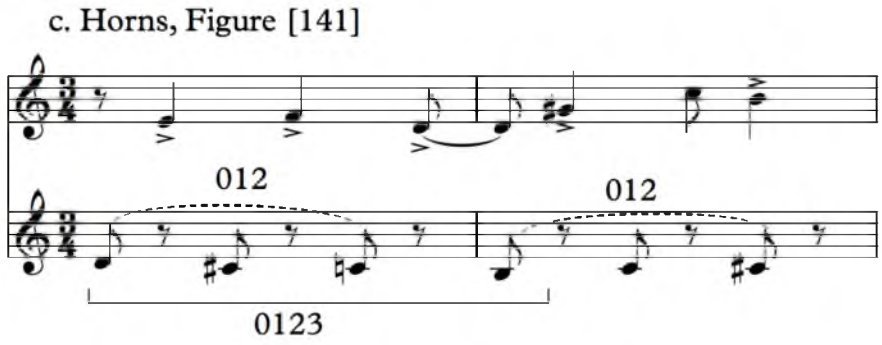
There are other pitch sets Stravinsky used to personify the evil Kastchei. One of these includes the aforementioned 01234 cited in EXAMPLE 48 (below), which emphasizes, at its outer interval, the major third, or interval class 4.

EXAMPLE 48: *The Enchanted Garden of Kastchei,* mm. 24-27, bassoon melody showing pitch set 01234.

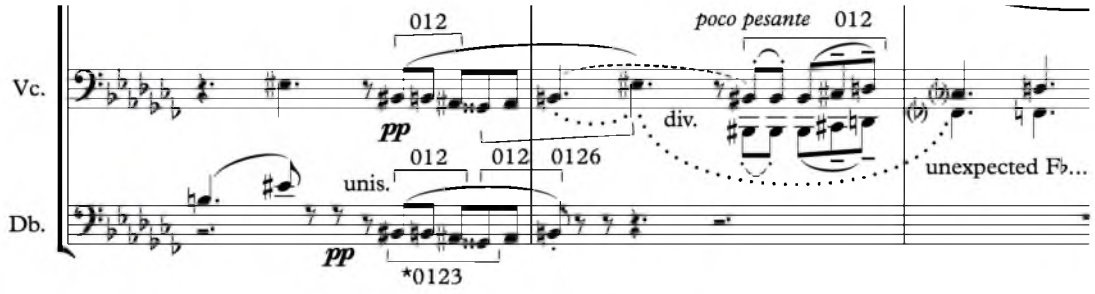


One of the most pervasive sets used to personify Kastchei is the related set, 0123, a subset of the aforementioned 01234, which seems to be generated from two 012 sets a semitone apart, which work in contrary motion to form a single musical line. From this is generated a four-note descending linear set 0123 (disregarding the last two ascending pitches of the second measure). See EXAMPLE 49 below. This set also comes into play in the *Introduction* at m. 16 in the cellos and basses. See EXAMPLE 50 below.

EXAMPLE 49: *Infernal Dance of Kastchei*, Figure [141], first and second horns. Note two sets 012 forming an 0123 in the second horn part.



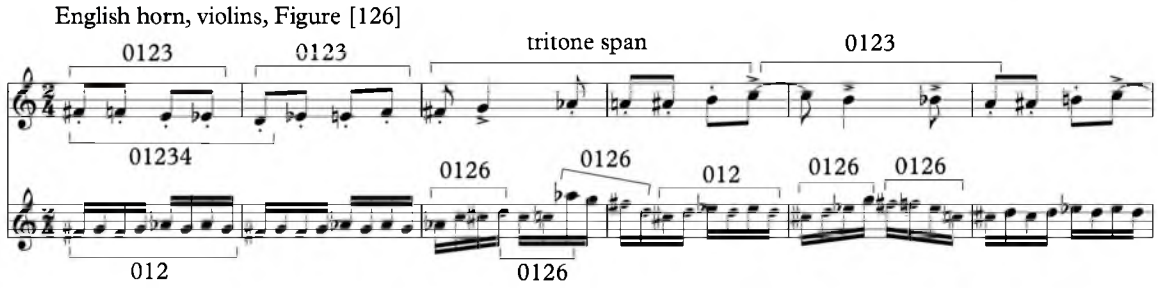
EXAMPLE 50: *Introduction,* mm. 16-18, cellos and basses shown.



