

# **Principles of Orchestration and the Analysis of Musical Gestures**

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# ABSTRACT

## Principles of Orchestration and the Analysis of Musical Gestures

Composing or arranging for orchestra is a skill which is hard to learn and hard to teach. Literature on orchestration is comprehensive in terms of rules of thumb and these heuristic tools are sometimes called principles of orchestration. However, a study of the literature on orchestration revealed that these 'principles' are not theories about the outcomes and effects of specific decisions made by composers. An exception is the work of George McKay who does indeed establish principles of orchestration to some extent.

Granting a few exceptions, literature on orchestration takes as point of departure recommendations about techniques of orchestration and illustrates these techniques with analyses of existing compositions for orchestra. In this study I invert the approach followed in the literature and take music analysis as a point of departure for my study. I used an existing and conventional analysis of Claude Debussy's *Syrinx* for solo flute from the book *Sonic Design: The Nature of Sound and Music* by Robert Cogan and Pozzi Escot (1976) as context for my own analysis of *Syrinx* in which the less familiar type of analysis – the analysis of musical gestures and musical forces – can be understood. This analysis formed the basis for my orchestral composition titled *Ananke* which is based upon musical gestures from *Syrinx*. A reinterpretation of Cogan and Escot's analysis of Debussy's *Syrinx* enabled me to identify the musical gestures I used as a basis for my orchestral composition.

Musical gestures are understood in this dissertation in terms of the theory of musical forces by Steve Larson. The objective in composing *Ananke*, based upon material from *Syrinx* by Debussy, is to explore different ways in which the musical gestures can be orchestrated in order to amplify the three musical forces namely musical gravity, musical magnetism and musical inertia. This process of composing the orchestral composition enabled me to construe principles of orchestration concerning musical forces and the different ways in which musical forces can be amplified. I found that the approach I followed in this study can indeed be employed in order to investigate and construe principles of orchestration, taking music analysis as a point of departure. This new approach to the study of orchestration opens up new possibilities in teaching and learning orchestration, as well as in composing or arranging for orchestra.

Keywords: orchestration, principles of orchestration, musical gestures, musical forces, *Syrinx*, Claude Debussy, Steve Larson

# OPSOMMING

## **Beginsels van Orkestrasie en die Analise van Musikale Geste**

Om musiek vir 'n orkes te komponeer of te verwerk is 'n vaardigheid wat moeilik is om te leer en om te onderrig. Die omvattende literatuur rakende orkestrasie gee riglyne en reëls, heuristiese gereedskap waarna soms verwys word as beginsels van orkestrasie. 'n Literatuurstudie oor orkestrasie het egter getoon dat hierdie 'beginsels' nie werklik beginsels is nie; dit is nie teorieë rakende die uitkomst en gevolge van spesifieke besluite wat komponiste maak nie. 'n Uitsondering is die werk van George McKay waarin hy inderdaad in 'n mate beginsels van orkestrasie neerlê.

Met enkele uitsonderings neem die skrywers in die literatuur oor orkestrasie aanbevelings oor tegnieke as 'n vertrekpunt vir orkestrasie en illustreer dan hierdie tegnieke met analises van bestaande orkeskomposisies. In hierdie studie volg ek 'n omgekeerde benadering deur musiekanalise te neem as vertrekpunt vir my studie. Ek maak gebruik van 'n bestaande en konvensionele analise van Claude Debussy se *Syrinx* vir solo fluit uit die boek *Sonic Design: The Nature of Sound and Music* deur Robert Cogan en Pozzi Escot (1976) as konteks vir my eie analises van *Syrinx* wat 'n minder bekende analisemethode gebruik, naamlik die analise van musikale geste en musikale kragte. Hierdie analise vorm die basis vir my orkeskomposisie getiteld *Ananke* wat gebaseer is op die musikale geste van *Syrinx*. 'n Herinterpretasie van Cogan en Escot se analise van Debussy se *Syrinx* het my in staat gestel om die musikale geste te identifiseer wat ek as basis vir my orkeskomposisie gebruik het.

Musikale geste word in hierdie navorsingsverslag verstaan in terme van die teorie van musikale kragte soos uiteengesit deur Steve Larson. Die doel met die komponering van *Ananke*, gebaseer op die materiaal van *Syrinx* deur Debussy, was om verskillende maniere te verken waarin musikale geste georkestreer kan word om sodoende die drie musikale kragte naamlik musikale gravitasie, musikale magnetisme en musikale bewegingstraagheid te versterk. Hierdie proses wat die skep van die orkestrale komposisie ingesluit het, het my in staat gestel om beginsels van orkestrasie te formuleer. Ek het gevind dat die benadering wat ek gevolg het in hierdie studie inderdaad gebruik kan word om beginsels van orkestrasie te ondersoek en te formuleer deur musiekanalise as vertrekpunt te neem. Hierdie nuwe benadering tot die studie van orkestrasie skep nuwe moontlikhede vir die onderrig en leer van orkestrasie, asook vir die skep van komposisies en verwerkings vir orkes.

Sleuteltermes: orkestrasie, beginsels van orkestrasie, musikale geste, musikale kragte, *Syrinx*, Claude Debussy, Steve Larson

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# CHAPTER 1

## INTRODUCTION

### 1.1 Research Problem

In this chapter a discussion of the importance of the skill to compose and arrange for orchestra is followed by a discussion of how this is a skill which is hard to learn and to teach. The teaching-learning strategies concerning orchestration, as discussed in the literature which addresses this subject, are named and it is argued that the literature shows a lack regarding the formulation of principles concerning orchestration. The approach followed in this research project – an inversion of the approach followed in the literature on orchestration – is then presented. Analysis of orchestration is then discussed and the analysis of musical forces motivated as a suitable theoretical framework for this study. I will then discuss why musical gestures will be identified in terms of musical forces and argue that musical gestures can be orchestrated in terms of musical forces with different combinations of possibilities. The choice of material for analysis is then motivated: *Syrinx* (1915) for solo flute by the French composer Claude-Achille Debussy (1862 – 1918) will be used as an example to show the process of how principles of orchestration can be construed based upon considerations of musical forces in gestures.

#### 1.1.1 Orchestration as an important Skill which is hard to Learn and Teach

To compose and arrange for orchestra is an important compositional skill that most composers and composition students need to learn at some stage (Jacob, 1977:i). This skill is especially necessary when composers wish to compose in a musical genre which requires an orchestra, such as symphonies, concertos, ballets, operas, oratorios, cantatas, theatrical productions and film music. Cochran (1941:9) writes that it is “impossible to exaggerate the importance of this art among the many that go to the making of a musical success in the theatre.” Although

orchestration is a skill eventually mastered by many composers, it “is hard to teach”<sup>1</sup> (Belkin, 2008) and thus also hard to learn. In the even stronger opinion of the well-known Russian composer, Nikolay Rimsky-Korsakov: “[t]o orchestrate is to create, and that is something which cannot be taught.” (Rimsky-Korsakov, 1964:2.) These prominent composers’ views still suggest, however, that although it is difficult to teach orchestration, it can be learnt in various ways.

### 1.1.2 Teaching-learning Strategies concerning Orchestration

Orchestration can be learnt in the following ways:

- Arranging (standard) orchestral compositions for piano or organ (Jacob, 1977:101)
- Rescoring orchestral compositions arranged for piano and comparing the orchestration with the original full score (Jacob, 1977:101)
- Transferring music between different mediums (Kechley, 1959:234)
- Orchestrating an instrumental composition which was orchestrated by other composers and comparing different attempts with different orchestrations
- Studying and analyzing existing repertoire (Belkin, 2008; Berlioz & Strauss, 1948:1; Jacob, 1977:101; Kennan & Grantham, 1997:v; Parrott, 1957:75; Piston, 1980:461; Rimsky-Korsakov, 1964:4)
- Studying books on orchestration (Jacob,<sup>2</sup> 1977:i; Kennan & Grantham, 1997:1; Rauscher, 1963:vii)
- Listening to live, recorded or even simulated orchestral compositions and aural training (Adler, 1982:v; Belkin, 2008; Jacob, 1977:101; Kennan & Grantham, 1997:1)
- Studying timbral combinations (Adler, 1982:v; Berlioz & Strauss, 1948:1; Kennan & Grantham, 1997:1; Parrott, 1957:14; Read, 1976:ix)
- Individual lessons or classes on composing for orchestra (Kennan & Grantham, 1997:1; McKay, 1969:iv-v)

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<sup>1</sup> Belkin (2008) motivates his statement that “[o]rchestration is hard to teach” by remarking that (1) feedback on the attempts of students is difficult because an orchestra is not always available for experimentation and (2) “if the parts are reasonably playable, and provided the coming and going of entries does not actively contradict the work’s main structural articulations, it is almost as hard to write glaringly badly for the orchestra as it is to write glowingly well.”

