

Revised Selected Papers

Accademia Musicale Studio Musica  
Michele Della Ventura, *editor*

2019

# Proceedings of the International Conference on New Music Concepts and Inspired Education

Vol. 6



**Accademia Musicale Studio Musica**

International Conference on New Music Concepts and  
Inspired Education

Proceeding Book  
Vol. 6

Accademia Musicale Studio Musica  
Michele Della Ventura  
Editor

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Printed in Italy  
First edition: April 2019

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[www.studiomusicatreviso.it](http://www.studiomusicatreviso.it)  
Accademia Musicale Studio Musica – Treviso (Italy)  
ISBN: 978-88-944350-0-9

## Preface

This volume of proceedings from the conference provides an opportunity for readers to engage with a selection of refereed papers that were presented during the International Conference on New Music Concepts and Inspired Education. The reader will sample here reports of research on topics ranging from mathematical models in music to pattern recognition in music; symbolic music processing; music synthesis and transformation; learning and conceptual change; teaching strategies; e-learning and innovative learning. This book is meant to be a *textbook* that is suitable for courses at the advanced undergraduate and beginning master level. By mixing theory and practice, the book provides both profound technological knowledge as well as a comprehensive treatment of music processing applications.

The goals of the Conference are to foster international research collaborations in the fields of Music Studies and Education as well as to provide a forum to present current research results in the forms of technical sessions, round table discussions during the conference period in a relax and enjoyable atmosphere.

36 papers from 16 countries were received. All the submissions were reviewed on the basis of their significance, novelty, technical quality, and practical impact. After careful reviews by at least three experts in the relevant areas for each paper, 12 papers from 10 countries were accepted for presentation or poster display at the conference.

I want to take this opportunity to thank all participants who have worked hard to make this conference a success. Thanks are also due to the staff of “Studio Musica” for their help with producing the proceedings. I am also grateful to all members of Organizing Committee, Local Arrangement Committee and Program Committee as well as all participants who have worked hard to make this conference a success.

Finally I want to appreciate all authors for their excellent papers to this conference.

April 2019

Michele Della Ventura

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# A Mathematical Insight into Balakirev's Orientalism in *Islamey*

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**Abstract.** Balakirev's *Islamey*, composed in 1869 and revised in 1902, consists of three sections and can be analyzed from perspective of form and structure. Balakirev derives three separate motives, represented as *mot. a*, *mot. b*, and *mot. c*. In the A-section of *Islamey*, each phrase is a combination of variations and fragmentations of the three motives, where a set of four or five such segments commensurate a sole group. The A-section contains ten separate groups, all unique in their structure and form. By applying a mathematical approach to understand the form, it is evident that Balakirev employs three types of group structures. (1) groups that contain *mot. a* and *mot. b*; such groups utilize prime, variation, and fragmentation forms. (2) groups that contain only *mot. c*; such groups use only variation form. (3) groups that contain only *mot. b*; such groups use only the fragmentation form.

**Keywords.** Balakirev, music analysis, music and mathematics, music form

## 1 Introduction

The tradition of Russian classical music commenced at the onset of 19th century with Mikhail Glinka, acclaimed as "the father of Russian music", becoming the first Russian national composer to carve out a unique compositional style, albeit with Italian characteristics [1]. Along with historically-prominent operas *A Life for the Tsar* (1836) and *Ruslan and Lyudmila* (1842), Glinka's works serve as a source of inspiration for future composers, such as the Mighty Handful, to expand and develop the 'Russianness' in music [2]. The Mighty Handful includes Mily Balakirev (1837-1910), Alexander Borodin (1833-1887), César Cui (1835-1918), Modest Mussorgsky (1839-1881), and Nikolai Rimsky-Korsakov (1844-1908), who began their collaboration in St. Petersburg in the mid-1850s and took on a rigorous attempt to produce strictly Russian music [3]. From the Russian submediant to the notion of tonal mutability, there are multiple traits that separate the Mighty Five members from other Russian and non-Russian composers [4], [5]. One of such prominent traits is musical orientalism that can be traced in Balakirev's piano work *Islamey*, likewise known as *Oriental Fantasy* [6].