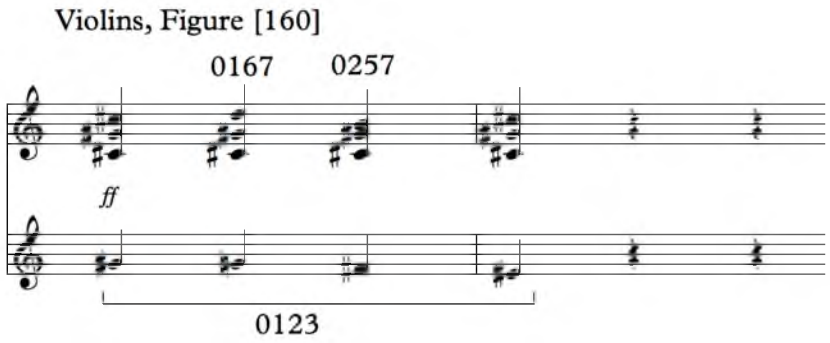
This same set is used extensively in the *Kastchei* movement. Another statement of it is shown in EXAMPLE 51 below (see the English horn part on the upper staff). An extension of this motif to reach a tritone span is also seen in mm. 3-4 of the example. Essentially, what is happening here is that the semitone set 0123 has been expanded 3 more semitones. The 0123 motif is also used in conjunction with multiple iterations of the Firebird's set 0126 and its subset 012 in the violins (see lower staff in EXAMPLE 51 below).

A final example of Stravinsky's use of the set 0123 can be found in the second violins in EXAMPLE 52 below. This is accompanied by the first violins, which play it in *fortissimo* triple-stops. In the course of the movement, this motif gets passed around to all of the instrument sections, again emphasizing the evil Kastchei. See EXAMPLE 52 below.

EXAMPLE 51: *Dance of Kastchei's Retinue*, *Enchanted by the Firebird*, Figure [126].



EXAMPLE 52: *Infernal Dance,* Figure [160], first and second violins.



CONCLUSION

In *The Firebird,* Stravinsky followed the Russian convention of sharply contrasting the music of the human characters against that of the supernatural characters. Most theorists posit that the human characters are portrayed with principally diatonic music, and the supernatural with principally chromatic music. In the case of the supernatural, the tritone, as personification of the two magical characters, Kastchei and the Firebird, is the basis for all of the music Stravinsky applies to them. He makes extensive use of it as bookends to the pitch sets of their two *leitmotifs*, both drawn from the first six notes of the opening *ostinato*. The ubiquitous tritone is of prime importance in the building of intervallic, motivic, and harmonic elements in the piece and helps to provide unity in the work as a whole.