<sup>2</sup> Jacob (1977:i) writes that “the whole technique of scoring cannot be learned from books alone – experience and common sense being in the end the only teachers”.

- Working with orchestras, demonstrations by orchestral players or an orchestra, or workshops (Berlioz & Strauss, 1948; Kennan & Grantham, 1997:1)
- Conducting an orchestra (Berlioz & Strauss, 1948:1; Wagner, 1959:346)
- Composing a lot of compositions for orchestra to gain experience (Jacob, 1977:i; Wagner, 1959:2)
- Composing for individual instruments of the orchestra (Piston, 1980:461; Rauscher, 1963:vii)

### 1.1.3 Principles of Orchestration and the Literature

Principles of orchestration can be contrasted with rules of thumb regarding orchestration. Principles of orchestration are interpreted here as theories about the outcomes and effects of certain decisions made by composers. When known and applied, principles of orchestration will enable composers to consider their decisions in a systematic way because the outcomes of certain decisions are based upon ‘laws of music’ regarding the different elements of music.

In contrast to principles of orchestration, rules of thumb are less systematic and tell composers what to do and what not to do. Rules of thumb show a relative lack of theoretical justification when compared with principles of orchestration.

Alan Belkin (2008) writes that “[s]everal fine books on orchestration already exist”<sup>3</sup> and there are indeed many sources available in the literature. Although the literature is comprehensive on the ways of teaching and learning about orchestras, instruments and orchestration, a lack of principles of orchestration is evident. Sources from the literature that prominently address principles of orchestration can be discussed as follows.

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<sup>3</sup> Belkin (2008) refers to the publications of Rimsky-Korsakov, Piston, Adler and Koechlin as examples (see bibliography).

George F. McKay (1969:iv-v) discusses the methods employed to learn and teach orchestration and concludes that “[t]he most creative orchestration occurred when the student was unburdened from imitating masterworks and was allowed to develop personal expression restricted only by the most fundamental guiding principles”<sup>4</sup>. McKay (1969:iii) writes that the main purpose of his book is the formulation of a general theory concerning orchestration. In his approach, vastly different from those of other writers, McKay devotes two chapters in his book *Creative Orchestration* to the Principles of Clarity<sup>5</sup> and the Principles of Tonal Interest respectively.<sup>6</sup>

Gordon Gidley (1963:626) reviewed McKay’s book and considered his textbook as “not only excellent but one which is quite possibly unique.” McKay’s approach is indeed unique, but some of his principles can still be considered rules of thumb, rather than principles. McKay’s principles are also not based upon music analysis which is the focus of this study and therefore he addresses different kinds of principles.

Alan Belkin (2008) mentions that he will “concentrate [...] on general principles instead of rules of thumb”<sup>7</sup>. He uses an example of a rule of thumb which tells a student to avoid big gaps in orchestral textures. As a counter suggestion he prefers that the following principles concerning orchestration should be adhered to: “[1] Musical elements that are in separate registers are not perceived as being on the same plane of tone. [2] For fullness of sound, the ear requires fairly complete registral saturation, especially in the middle range.” Such principles explain why large gaps may be effective in one situation but not in another, depending on the character of the composition.

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<sup>4</sup> McKay most likely refers to the principles of clarity and the principles of tonal interest as the ‘most fundamental guiding principles’.

<sup>5</sup> This guiding principle is subdivided into the following principles: Consistency of Unit Organization; Definiteness of Texture; Monophonic Texture; Chordal Texture; Polyphonic Texture; Homophonic Texture; Onomatopoeic Texture; Textural Combination; Pitch Distribution; Limitation of Harmony; Vividness of Timbre; Limitation of Melodic Components; Control of Dynamics.

<sup>6</sup> This guiding principle is subdivided into the following principles: Contrast of Timbre (Antiphonal); Instrumental Motion; Doubling for Power; Timbre Blend; Contrast of Pitch Locale; Blend of Differentiated Motion; Extreme Registers; Contrasted Articulation; Overlapping; Pointillism; Total Mixture; Contrast of Chord and Line; Motion as a Sustaining Factor; Percussion as Background; Strings as Background; Punctuation; Balance of Idiomatic Characteristics; Contrast of *Staccato* and *Legato* (Consecutive); *Staccato* and *Legato* (Simultaneous); Expanded Tonal Groups; Frontiers; The Full and Subtle Use of Percussion Instruments; Total Mixture (Horizontal); Total Mixture (Vertical); "Music Concrete"; Electronic Music; Orchestral Use of Human Voices.

<sup>7</sup> Belkin (2008) considers general principles as important because “orchestration is hard to try out experimentally”.

Charles-Marie Widor (1946:197-198) summarizes “the most essential principles of our art [orchestration]” as follows: [1] “Write your orchestral music so that each group can be heard without the others.” [2] “Write in such a fashion that each musician may understand the part he plays in the orchestra.” [3] “Change your orchestration when you change key.” [4] “Keep your instruments in the register where their tone is of best quality.” Although he designates these as ‘principles’, they are in effect rules of thumb rather than principles.

Francis M. Collinson (1941:126-137) devotes a whole chapter in his book *Orchestration for the Theatre* to “The General Principles of String Writing for the Orchestra” which are also in effect rules of thumb. Collinson (1941:136-137) summarizes these principles as follows: [1] “A melody on strings does not have to be supported by strings, but may be supported by woodwind or brass, or a mixture of both.” [2] “A high melody on strings does not need to be doubled in any octave below by a string instrument: it may be doubled instead by a woodwind or brass instrument.” [3] “In a melody in thirds or sixths, the strings need not to play both parts; the lower part may be given to a woodwind instrument and if brass is used, the latter should play both parts.” [4] “Open harmony sounds well on strings from *pp* to *mf* without the support of woodwind or brass, and gives greater transparency than harmony in close position.” [5] “The violins should only be divided into more than two parts when the type of music definitely requires this effect. It should *not* be used when the consequent weakening of individual string parts will result in their ceasing to dominate the score (unless they are playing something other than the melody).”

The title of Rimsky-Korsakov’s book, *Principles of Orchestration*, creates the impression that principles of orchestration will be identified and discussed. However, this is not the case since a study of this book does not afford the reader the opportunity to identify Rimsky-Korsakov’s principles. McKay (1969:iii) identifies the same weakness when he writes that Rimsky-Korsakov “fell short of a complete general theory.” It is however important to note that the title of the book was later chosen by the editor, Maximilian Steinberg, and not by Rimsky-Korsakov (Rimsky-Korsakov, 1964:x).

Craig Stuart Garfinkle (2009:44) gives three ‘rules’ for realistic orchestration in computerized simulations which are made of original orchestral compositions. These ‘rules’ are said to “[begin] with three principles: [1] Be true to the linear melody as an acoustic musician would perform it. [2] Pay close attention to dynamics, expression markings, and articulations. [3] Only create parts that each actual instrument *can* and *would* play.” Although Garfinkle calls these ‘principles’, they are rules of thumb as is evident in the title of this short article of two pages.

A possible reason for this lack of principles in the literature is that most writers make simple observations – dos and don’ts or rules of thumb – based upon their experiences<sup>8</sup> as orchestrators and/or arrangers and even composers, theorists and teachers. When these writers do identify principles of orchestration, these principles (or rather rules of thumb<sup>9</sup>) are employed to various degrees of effectiveness but not as the foundation for their writings.