## 2 The mathematical approach to study form

Balakirev completed *Islamey* in 1869 and later revised it in 1902. The piece consists of three distinct sections, each characterized by a unique tempo, level of lyricism, and technical requirements. Balakirev's musical language is at the apex of its development throughout the work and the composer's approach to employ various scales and modes, as well as to suggest tonal instability, are the prominent theoretical matters worthy of analysis in all three sections of *Islamey*, yet it is the notions of orientalism and heterophony in the first section that are of most interest from empirical perspective, formed as Balakirev carefully maneuvers multiple variations derived from a Caucasian dance tune [7]. Balakirev generates three separate segments that will be referred to as "motives" and defined as *mot. a*, *mot. b*, and *mot. c*. A motive is a short musical idea that will often undergo changes in form and structure throughout the piece of music and is typically introduced in the beginning of the composition [8]. In *Islamey*, the three motives are the building blocks of the first section of the work and are found either in prime form, variation form, or fragmentation form.



Fig. 1. The opening *mot. a*<sup>0</sup> in prime form.



Fig. 2. The opening *mot. b*<sup>0</sup> in prime form.



Fig. 3. The opening *mot. c*<sup>0</sup> in prime form.

The motive is considered to be in prime form if it is shown in its original arrangement throughout the music. The motive is said to be in variation form if any musical alterations are generated in relation to the prime form. A variation occurs when the motive is altered through changes in melody, harmony, dynamics, articulation, or other similar musical components [9]. The motive undergoes a fragmentation if such motive is employed by the composer partially. In fragmentation, a musical reduction of a motive occurs, allowing the composer to employ merely a portion of such motive [10]. The three operations will be represented by  $y$ , as in *mot. x* <sup>$y$</sup> , where  $y = 0$  if *mot. x* is in prime form and  $y > 0$  if *mot. x* is a variation. The *fr* variable will be assigned to a particular motive that has been fragmented. Furthermore, certain motives undergo transposition, which will be labeled as  $T_x$ . A set of four or five motives will be considered as a sole group. The opening section



contains a total of nine musical groups with four motives each and one musical group with five motives. Each group is distinct in its own way and is built on certain combinations of *mot. a<sup>0</sup>* (shown in Figure 1), *mot. b<sup>0</sup>* (shown in Figure 2), and *mot. c<sup>0</sup>* (shown in Figure 3). The A-section of *Islamey* is presented in Figure 4 and can be found at the end of the article [11].

### 3 Analysis

The opening group presents *mot. a* and *mot. b* as prime form monophony and is the only group to do so. There are two important aspects to consider in structure and cohesiveness of both prime forms that are not seen in any other groups in the first section of *Islamey*. First, both motives contain a raised fifth that is lowered in resolution. The A $\sharp$  in m. 1, m. 3, m. 5, and m. 7 is resolved to A $\flat$  in m. 2, m. 4, m. 6, and m. 8 respectively. Second, both motives represent a G $\flat$  major tonality (IV) resolving to D $\flat$  major (I), generating a hypothetical subdominant-tonic relation. Such a simple approach deceives the listener, as the piece rapidly expands in artistic and technical complexity. It is also important to note that the tradition of pianistically undemanding introduction is not uncommon in Russian music. One of such later examples is the opening of the first movement of Rachmaninoff's Piano Concerto No. 3 in D minor [12]. In the first group of *Islamey*, mm.1-2 and mm. 3-4 = *mot. a<sup>0</sup>*, while mm.5-6 and mm. 7-8 = *mot. b<sup>0</sup>*.

The variations of both motives are introduced in Group II and the main melody of *mot. a<sup>1</sup>* is altered and incomplete, as certain pitches are not consistently used. Instead of the raised fifth as seen in the opening group, Balakirev uses a raised tonic in m. 9, m. 11, m. 13, and m. 15 as a way to convey dissonance. The texture and melody of *mot. b<sup>1</sup>* likewise differs from its prime form. The accompaniment in *mot. a<sup>1</sup>* is generated through the use of dyads, where Balakirev chooses to employ only perfect harmonic intervals, including fourths, fifths, and octaves. On the contrary, the accompaniment of *mot. b<sup>1</sup>* consists of octaves and chords, including triads and complete and incomplete seventh chords to provide musical reinforcement for the right hand's melody. Therefore, mm.9-10 and mm. 11-12 = *mot. a<sup>1</sup>*, while mm.13-14 and mm. 15-16 = *mot. b<sup>1</sup>*.