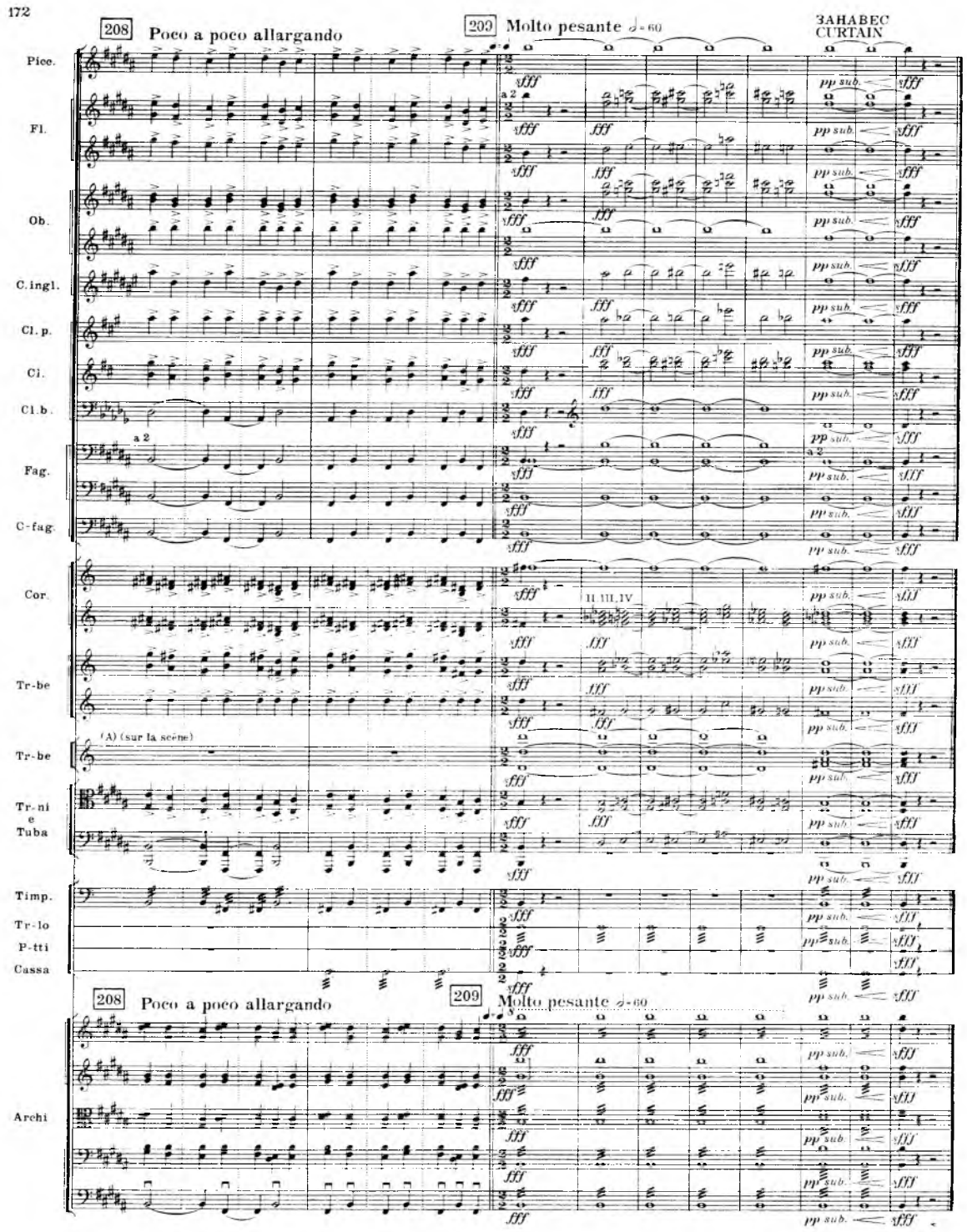
My greatest contribution in analyzing the music of *The Firebird* relates principally to the music representing the Princesses, captive humans under the supernatural control of Kastchei. In this dissertation, I have demonstrated that this music, commonly believed to be primarily folk or diatonic, and therefore given less importance by theorists, in actuality, is in large part constructed from the same source materials that spawned the supernatural music of the Firebird and Kastchei. Undoubtedly, the Princesses' music has frequent harmonic and motivic hints in the foreground and background of the chromatic *leitmotifs* of the principal supernatural characters. In addition, musical motifs in the "Princesses" sections are at times constructed by giving the pitch sets of the supernatural characters a more "diatonic" quality, extending or

contracting their outer interval of a tritone by a semitone, to form perfect fourths or fifths. There is evidence that, for Stravinsky, this was part of the reasoning governing his motivic, intervallic, and harmonic choices. The perfect fifth, certainly, was seen as representative of the human element of the work, while the tritone was seen as representative of the supernatural element. The combination of the two elements is what makes the composition of Stravinsky's *Firebird* truly masterful.

Perhaps this last aspect is seen most obviously in the last few measures of the work. At Figure [209], after the *Hymn of Thanksgiving,* the Firebird pitch set 0126 is expressed, most emphatically and gloriously for the last time in the majority of the brass and woodwind parts, with pedal tone pitch B as highest and lowest pitch sounding in both extreme registers, expressed by all of the string parts, the piccolo, all bassoons (with contrabassoon), the third oboe, and bass clarinet, and even the three onstage trumpets. What makes this iteration of the set 0126 the final "resolution" of the story is that this time, it has both chromatic *and* diatonic qualities. The root progression of complete, major triads in root position on B-C-$C^{\#}$-F-$C^{\#}$-C-B expresses the *leitmotif* of the Firebird in a form unprecedented in the work. The juxtaposition of the perfect diatonic fifths from the triads in a tritone-spanned progression is undoubtedly symbolic of the victory of the human element, Prince Ivan, over the evil, supernatural Kastchei with the help of the magical Firebird. See EXAMPLE 53 below.