In most cases the writers use rules of thumb as the points of departure in their writings. These rules of thumb are illustrated by means of orchestral passages, discussions and sometimes analyses. In this approach to the study of orchestration the general is first established and then illustrated by the specific. The ‘general’ is understood as the rules of thumb determined by composers/theorists and the ‘specific’ is understood as examples from orchestral compositions to illustrate the general.

In spite of the fact that most writers do not clearly identify principles of orchestration, some are aware of the importance of principles. Gordon Jacob (1977:99) writes that “[e]very piece of music will be found to present its own problems, and it is manifestly impossible to give formulae whereby an infinite number of contingencies may be dealt with.” This idea is stated even stronger by Piston (1980:462) who writes that “[f]ormulas and ‘devices’ are the death of creative orchestration.”

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<sup>8</sup> Belkin (2008) states explicitly that his writings are “[a]ll based on [his] own experience as a composer and teacher.”

<sup>9</sup> For the remainder of this document the phrase ‘rule(s) of thumb’ will be used rather than principles in these cases.

#### 1.1.4 Principles of Orchestration and Music Analysis

In this research I invert the approach followed in the literature and study orchestration by taking analysis as the point of departure and working towards construing principles of orchestration. This inverts the approach followed in the literature because generalizations concerning the principles of orchestration are made from analyses of specific orchestral compositions. This approach seems promising since according to Bent and Pople (2001:530) musical analysis existed as a structured auxiliary scholarly tool since the Middle Ages. Piston (1980:355) refers to this auxiliary nature of music analysis when he writes that “[t]he objective in analysis of orchestration is to discover how the orchestra is used as a medium to present musical thought.” He (Piston, 1980:461) emphasizes the importance of the analysis of scores by suggesting that analysis of scores should become a daily habit. He also devotes a considerable part of his book to the analysis of orchestration. Binkerd (1955:138) regards analysis as “the real heart of the problem of writing for orchestra”. Other writers agree that a suitable approach to this ‘problem’ is music analysis (Belkin, 2008; Jacob, 1962:9; Jacob, 1977:101; Kennan & Grantham, 1997:v; Piston, 1980:355; Rauscher, 1963:ix; Wagner, 1959:9).

It is therefore clear why Bent and Pople (2001:528) write that “[a]nalysis is the means of answering directly the question ‘how does it work?’.” In this context, the question ‘how does it (orchestration) work?’ can be understood as either a question musicians would ask themselves or a question asked by students to their tutors. In both cases, to understand how orchestration works, analysis can be used as the tool to reveal the basic structure, the different processes in the composition and other musical aspects. In terms of orchestration, composers, student composers and orchestrators will gain insight into effective orchestration and instrumentation when they study orchestral compositions (Belkin, 2008; Berlioz & Strauss, 1948:1; Jacob, 1977:101; Kennan & Grantham, 1997:v; Parrott, 1957:75; Piston, 1980:461; Rimsky-Korsakov, 1964:4). When orchestral compositions are analyzed with the aim to gain insight into orchestration and instrumentation and to answer the question ‘how does it work?’, analysts will be able to construe their own principles of orchestration.

Many of these music-analytical methods and approaches are reductive and work from the music (which is seen as concrete) towards abstraction.<sup>10</sup> For the study of orchestral compositions a more concrete and perceptual method of musical analysis is needed because orchestration and choices of orchestration and instrumentation concerning timbre concerns phenomena. A method concerned with phenomena is the analysis of musical forces. The analysis of musical forces can be used efficiently by composers who work in a concrete and perceivable medium and not in an abstract medium.

#### 1.1.5 Musical Forces

The theory of musical forces was introduced by Professor Steve Larson in 1993. He molded his theory of musical forces as an analogy of the research on perceptual forces by Rudolf Arnheim. Larson identified three musical forces which constitute his theory and these three forces are (1) musical magnetism, (2) musical gravity and (3) musical inertia. (1) Musical magnetism is the tendency of an unstable note to move up or down to the nearest stable pitch. Instances of musical magnetism is also known under terms such as 'attraction', 'pulling', 'yearning' and 'leading note'. (2) Musical gravity is the tendency of an unstable note to descend to a *lower*, more stable pitch. (3) Musical inertia is the tendency of a pattern of musical motion to continue in the *same* fashion. In his research, Larson claims that if we think about musical gestures in terms of musical forces we may better understand the creation, experience, and understanding of music (Gritten & King, 2006:xxii; Larson, 2006:73). He (Larson, 2006:61) also explains clearly how musical gestures can be understood in terms of musical forces. The theory of musical forces and musical gestures will be discussed in more detail in Chapter 2.

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<sup>10</sup> Bent and Pople (2001:526) stress the importance of a phenomenological approach when they write that “[u]nderlying all aspects of analysis as an activity is the fundamental point of contact between the mind and musical sound, namely musical perception.” Nonetheless, most analysis methods are reductionistic.

### 1.1.6 Material chosen for Analysis

I expanded my view of musical analysis in this research report to encompass a broader understanding of musical analysis. It is generally accepted that the process of ‘making a music analysis’ consists primarily of two phases: the analysis of material (the taking apart) and a synthesis (the putting together again). In this research report the 'material' mentioned in phase 1 does not only refer to a musical composition but also to an existing musical analysis. This is the first way in which I expanded my notion of analysis. The synthesis in phase 2 is also not merely a traditional representation<sup>11</sup> of the findings but also involves a composition that originated from the musical analysis, and can be understood as the final part of the process of analysis in this study.

For phase 1 (analysis) I chose the following material: *Syrinx* for solo flute by Claude Debussy and an existing analysis of this composition by Cogan and Escot. *Syrinx* for solo flute (L.129), originally titled *La Flûte de Pan*, is considered one of the most important flute works in the flute literature and is an indispensable part of any flautist's repertory. *Syrinx* is the first solo flute composition written for the modern Böhm system flute in 1913. This work is widely performed, recorded, discussed and debated (Price, 2005:2; 2008:19). I chose this composition because it is widely known, many different recordings and interpretations are available and because there is a well-known analysis of this work in the book *Sonic Design: The Nature of Sound and Music* by Robert Cogan and Pozzi Escot, published in 1976. I felt that this more conventional analysis could function as a context within which the less familiar analysis of musical gestures in terms of musical forces could be understood.

Regarding phase 2 (synthesis), this piece of monodic music lends itself to an analysis and orchestration of musical gestures and musical forces mainly because of two reasons. Firstly, the interaction of musical forces is easier to determine and illustrate in monodic music as opposed to polyphonic or even homophonic music. Secondly, the fact that existing rules of thumb provide very little guidance for transferring a piece of monodic music into a composition for orchestra, forced me to develop techniques for orchestration that are in strong contrast to the techniques

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<sup>11</sup> These traditional representations of musical analyses include reductions, diagrams, graphs and exploded scores.

discussed in the literature. I therefore decided to not only represent my musical analytical findings<sup>12</sup> in the usual formats, but also to use these findings as a basis for writing an orchestral composition.

## 1.2 Research Questions

The research question is therefore: how can principles of orchestration be construed when Cogan and Escot's analysis of Claude Debussy's *Syrinx* for solo flute is reinterpreted and orchestrated in terms of musical gestures?

The secondary questions are as follows:

- a. Which are the musical gestures in *Syrinx* by Claude Debussy?
- b. How can the musical gestures in *Syrinx* by Claude Debussy be classified into paradigms<sup>13</sup>?
- c. How can the musical gestures in *Syrinx* by Claude Debussy be orchestrated?
- d. Which principles concerning orchestration are suggested when the different possibilities for orchestrating the musical gestures in Debussy's *Syrinx* are investigated?

## 1.3 Research Aims and Objectives

The primary aim of this study is to show how principles orchestration can be construed when Cogan and Escot's analysis of Claude Debussy's *Syrinx* is reinterpreted and orchestrated in terms of musical gestures.