The third group only utilizes *mot. c*, which is seen throughout *Islamey* solely in variation form. The actual melody in all four segments can be found in the inner voices, as Balakirev applies the hocket technique in order to outline the melodic line. The third and the fourth segments are identical with the exception of a supplementary F-octaves on the third, sixth, ninth, and twelfth beats of the fourth segment, turning the fourth segment into a variation of the third segment. Therefore, mm.17-18 and mm. 19-20 = *mot. c<sup>1</sup>*, mm. 21-22 = *mot. c<sup>2</sup>*, and mm.23-24 = (*mot. c<sup>2</sup>*)<sup>1</sup>.

Balakirev returns to the first two motives in the fourth group. This group is similar to the second group, only with a much thicker texture and a larger range of notes. While depicting a similar melody, the second segment is not reinstated. In the third segment, Balakirev incorporates identical music in the right hand as of *mot. b<sup>1</sup>*, while changing the pitches in the left hand. In the fourth segment, Balakirev utilizes only certain identical parts in the right hand, similar to *mot. b<sup>1</sup>*. Both of *mot. b* variations are defined in contrary motion and utilize all possible twelve pitch-classes. A significant trait of the fourth group as a

whole is the fact that every segment contains an interval of a third. Therefore, mm. 25-26 = *mot. a*<sup>2</sup>, mm. 27-28 = *mot. a*<sup>3</sup>, mm. 29-30 = (*mot. b*<sup>1</sup>)<sup>1</sup>, and mm. 31-32 = (*mot. b*<sup>1</sup>)<sup>2</sup>.

Group V (mm. 33-44) continues with similar structure by incessantly utilizing *mot. a* and *mot. b*, only this time incorporating elements of transposition and fragmentation. Transposition is seen in both motives of this group, as the tonality modulates to D major. Additionally, even though the first two segments of the group are identical, mm. 35-36 are composed one octave higher than mm. 33-34. Furthermore, the complete transposition of *mot. a*<sup>4</sup> as in relation to *mot. a*<sup>0</sup> would mean that *mot. a*<sup>4</sup> would start on pitch B rather than on F#. Lastly, while *mot. a*<sup>0</sup> consists of the subdominant resolving into tonic, portraying a modification of a plagal cadence, *mot. a*<sup>4</sup> does the opposite as tonality of D major resolves into tonality of G# major. Both left and right hands take turns playing and generate yet another example of hocket technique, previously seen in the third group. Looking at the second motive, it is evident that there are two repetitions of *mot. b*<sup>2</sup> (a transposition of *T*<sub>12</sub>) before Balakirev applies fragmentation. Even though the third variation of *mot. b* begins in the same fashion as the first two, it deviates into sets of thirds, generating diminished seventh chords that ascend in parallel motion. The fifth segment of this group contains a fragmentation of *mot. b*<sup>1</sup>. Therefore, mm. 33-34 and mm. 35-36 = *mot. a*<sup>4</sup>, mm. 37-38 and mm. 39-40 = *mot. b*<sup>2</sup>, and mm. 41-44 = (*mot. b*<sup>2</sup>)<sup>1</sup>.

Abjuring *mot. a* and *mot. b*, Balakirev returns to utilization of merely the *mot. c* in the sixth group, similarly to the third group. In this variation, there is a clear deviance of rhythm in all four segments, as well as a contrasting left-hand melody that generates a sense of counterpoint. Additionally, transposition is evident in the right hand on the third and the fourth repeats. Looking solely at the right hand, it is likewise possible to define *mot. c*<sup>5</sup> as *T*<sub>5</sub> (equivalent to *mot. c*<sup>3</sup>) and *mot. c*<sup>6</sup> as *T*<sub>7</sub> (equivalent to *mot. c*<sup>4</sup>) with a raised E. Therefore, mm. 45-46 = *mot. c*<sup>3</sup>, mm. 47-48 = *mot. c*<sup>4</sup>, mm. 49-50 = *mot. c*<sup>5</sup>, and mm. 51-52 = *mot. c*<sup>6</sup>.

The seventh group is the final one in the first section to use variations of only *mot. c*. The contrasting aspects can be found in the hidden melody, rhythmic deviance, pianistic technique, and partial utilization of a hocket technique. While hinted, no direct transposition exists. Therefore, mm. 53-54 = *mot. c*<sup>7</sup>, mm. 55-56 = *mot. c*<sup>8</sup>, mm. 57-58 = *mot. c*<sup>9</sup>, and mm. 59-60 = *mot. c*<sup>10</sup>.