One final question remains unanswered by theorists. If the work begins by alternating steps 2 (A^{b}-F^{b}) and 1 (D-F) of the ladder of thirds, implying E major (enharmonically) and D minor harmonies, why then does the piece end in B major? I believe the answer is very simple. It must have to do with the ladder of thirds. The last

EXAMPLE 53: Last page of *The Firebird,* 1910 version, Figures [208-end]. the Firebird pitch set 0126 is expressed for the last time in the majority of the brass and woodwind parts, with pedal tone pitch B as highest and lowest pitch sounding in both extreme registers. (Dover edition score, p. 172).



step in the sequence before the return of step 1 is step 24, or B-D#. This last step, which coincides with the end of the piece, implies the key of B major. Essentially, Stravinsky is ending the work with the last step in the ladder of thirds.

CODA: OTHER CONNECTIONS

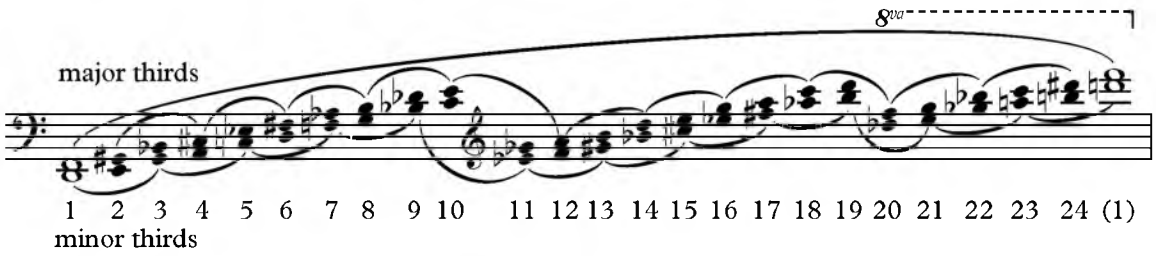
Stravinsky, while criticizing *The Firebird,* admitted that it "was in some respects a fecund score for my own development in the next four years."[70] In this period of time, he composed the other two "Russian" ballets, *Petrushka* (1911) and *The Rite of Spring* (1913). Following are some examples of music that relates to the music of *The Firebird.*

Petrushka (1911)

Many harmonies Stravinsky uses in the ballet *Petrushka* come from those he had already used in *The Firebird.* For example, the *"Petrushka* chord" already mentioned previously (used at the end of m. 12) is constructed by using two pairs of adjacent thirds on the "ladder," steps 9-10 and 21-22. See EXAMPLE 54.

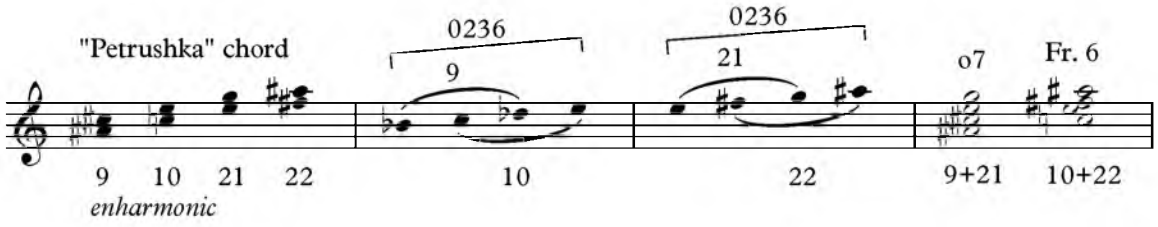
The "*Petrushka* chord" may also be conceived in other ways. One, it can be formed by two sets 0236 that are superimposed; two, perhaps the combination of a

EXAMPLE 54: Stravinsky's ladder of thirds.



[70] Van den Toorn, p. 2.

EXAMPLE 55: Derivation of the *Petrushka* chord from differing perspectives.



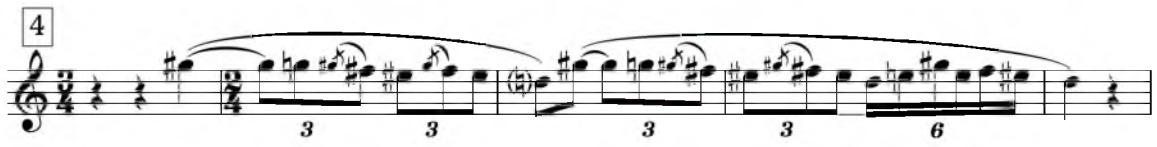
diminished-seventh chord with a French sixth chord; three, the superimposition of two major triads whose roots are a tritone apart. Perhaps in the mind of truly great composer, these concepts are simply facets of one great theoretical whole. See EXAMPLE 55 above.