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<sup>12</sup> These findings are the identification and classification of musical gestures in terms of musical forces.

<sup>13</sup> The term 'paradigms' is used as employed in semiotic analysis. My analysis will be presented as a quasi-paradigmatic analysis.

The secondary aims are as follows:

- a. To identify the musical gestures in *Syrinx* by Claude Debussy.
- b. To classify the musical gestures in *Syrinx* by Claude Debussy into paradigms.
- c. To show how the musical forces in the musical gestures in *Syrinx* by Claude Debussy can be orchestrated.
- d. To investigate different possibilities in which the musical gestures can be orchestrated in order to determine which principles concerning orchestration are suggested.

#### 1.4 Research Method and Techniques

An inductive method will be followed in this exploratory study. The musical gestures are the specific phenomena that will be studied in order to construe the general, namely the principles of orchestration. The research method and technique which will be applied are the analysis of musical gestures in terms of musical forces. This research method and technique will be applied by following the steps listed below, using *Syrinx* for solo flute by Claude Debussy as an example for this study.

- 1) Critically evaluate the analysis of Debussy's *Syrinx* for solo flute in the book *Sonic Design: The Nature of Sound and Music* by Robert Cogan and Pozzi Escot (1976) and make suggestions for filling in shortcomings of the analysis.
- 2) Reinterpret Cogan and Escot's analysis in terms of musical gestures and classify the musical gestures. These musical gestures will be understood in terms of musical forces.
- 3) Orchestrate the musical gestures in terms of the musical forces that act upon them.
- 4) Discuss how different techniques of orchestration can be used in order to establish a point of stability or to amplify musical forces.
- 5) Determine and discuss which principles of orchestration are suggested.

It is important to note that this study focuses on the process of how to construe specific principles of orchestration using the analysis of musical gestures as a technique, rather than to list **general** principles of orchestration. After following these steps, conclusions will be made concerning the example used for this study: *Syrinx* by Claude Debussy. The findings will then be interpreted by construing principles of orchestration that are valid for *Syrinx*.

## 1.5 Chapter Division

This dissertation is divided into five chapters which are as follows.

### Chapter 1: Introduction

In this chapter the research problem is discussed and based upon this research problem specific research questions were formulated. Research aims and objectives were deduced from the research questions in order to identify the methods and techniques which can be used to answer the research questions.

### Chapter 2: Reinterpreting Cogan and Escot's Analysis of Claude Debussy's *Syrinx* in Terms of Musical Gestures

An analysis by Robert Cogan and Pozzi Escot regarding the musical language of Claude Debussy's *Syrinx* for solo flute is presented in this chapter. Their analysis is then critically evaluated in terms of its usefulness for orchestrating *Syrinx*. It is found that the analysis by Cogan and Escot has several shortcomings in terms of its usefulness for orchestrating *Syrinx*, especially because musical language was the point of departure for their analysis. Suggestions are then made in order to fill in these shortcomings and these suggestions are followed in order to enhance the analysis by Cogan and Escot. I suggest that the analysis of musical gestures in terms of musical forces be used as a basis for orchestration and therefore I reinterpret the analysis in terms of musical gestures which are identified in this chapter.

### Chapter 3: Orchestration of Musical Gestures in *Syrinx* by Claude Debussy

The musical gestures and the musical forces which act upon them – identified in the previous chapter – are used as a point of departure for this chapter. I show how each musical force (musical gravity, musical magnetism and musical inertia) as well as combinations of the forces can be made clear in a specific gesture by means of orchestration. I use excerpts of my own recomposition of *Syrinx* as examples to show how musical forces can be amplified in orchestrated gestures. This orchestration was composed specifically for this research project and is not an orchestration which is faithful to the style or expression of the original *Syrinx* for solo flute or even to Impressionism. The orchestration techniques and the interaction of musical forces will be discussed in this chapter for specific examples presented.

### Chapter 4: Principles of Orchestration, Conclusion and Suggestions for Further Study

The principles I construed will be presented in this chapter. However it is important to note that these principles are in the first instance valid for orchestrating *Syrinx* by Claude Debussy. The findings from this research show the process of how principles of orchestration can be construed and that musical forces can be amplified when orchestrated. The research report will be concluded in this chapter and suggestions for further study will be made.

### Chapter 5: Bibliography

# CHAPTER 2

## REINTERPRETING COGAN AND ESCOT'S ANALYSIS OF CLAUDE DEBUSSY'S *SYRINX* IN TERMS OF MUSICAL GESTURES

### 2.1 Introduction

Studies of musical gestures are undertaken in divergent fields. In each of these fields, the term 'musical gesture' is used differently to such an extent that a well-known scholar on musical gestures, Robert Hatten (2004:93), writes that the term is used in "a bewildering array of contexts". One of the many different ways in which musical gestures can be analyzed and understood is in terms of the theory of musical forces by Steve Larson, the theory that forms the basis of this present research project. Larson suggests a clear way of understanding sound gestures in terms of three musical forces, namely musical magnetism, musical gravity and musical inertia.

Firstly, in this chapter I firstly summarize an existing analysis of Debussy's *Syrinx* for solo flute published by Robert Cogan and Pozzi Escot in their book *Sonic Design: The Nature of Sound and Music*. Since the ultimate aim of my research on gestures is to create an orchestral version of *Syrinx*, the analysis by Cogan and Escot is then critically evaluated in order to identify shortcomings of the analysis in order to be able to use this analysis as a basis for orchestrating *Syrinx*. Four shortcomings are identified and suggestions for filling in these shortcomings are then proposed. It is argued that a way in which the shortcomings can be avoided or filled in is to work with musical gestures. In order to understand musical gestures, one must first understand musical forces, therefore I discuss musical forces first and then musical gestures. The motifs of *Syrinx* are then reinterpreted as musical gestures which can form the basis for an orchestration of Debussy's *Syrinx*.

## 2.2 Analysis of Debussy's *Syrinx* for Solo Flute by Cogan and Escot

Robert Cogan and Pozzi Escot published their analysis of Debussy's *Syrinx* for solo flute in their book *Sonic Design: The Nature of Sound and Music* (Cogan & Escot, 1976:92-101). Their analysis focuses on the musical language of *Syrinx*. I now present a summary of the analysis by Cogan and Escot, using the same headings that they used for their analysis. The score of Debussy's *Syrinx* is attached in Addendum A.

### 2.2.1 Linguistic Definition<sup>14</sup>

In their analysis of Debussy's *Syrinx* for solo flute Cogan and Escot (1976:93) take as point of departure a quasi-Schenkerian graph which summarizes and traces the most prominent features in the linguistic definition ("spatial-linguistic formation") of this composition. The graph by Cogan and Escot (1976:95) is shown below in Example 2-1.

Cogan and Escot (1976:93) identified two processes which they consider inseparable and which are initiated in the first two measures which form the first phrase:

- the motion of the composition<sup>15</sup>
- the definition of the linguistic elements of the composition

The graph shows that the motion of the first phrase is outlined by B<sup>b5</sup> which descends to D<sup>b5</sup> with a subdivision at E5. The D<sup>b</sup> is also the ultimate concluding goal of the composition. The descending pattern immediately returns to B<sup>b5</sup> which begins and concludes the motion. The pattern begins on B<sup>b5</sup> and descends to the D<sup>b5</sup> which is the goal of the pattern. The goal of the unbroken linear descent is E5. This descending pattern shows that the primary cell ("linguistic cell") of the composition consists of the notes that outline the motion as well as the subdivision: B<sup>b</sup>, E, D<sup>b</sup>. This primary cell is also prominently shown on the graph (Cogan & Escot, 1976:93).

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<sup>14</sup> With 'linguistic definition' Cogan and Escot refer to the material that constitutes the musical language of a composition. Musical language is defined by Cogan and Escot (1976:88) as "[t]he selection of pitches and (especially) of characteristic interval relationships among them". They use various terms for similar concepts but I will use only one term and include their alternative terms in parenthesis.