Balakirev returns to the unity of *mot. a* and *mot. b* in the eighth group, found in mm. 61-68. The variation of the first motive in this group is similar to the *mot. a* variation in the fifth group, where the composer alters the tonality and its resolution. In this passage, Balakirev modulates back to the key of D major, yet this time beginning *mot. a* on G major to clearly resolve into the home key. Hocket is used once again to emphasize the main melody in addition to *T*<sub>12</sub> operation between the first and the second segments. The uniqueness of *mot. b*<sup>6</sup> is seen in the textural change in right hand, as well as in the chordal and triadic accompaniment in the left hand, previously seen in the *mot. a* from the second group. Lastly, similarly to the first two segments of the group, the two *mot. b*<sup>3</sup> are one octave apart. Therefore, mm. 61-62 and mm. 63-64 = *mot. a*<sup>5</sup>, while mm. 65-66 and 67-68 = *mot. b*<sup>3</sup>.

The ninth group is analyzed differently than all previous groups, as it entirely consists of fragmentation of the first part of *mot. b*<sup>1</sup>. This group incorporates 8 measures, divided into four identical in structure segments and moves in perpetuum mobile. The left hand

of the first two motives is centralized on D  $\flat$  arpeggiation, since the lack of F and F  $\flat$  keeps the actual tonality hidden. The left hand of the final two motives contains its own contrapuntal melody. The right hand consists of twelve pitches in each measure, which will be represented as a set of two variables  $q$  and  $r$ , where  $q$  is the fragmentation of set of pitches #1 through #6 from *mot. b<sup>1</sup>* and  $r$  is the fragmentation of set of pitches #7 through #12 in *mot. b<sup>1</sup>*. Therefore, mm. 69-71 and mm. 73-75 will be defined as a set of  $\{q, r\}$ , while m. 72 and m. 76 will be defined as a set of  $\{r, r\}$ . The right hand in mm. 69-72 is identical to mm. 73-76. The simultaneously played pitches, such as any two pitches  $m$  and  $n$  will be defined as  $(m/n)$ . The pitch-classes are centered at D  $\flat$  where D  $\flat$  = 0. Therefore,  
m. 69:  $q = \{1, 5/2, 4, 9/5, 8, 12/9\}$ ,  $r = \{10, 14/11, 12/9, 11/7, 6, 9/5\}$ .  
m. 70:  $q = \{3, 7/4, 6, 11/7, 10, 14/11\}$ ,  $r = \{11, 16/12, 14/11, 12/9, 8, 11/7\}$ .  
m. 71:  $q = \{4, 9/5, 8, 12/9, 11, 16/12\}$ ,  $r = \{13, 17/14, 16/12, 14/11, 10, 12/9\}$ .  
m. 72:  $r^1 = \{15, 19/16, 17/14, 16/12, 10, 14/12\}$ .  
m. 72:  $r^2 = \{16, 21/17, 19/16, 17/14, 13, 16/12\}$ .

Based on the data, there is no direct transposition between the fragments of the ninth group, yet certain elements of transposition and translation can be traced. First, the elements in set  $q$  in m. 70 are two semitones higher than the elements of set  $q$  in m. 69. Second, the last four elements of  $q$  at m. 69 are the initial four elements of  $q$  at m. 71. Third, the opening three elements of  $r$  in m. 69 are the final three elements of  $r$  in m. 71, except in different order.

The tenth group is the final one of the first section and consists of *mot. a* and *mot. b*. The *mot. a<sup>6</sup>* and  $(mot. a^6)^1$  can be expressed in a series of first inversion triads and centralized on D major tonality resolving to A major. It is evident that  $(mot. a^6)^1$  is a variation of *mot. a<sup>6</sup>* since only the left hand alters at the time when the right hand remains identical. By looking at  $(mot. b^1)^3$  and  $(mot. b^1)^4$ , it can be concluded that both are variations of *mot. b<sup>1</sup>* and only the beginnings of each of those motives differ from the original form and  $(mot. b^1)^4$  is the extended variation of  $(mot. b^1)^3$ . Therefore, mm. 77-78 = *mot. a<sup>6</sup>*, mm. 79-80 =  $(mot. b^1)^3$ , mm. 81-82 =  $(mot. a^6)^1$ , and mm. 83-84 =  $(mot. b^1)^4$ .