The opening of *Petrushka* contains a melodic idea over a related static harmonic base, consisting of stacked perfect fifths, forming set 0257. This type of device had already been seen in *The Firebird* in the *Supplications of the Firebird* section at Figures [29-31]. Note the second clarinet part, which contains notes B-D over perfect fifths A-E in the bass, producing set 0257.

The Rite of Spring (1913)

There are numerous examples of music from *The Rite of Spring* that relate to music in *The Firebird.* One instance of music that seems strongly influenced by *The Firebird* is at the outset of *The Rite of Spring.* Note the melody in the D clarinet at Figure [4]. It contains hints of both the Firebird and Kastchei *leit-harmonies.* See also a similar melody at Figure [8]. See EXAMPLE 56.

EXAMPLE 56: *The Rite of Spring*, Figure [4], motif in the clarinet in D. Example sounds as written.



The following instances are cited in the score.

- The oboe and D clarinet melodies at Figure [9] are exclusively based on set 0257. They are pitted against the above pictured melody in the A clarinet.
- Sets 0257 in the violin parts at Figure [95].
- Tritone voice leading in the clarinets at Figure [79] at the *Introduction* to the *Second Part*.
- The existence of trichord sets 016 in the music at Figures [87-89] and [109].
- Set 016 voice leading in the basses and cellos at Figures [178-179].
- Tritone voice leading in tremolos at and around Figures [45-46].
- Pitch sets 012 at Figures [93-97].
- Pitch sets 026 at Figure [97] and beat two of m. 68 (three measures after Figure [12]).

Debussy's Ondine, from *Préludes, Bk. II*, No. 8 (1912-13)

There are some unusually close relationships with the music of Debussy's piano prelude Ondine (from *Preludes, Book II*, No. 8) and excerpts from Stravinsky's *Firebird* and *The Rite of Spring*. Both *The Rite of Spring* and Debussy's *Préludes, Book II* were written within months of each other in 1912 and 1913.

Some similarities are noted below.

- The very first sonority in Ondine is exclusively set 0236.
- Measures 4-7 of Ondine contain many sets 016 voiced similarly to Stravinsky's in *The Rite of Spring* at Figure [109].
- More pitch sets 016 in each of the two treble staves in mm. 45-53 in conjunction with Debussy's use of dominant minor ninth chords.
- Pitch sets 012 present at m. 10.

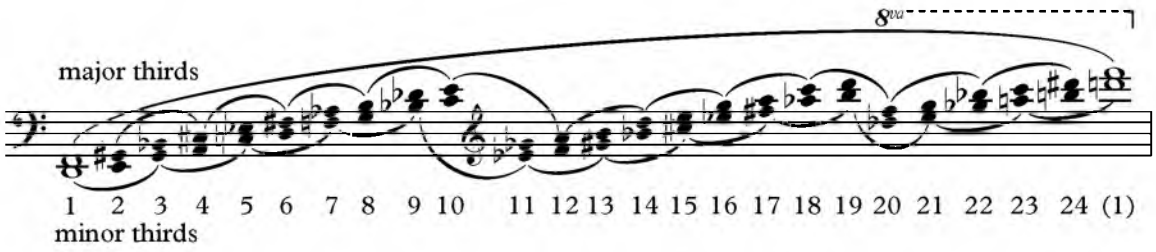
- Measure 20 presents a melody accompanied by pitch sets 0257 voiced like the opening of *Petrushka.*
- The Firebird set 0126 is one of the primary themes in the piece (introduced in mm. 30-31, but used more typically to *The Firebird* in m. 37).

Debussy's Prelude to the Afternoon of a Faun (1894)

Though Debussy's *Prelude to the Afternoon of a Faun* was composed nearly two decades earlier, in 1894, there are some relationships between its music and that of *The Firebird.* The opening flute motif contains a tritone, "filled in" with mostly semitones, which descends and then ascends in mirror-inversion at the tritone, extremely similar to several instances in *The Firebird,* especially in its use of mirror-inversion in both the Firebird's set 0126 and Kastchei's set 0236.

APPENDIX: STRAVINSKY'S LADDER OF THIRDS

EXAMPLE 5 (reprinted): Stravinsky's ladder of thirds, each rung numbered for future reference.[71]



[71] As printed in Taruskin, p. 591.

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