<sup>15</sup> The motion of a composition is defined as the way in which music "shapes its sound in space and time" (Cogan & Escot, 1976:3).

CONTINUING LINEAR AND REGISTRAL DESCENT FROM B<sup>b5</sup> TO D<sup>b4</sup>

Definition of register (Reg.5), cell (B<sup>b</sup>, E, D<sup>b</sup>) and scale (in two halves).

Gradual dissolution of original register, cell, and scale.

FIXED D<sup>b4</sup> AS LOWER BOUNDARY

REGISTER SHIFTS OF D<sup>b</sup> THROUGH ENTIRE RANGE (Reg. 4, 5, 6, 5, 4), WITH FILLING-IN

Reformation of original cell, scale, and register, with a complete registral filling-in, accomplished through three transitional scales.

Registral extremities: D<sup>b6</sup> and D<sup>b4</sup>. Final variants of original scale and cell.

*Example 2-1: Graph of Debussy's Syrinx by Cogan and Escot (1976:95)*

The component intervals of this cell are identified as s3<sup>16</sup> and s6. This first unfolding of the cell forms a phrase which Cogan and Escot call phrase Ia on the graph. They remark that the same cell appears five more times. The five appearances, according to Cogan and Escot (1976:93), are in the phrases which they call Ib, IIa, IIIa, IIIb and IVa on the graph<sup>17</sup>. The pitches of the cell appear throughout the composition in different permutations, fragmentations and registers. The first phrase (Ia) consists of pitches that connect and elaborate the three cellular pitches. Cogan and Escot (1976:96) give another example which shows how the elements of the cell are reinforced by the other pitches which add further intervallic content of s2 intervals. See Example 2-2.

<sup>16</sup> Cogan and Escot indicate intervals as ①, ②, ③ where the circled numeral indicates the interval distance in semitones. I use s1, s2, s3 instead.

<sup>17</sup> Note that Cogan and Escot draw their correlations between phrases in terms of musical language and elements which are shared by the primary cell and other cells or phrases.

a. *mf*

b. Scale segment with incomplete lower half

c. ③ and ⑨ : interval between the principal spatial boundary tones; and of all of the actual leaps

d. ⑥ : beginning and end-points of the passing and leaping motions

e. ② : principal tones of the passing motion

f. ① : passing and elaborating tones, largely grouped as three chromatic notes (b-B<sup>b</sup>-a, a-A<sup>b</sup>-g, G<sup>b</sup>-f-E)

Intervallic content

Example 2-2: Interval content of Debussy's *Syrinx*, mm. 1-2 (Cogan & Escot, 1976:96)

This intervallic content of s1 and s2 are added to the s3 and s6 intervals in phrase Ia which are the primary intervals of the phrase. The complete interval content of the phrase is then given: s1, s2, s3, s6<sup>18</sup> and s9. The importance of the s3 intervals of the primary cell is reinforced by additional s3 intervals between all the leaps of the phrase. The interval of s9 is also used to reinforce the s3 interval between leaps because s9 is the complement interval of s3. Intervals s4 and s5 are not important in the language of the first phrase. Cogan and Escot (1976:97) summarize the language of the first phrase as follows: "[a] primary cell, B<sup>b</sup>-E-D<sup>b</sup>, embodying [s3] and [s6 intervals]; connecting [s2 intervals], forming a scalar segment; and elaborating [s1 intervals]."

<sup>18</sup> The interval s6 is the interval shown on the graph as the "interval between beginning and end-points of the passing and leaping motions". However, an interval of six semitones is not heard between two consecutive notes in this phrase.

## 2.2.2 Linguistic Continuation and Completion

Cogan and Escot (197:97-99) discuss how the elements ("linguistic elements") of the primary cell are used in other parts of the composition. Phrase Ib (mm. 4 – 8) follows phrase Ia (mm. 1 – 3), but phrase Ib is a linear rising from the B<sup>b</sup>4. The motion from mm. 3 – 9, which contains phrases Ia and Ib is graphically represented by Cogan and Escot (1976:97) as shown in Example 2-3.

*Example 2-3: The motion of Debussy's Syrinx, mm. 3-9 (Cogan & Escot, 1976:97)*

When the octave between B<sup>b</sup>4 and B<sup>b</sup>5 is formed as the outlines of phrases Ia and Ib, this octave can be filled in linearly using a scale segment from phrase Ia and a scale segment from phrase Ib to form a complete scale (Cogan & Escot, 1976:97). Cogan and Escot suggest this scale in the following example.

*Example 2-4: The scale used in Debussy's Syrinx (Cogan & Escot, 1976:97)*

This scale forms a larger entity ("linguistic entity") of the composition. In the following example (Example 2-5) Cogan and Escot (1976:98) show the scale segment and interval content of mm. 3 – 9. They show how the primary cell is embodied with similar total interval content as phrase Ia. The primary cell (B<sup>b</sup>-E-D<sup>b</sup>) which was used in phrase Ia is also embodied in phrase Ib.

The image displays a musical score for Debussy's Syrinx, measures 3-9. It is divided into two main sections: 'Scale segment' and 'Intervallic content'.

- Scale segment (a, b):**
  - Line a: The original musical notation for measures 3-9. It includes dynamic markings like *p* and *Retenu*, and articulation like slurs and accents.
  - Line b: A simplified version of the scale segment, showing the pitch contour with 'reg. shift' (register shift) indicated by arrows.
- Intervallic content (c, d, e, f):**
  - Line c: Labeled '③'s', showing intervals of a third.
  - Line d: Labeled '⑥'s', showing intervals of a sixth.
  - Line e: Labeled '②'s', showing intervals of a second.
  - Line f: Labeled '①'s', showing intervals of a first (unison).

Example 2-5: Scale segment and interval content of Debussy's Syrinx, mm. 3-9  
(Cogan & Escot, 1976:98)

### 2.2.3 Linguistic Transformation

When the primary cell is restated in mm. 9 – 10, the cell forms a scalar descent B<sup>b</sup>-A<sup>b</sup>-G<sup>b</sup> which consists of s2 intervals. A transformation ("linguistic transformation") is heard in mm. 10 – 12 where characteristic intervals s1 and s6 are eliminated from mm. 6 – 8 (Cogan & Escot, 1976:99).



#### 2.2.4 A Critical Evaluation of Cogan and Escot's Analysis in Terms of its Usefulness for Orchestrating *Syrinx*

Cogan and Escot (1976:100) write that their essential goal with the analysis of Debussy's *Syrinx* is to introduce the reader to "linguistic definition and transformation". Still, like any analysis, their analysis has several shortcomings. Even though their aim was not to create an analysis that could be used as a basis for orchestrating *Syrinx*, I will evaluate their analysis in terms of its usefulness for orchestrating *Syrinx* in order to present an analysis that can inform orchestrators to a larger extent than theirs. In this section I will use Cogan and Escot's analysis of Debussy's *Syrinx* and focus on making this analysis more useful for persons who wish to orchestrate *Syrinx*. I use *Syrinx* only as example for this study and these insights can also be applied more widely to the orchestration of other monodic compositions. I will now discuss four of the most relevant shortcomings that I identified: (1) the absence of a discussion of the structure of the composition as a whole; (2) no identification of motifs in the composition; (3) no classification of musical patterns; and (4) the lack of a discussion of the tonal processes of the composition.

(1) The structure of the composition as a whole is not addressed or discussed in Cogan and Escot's analysis. However, Cogan and Escot (1976:95) do summarize Debussy's *Syrinx* on their quasi-Schenkerian graph (Example 2-1). Even though this graph gives an overview of the composition, the structure and segments are not indicated clearly. Cogan and Escot also use dashed, solid and double bar lines on the graph but it is unclear what the function of each bar line is. It seems that the double bar lines serve as delimitations for the sections of the composition that are discussed in the blocks above the graph and do not reflect the larger structure of the composition. However, when orchestrators are aware of the larger structure they can clarify the structure in their orchestration by means of different textures and timbres in the orchestra for different segments. An analysis of *Syrinx* is, however, not simple in terms of segmentation because of ambiguities in the structure which will be discussed in §2.2.5.