[illegible]

The image displays a page of musical notation, likely for a piano piece, consisting of ten systems of staves. The notation includes various musical elements such as notes, rests, and dynamic markings. The key signature is B-flat major (two flats). The piece begins with a series of chords and arpeggiated figures in the right hand, while the left hand provides a steady accompaniment. The notation is written in a standard musical format, with treble and bass clefs. The piece concludes with a final chord in the right hand and a sustained bass line in the left hand.

Dynamic markings include *p* (piano), *pp* (pianissimo), and *ff* (fortissimo). Performance instructions include *il ritmo ben marcato* (the rhythm well marked), *poco* (a little), *cre* (crescendo), and *acen* (accelerando). The piece features a variety of musical textures, including dense chordal passages and more fluid, melodic lines.

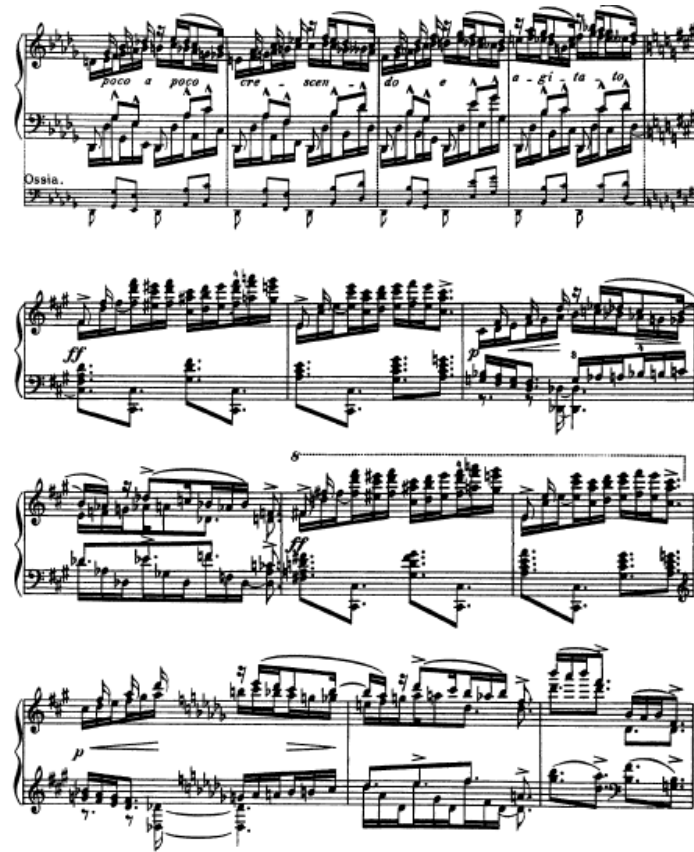


Fig. 4. The A-section of *Islamey*, mm. 1-84.

## 4 Conclusion

The particular structure and the formation of musical elements is a significant component to the analysis of Balakirev's works and Russian music in general [13]. The grouping of motivic segments according to prime, variation, and fragmentation forms is a prominent characteristic in Balakirev's other piano works, particularly evident in *Polka in F# minor* and *Scherzo No. 1 in Bb minor* [14]. Therefore, such a mathematical approach can likewise be applied to further understand the form of these compositions. Since Balakirev's goal was to emphasize on stylistic musical traits and characteristics of own musical nationalism, it is very unlikely that mathematical approach was more significant than the qualities of style, for which *Mighty Five* are known, yet it is evident that the piece is structurally organized. The phrases of *Islamey* in the first section are derived from the Caucasian folk tune with the use of compositional methods, such as variation and fragmentation. Based on the structure and the motivic development that is seen through *Islamey*, it is evident that Balakirev assembles the musical groups in three ways: (1) groups

that contain *mot. a* and *mot. b* employing prime, variation, and fragmentation forms; (2) groups that contain *mot. c* employing variation form; (3) groups that contain *mot. b* employing the fragmentation form.

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This book presents a collection of selected papers that present the current variety of all aspect of music research, development and education, at a high level. The respective chapters address a diverse range of theoretical, empirical and practical aspects underpinning the music science and teaching and learning, as well as their pedagogical implications. The book meets the growing demand of practitioners, researchers, scientists, educators and students for a comprehensive introduction to key topics in these fields. The volume focuses on easy-to-understand examples and a guide to additional literature.

Michele Della Ventura, editor

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