(2) Cogan and Escot do not identify or discuss any motifs in their analysis. The only subdivisions of the composition by Cogan and Escot are the eight phrases Ia, Ib, IIa, IIb, IIIa, IIIb, IVa and IVb, which they identify. The smaller pattern which they identify in the phrases is the primary cell (mm. 1-3). Cogan and Escot (1976:93) specifically call this cell the "primary linguistic cell", which places emphasis on the more abstract elements of musical language, rather than on the foreground motifs. To determine this cell Cogan and Escot primarily considered interval classes<sup>19</sup> and pitch content. The cell is not considered as a motif in the first instance although it can be construed as such. Motifs are important for orchestration because an effective orchestration reflects a classification of sorts of the thematic material and an elucidation of the thematic processes. If the thematic material and thematic processes are clearly understood, similarities and contrasts between motifs can effectively be orchestrated. I will identify and briefly discuss the motifs in *Syrinx* in §2.2.5.

(3) There is no clear classification of phrases or musical patterns. Several correlations are made by Cogan and Escot between the different phrases. The continuation and completion of elements ("linguistic elements") which are unfolded in the primary cell are also discussed. The absence of classification of musical patterns can be the result of the fact that motifs are not identified. When motifs are classified, the classification of sorts in the orchestration – referred to above – can be done more convincingly by the orchestrator. In §2.2.5 I will classify the motifs I identified by means of a quasi-paradigmatic analysis of motifs.

(4) Cogan and Escot's analysis of *Syrinx* lacks a thorough discussion of the tonal processes of the composition. Cogan and Escot (1976:93) write about three tones (B<sup>b</sup>, E and D<sup>b</sup>) which constitute the primary "linguistic cell" of the composition. These three notes are shown throughout on the motion and language graph (see Example 2-1) as stemmed half notes. They also mention that B<sup>b</sup> and D<sup>b</sup> are important tones and that D<sup>b</sup> is the ultimate concluding goal of the composition (Cogan & Escot, 1976:93). Even with music that is not harmonic, tonal processes remain important because certain tones play an important role in the tonal process of the composition. The discussions by Cogan and Escot are not sufficient to give a clear understanding of the tonal

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<sup>19</sup> The term 'interval classes' is used here as in Set Theory.

process of the composition as a whole. In §2.2.5 I will suggest how the tonal processes can be clarified and then discuss the tonal processes accordingly.

In the following section I will discuss these four most relevant shortcomings of Cogan and Escot's analysis of Debussy's *Syrinx* and suggest ways in which the shortcomings of their analysis can be filled in. This analysis will then be more useful when orchestrating *Syrinx*. These suggestions are also important when orchestrators want to use any existing analysis in order to orchestrate other monodic music, or when orchestrators make new analyses. Suggestions on how to make useful analyses are important because orchestrators need a good mental model of the structure (specifically the thematic and tonal processes) of the composition they wish to orchestrate. The mental model of the structure as a whole can be acquired by means of segmentation and the thematic processes can be understood clearly when motifs are identified and classified. The tonal processes are understood mainly in terms of relationships between tonal centers. When orchestrators have a good mental model of the structure they can make their orchestration more effective and convincing.

#### 2.2.5 Suggestions for Filling in the Shortcomings of Cogan and Escot's Analysis of Debussy's *Syrinx*

In §2.2.4 I identified four of the most relevant shortcomings of Cogan and Escot's analysis of Debussy's *Syrinx*. Three of these shortcomings can be ascribed to the ambiguities which are clearly present in *Syrinx* in terms of both the segmentation and the identification of motifs. In my suggestions of segmentation and motifs I will only present the segmentations and motifs I chose after several steps in the analytical process<sup>20</sup>.

I will firstly discuss the first three shortcomings as a group and suggest ways to fill in these shortcomings: (1) the absence of a discussion of the structure of the composition as a whole; (2) no identification of motifs in the composition; and (3) no classification of motifs. I will then suggest how the tonal processes in *Syrinx* can be understood better. These discussions will be

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<sup>20</sup> The ambiguities in segmentation and motifs were indeed considered but this process is not discussed in full because it is not the focus of this study.

followed by a concluding section where I suggest that shortcomings in analyses such as those in Cogan and Escot's analysis can be avoided by an analysis of musical gestures.

In order to discuss and illustrate the ambiguous structure of the composition I will employ a top-down approach as well as a bottom-up approach. In the top-down approach I will divide the composition into segments. This process of segmentation will be iterated in order to generate several hierarchical levels of structure. In the bottom-up approach I will identify the smallest structural units and show how they constitute motifs on another hierarchical level.

The top-down approach produces the first hierarchic level. The criteria for segmentation are not discussed, since they are evident from the music.




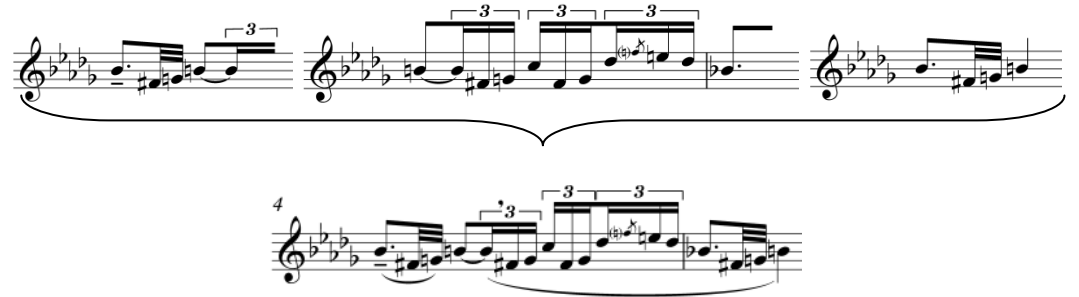


A	B	C
<i>Très modéré</i> mm. 1 - 8	<i>Un peu mouvementé (mais très peu)</i> mm. 9 - 25 <sup>2</sup>	<i>au Mouvementé (très modéré)</i> mm. 25 <sup>3</sup> - 35

The second hierarchic level is produced when the three main sections are further divided. The criteria for segmentation are not as evident as for the first hierarchic level. They are not discussed here, because these criteria are not the focus of this study.

-mm. 1 – 2	-mm. 9 – 15	-mm. 25 <sup>3</sup> - 31 <sup>1</sup>
-mm. 3 – 5	-mm. 16 - 23 <sup>1</sup>	-mm. 31 <sup>2</sup> – 35
-mm. 6 – 8	-mm. 23 <sup>2</sup> - 25 <sup>2</sup>	

On even deeper levels the segmentation becomes too ambiguous and calls for exhaustive explanations which are not relevant for this study. A typical way of handling ambiguous situations that are revealed in following a top-down approach, is to employ a bottom-up approach in an attempt to clarify the ambiguous situations under discussion.

The bottom-up approach is followed when the smallest structural units are identified and then grouped together when relevant in order to construe motifs. This approach is shown below.

 <p><i>Motif 01</i></p>
 <p><i>Motif 02</i></p>
 <p><i>Motif 03</i></p>
 <p><i>Motif 04</i></p>
 <p><i>Motif 05</i></p>
 <p><i>Motif 06</i></p>



Motif 07



Motif 08



Motif 09



Motif 10



Motif 11



Motif 12



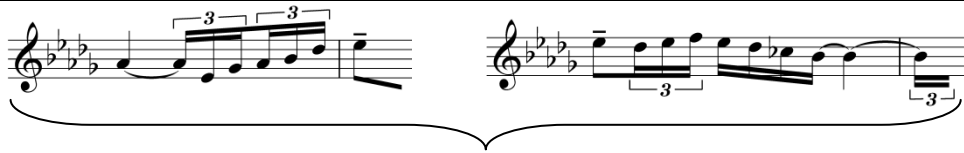
Motif 13



Motif 14



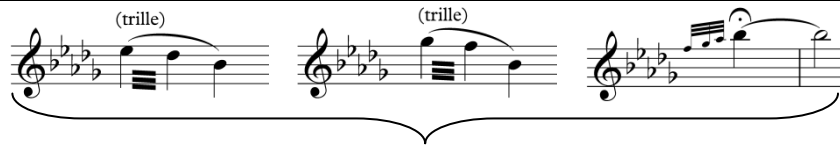
Motif 15



Motif 16



Motif 17



Motif 18



Motif 19

<p style="text-align: center;"><i>Motif 20</i></p>
<p style="text-align: center;"><i>Motif 21</i></p>
<p style="text-align: center;"><i>Motif 22</i></p>
<p style="text-align: center;"><i>Motif 23</i></p>
<p style="text-align: center;"><i>Motif 24</i></p>
<p style="text-align: center;"><i>Motif 25</i></p>

*Table 2-8: This example shows the 25 motifs identified in Syrinx. Note that some of these motifs are presented as overlapping patterns of which two different motifs share a single pitch. These overlapping patterns arise because of the ambiguous nature of the structure which causes ambiguous segmentation.*

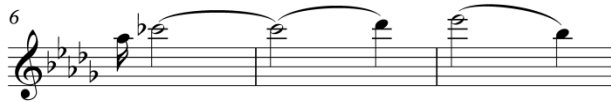
The motifs can now be classified into different paradigms in order to create a mental model of the thematic material and of the thematic processes. I will use a quasi-paradigmatic analysis in order to present the motifs. There are of course different possibilities of classification because of the ambiguities. However, I will only show the patterns in the paradigms that I chose because an exhaustive discussion of the ambiguous possibilities of classification is not relevant for this

study. An understanding of these ambiguities is, however, important for a convincing orchestration, since the ambiguities force orchestrators to make complex decisions. These decisions are not discussed in depth in this report.

### Paradigm I

The musical score for Paradigm I consists of nine staves of music in a single system, all in treble clef and a key signature of three flats (B-flat, E-flat, A-flat). The time signature is 3/4. The score is divided into measures 1 through 33. Measures 1-10 feature a complex rhythmic pattern with eighth and sixteenth notes, often beamed together. Measures 25-28 continue this pattern. Measures 29-30 feature triplet markings over groups of three notes. Measure 30 ends with a 3/4 time signature change. Measure 33 features a quintuplet (5) over a group of five notes, followed by a final note with a fermata.

## Paradigm II



### Paradigm III

Example 2-9: A quasi-paradigmatic analysis of the motifs identified in Example 2-8.

The tonal processes of *Syrinx* can also be discussed on different hierarchical levels. Because this composition is monodic and not harmonic, I suggest that the first and last tones of segments and motifs are firstly identified as potential tonal centers. The tonal center of that specific segment or motif can then be identified. One of the outer tones of a segment or motif can also be the tonal center of that segment or motif. If none of the outer tones are the tonal center, these tones may still be stable tones towards which other tones are drawn. The outer tones of a specific segment or motif will also show whether that specific segment or motif is centripetal or centrifugal in terms of tonal movement<sup>21</sup>. The tonal center or point of stability<sup>22</sup> of a specific segment can be identified in order to show how other tones in that segment act as unstable tones and are drawn toward the point of stability. These tonal attractions indicate the presence of

<sup>21</sup> Centrifugal movement is when a pattern starts on a stable tone and moves away from that stable tone. Centripetal movement can also be a movement towards a stable tone; in its purest form it is a movement away from and then towards the same stable tone.

<sup>22</sup> Points of stability will be discussed in detail in §2.3.1.


musical forces. Musical forces will be discussed in more detail in §2.3 and §2.4. The tonal process of *Syrinx* as a whole is as follows.

	Segment		
	A (mm. 1 – 8)	B (mm. 9 - 25 <sup>2</sup> )	C (mm. 25 <sup>3</sup> – 35)
Outer Tones	B <sup>b</sup> – B <sup>b</sup>	B <sup>b</sup> – B <sup>b</sup>	B <sup>b</sup> – D <sup>b</sup>
Type of Movement	Centripetal	Centripetal	Centrifugal
Point of Stability	B <sup>b</sup>	Unstable (various)	B <sup>b</sup> & D <sup>b</sup>

*Example 2-10: The tonal process of Syrinx as a whole. Centripetal movements are present in the first two segments and a centrifugal movement in the last segment because of the D<sup>b</sup> which becomes the new point of stability. There are various points of stability in segment B because this segment is unstable due to erosions of the points of stability.*

The composition as a whole has a centrifugal movement in terms of pitch class 10 (B<sup>b</sup>) because it starts on a B<sup>b</sup> and ends on a D<sup>b</sup>. I will now list the motifs I identified above and identify the outer tones, type of movement and the point of stability. One may find that the ambiguities regarding the segmentation and identification of motifs cause the outer tones to render the motif centripetal on the one hand or centrifugal on the other, depending on how the ambiguity is brought into consideration. However, I will once again not discuss the ambiguities and only discuss the tonal processes which are present in the motifs I identified. As mentioned above, an understanding of the ambiguities remains important for orchestrators.



12		F - D	Centrifugal	E <sup>b</sup>
13		D - D <sup>b</sup>	Centrifugal	D <sup>b</sup>
14		D - E <sup>b</sup>	Centrifugal	D <sup>b</sup>
15		E <sup>b</sup> - A <sup>b</sup>	Centrifugal	→B <sup>b</sup>
16		A <sup>b</sup> - B <sup>b</sup>	Centrifugal	→B <sup>b</sup>
17		B <sup>b</sup> - B <sup>b</sup>	Centripetal	B <sup>b</sup>
18		E <sup>b</sup> - B <sup>b</sup>	Centrifugal	B <sup>b</sup>
19		B <sup>b</sup> - D <sup>b</sup>	Centrifugal	B <sup>b</sup>
20		B <sup>b</sup> - B <sup>b</sup>	Centripetal	B <sup>b</sup>
21		B <sup>b</sup> - D <sup>b</sup>	Centrifugal	B <sup>b</sup>
22		B <sup>b</sup> - D <sup>b</sup>	Centrifugal	B <sup>b</sup>
23		B <sup>b</sup> - D <sup>b</sup>	Centrifugal	B <sup>b</sup>

24		D <sup>b</sup> - D <sup>b</sup>	Centripetal	D <sup>b</sup>
25		B - D <sup>b</sup>	Centrifugal	D <sup>b</sup>

*Example 2-11: Summary of the type of tonal movement of each motif as well as the tonal center of each motif.*

When these suggestions are added to Cogan and Escot's analysis, the orchestrator has a complex mental model of the structure of the composition, specifically in terms of the thematic and tonal processes of the composition. This mental model enables orchestrators to create a convincing and effective orchestration, specifically one that is characterized by a clear structure and clear tonal and thematic processes.

Regarding the clarification of the thematic processes, motifs can be orchestrated in such a way that they gain meaning. One of the ways in which motifs can become more meaningful is to reinterpret motifs as musical gestures, because gestures are often linked to the meaning of motifs. The qualities of musical gestures as meaningful salient sound patterns which act in terms of musical forces will be discussed in §2.4. In order to understand musical gestures one must first understand musical forces, which I will discuss below in §2.3.

## 2.3 Musical Forces

### 2.3.1 Steve Larson's Theory on Musical Forces

Steve Larson (1955-2011) was endowed chair and the Robert. M. Trotter Professor of Music at the University of Oregon where he was a jazz pianist, lecturer, composer and researcher who pursued significant research on Schenkerian analysis and musical forces (Anon., 2011).<sup>23</sup> Larson's theory on musical forces is an analogy<sup>24</sup> of the work by Gestalt psychologist and art historian, Rudolf Arnheim, who researched perceptual forces (Larson, 1993:97-104). Arnheim's work enabled Larson to identify three musical forces namely (1) musical magnetism, (2) musical gravity and (3) musical inertia<sup>25</sup>.

Larson introduced his theory of musical forces in his essay *On Rudolf Arnheim's Contribution to Music Theory* (1993:97-104). Other prominent researchers and musicologists also wrote about attractive forces in music before Larson did. Research by Larson's predecessors is to a certain extent similar to Larson's theory of musical forces and they differ from Larson mainly regarding the use of terminology. Some of them also use the terms 'magnetism', 'gravity', and 'inertia' but these terms do not always correlate with Larson's use of the terms in his theory. Because Larson's predecessors do not use these terms consistently in the literature, Larson refers to many of his predecessors in his writings and explains how their writings and their use of terms differ from his theory of musical forces. He uses these explanations to contextualize his theory of musical forces and to attempt to standardize terms with regard to his theory of musical forces and in the broader field of research into attractive musical forces. Larson's theory of musical forces

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<sup>23</sup> Larson also wrote two books which deal with Schenkerian analysis and musical forces, see bibliography: Larson 2009 and Larson 2012.

<sup>24</sup> Larson's (1993:97) analogy of Arnheim's concept that "perceptual dynamics of a visual percept are directed forces that are immediately perceived and inseparable from properties such as shape, size, texture, and color" led to a similar approach in music where "the perceptual dynamics of a musical sound are directed tensions or patterns of forces that are immediately perceived and inseparable from properties such as pitch, duration, loudness, and timbre." (Larson, 1993:97.)

<sup>25</sup> Larson (1993:98) comments on his identification of musical inertia as a force by writing that "[a] physicist might object that inertia is not a force, but people tend to perceive it as such."

has been employed in other fields of research in music like musical expectation<sup>26</sup> and musical gestures.

There are five features central to Larson's work.

- a) Three musical forces are identified and each specific musical force is defined in detail (Larson & VanHandel, 2005:119).
- b) The musical forces can be understood as metaphors that are central to discourse and experience of music. These metaphors explain and constitute our experience and discourse of music (Larson & VanHandel, 2005:119).
- c) The operation of the three musical forces is grounded in aspects of Schenkerian theory (Larson & VanHandel, 2005:119).
- d) Various musical behaviours can be explained in terms of musical forces because these musical forces provide necessary and sufficient conditions to explain those musical behaviours (Larson & VanHandel, 2005:119).
- e) The cognitive reality of musical forces is proven from a variety of practical and experimental sources. Empirical support were found in three forms regarding work on musical forces: firstly, it shows how melodic patterns are distributed in compositions, improvisations and analyses; secondly, the results from computer models regarding melodic expectation; and thirdly, results from psychological experiments derived from feedback by participants in these experiments<sup>27</sup> (Larson & VanHandel, 2005:119).

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<sup>26</sup> Musical expectation in terms of musical forces was researched by means of psychological experiments, computer models and algorithms. See Larson and McAdams, 2004:457-498.

<sup>27</sup> See Larson and McAdams, 2004:457-498 for computer models, algorithms of the musical forces and experiments on listeners.

An understanding of 'stability' is necessary in order to understand that towards which the musical forces are drawn. Larson and VanHandel (2005:126) define stability as "a state toward which motions may tend, but it cannot be expressed with a vector<sup>28</sup> that is analogous to those for describing forces." Varying degrees of stability exist between individual notes in a passage of tonal music which arise from embellishment relationships<sup>29</sup> between note groups of which each note participates in relationship patterns of embellishment. One note or group of notes may embellish a following note or group of notes. When one note or group of notes embellishes another note or group of notes, that note will feel less stable<sup>30</sup> than those it embellishes and a hierarchy of stability emerges between these notes or groups of notes. If a single note is embellished and the other notes serve in a hierarchical way in terms of stability, that single note will be perceived as the tonal center of the passage.

### 2.3.2 Musical Magnetism

The hierarchical embellishment relationships between notes make it possible to describe the attractive powers of varying degrees exerted by individual notes (Larson, 1993:98; Larson 2006:61). Larson (1993:98) calls this 'musical magnetism'<sup>31</sup> which he describes as "the tendency<sup>32</sup> of an unstable note to move (up or down) to a more stable pitch." He observes that distance affects musical magnetism: "Because magnetism is affected by distance, we may describe it as the tendency to move to the *nearest* stable pitch."<sup>33</sup> (Larson, 1993:98.) This magnetic tendency of notes to attract each other is also known under terms such as 'attraction',

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<sup>28</sup> The quantity and direction of a force can be represented when the force is described with vectors.

<sup>29</sup> Larson (1993:98) sees the term 'embellishment' as "an unfortunate one because it may suggest that notes are added as a decoration or ornament, but it really refers to the effect of a part on the whole to which it belongs" and therefore the term "should be regarded as a structural modification rather than a frivolous addition."

<sup>30</sup> The term 'stability' plays an important role in the theory of musical forces and is used by Larson as equivalent to the term 'tonality' which Krumhansl (1990:199) uses (Larson & McAdams, 2004:488). Larson and VanHandel (2005:120) describe a 'stable pitch' as "a member of a single major or minor triad". Magnetic pulls are also quantified in terms of stability (Larson & VanHandel, 2005:126).

<sup>31</sup> Musical magnetism is also reflected in principles of composition and harmony, for example species counterpoint which requires the stepwise resolution of dissonances (Larson & VanHandel, 2005:123).

<sup>32</sup> These tendencies (present at musical magnetism, musical gravity and musical inertia) are those attributed by a listener (Larson & VanHandel, 2005:122-125).

<sup>33</sup> Larson (1993:98) gives an example for musical magnetism: "in a context where D and G are heard as stable and the F between them is heard as unstable, listeners experience musical magnetism as a tendency of the F to ascend to G (because F is closer to G than it is to D). If that F should then move to F<sup>#</sup>, the magnetic force drawing us to G will intensify (because F<sup>#</sup> is now closer to G than F was)."

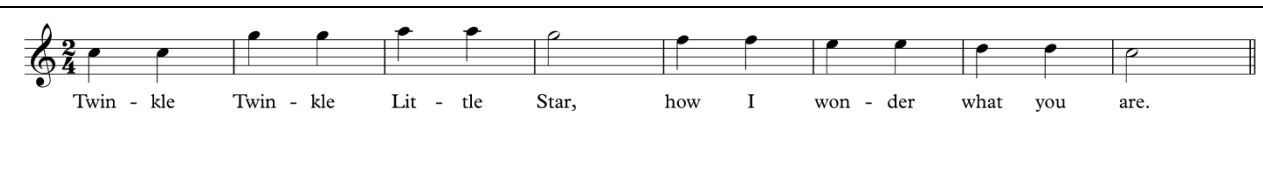
‘gravity’, ‘magnetism’, ‘pulling’, ‘yearning’ and ‘leading tone’ (Larson & VanHandel, 2005:123). The tendency grows stronger as the note moves closer to the goal (Larson & VanHandel, 2005:123). Larson and VanHandel (2005:124-125) hypothesize the following concerning musical magnetism: the strength<sup>34</sup> with which a melodic pattern move towards completion and the frequency at which patterns occur are affected by this force; the effect of musical magnetism is stronger than the effect of musical gravity; the effect of musical magnetism is clearer in local trajectories than the effect thereof in global trajectories; the effect of musical magnetism depends on proximity; something like the inverse-square or inverse-cube law can be used to accelerate the effect of proximity in musical magnetism; some magnetic attractors may be stronger or weaker than others; there may be correlations with other factors such as stability, volume or timbre and the strength of an attractor; the perception of this musical force may be more dependent on learning than other musical forces.

*Example 2-12: Larson's example of half-step magnetism in Dido's Lament (Larson, 2012:90)*

<sup>34</sup> Larson and VanHandel (2005:119-136) use quotation marks when they write about strength in order to draw attention to the metaphorical use of 'strength'.

### 2.3.3 Musical Gravity

Larson (1993:99) describes ‘musical gravity’<sup>35</sup> as “the tendency of an unstable note to descend to a *lower*, more stable pitch.”<sup>36</sup> Similar to musical magnetism, Larson and VanHandel (2005:123) hypothesize that the strength with which a melodic pattern moves towards completion and the frequency at which patterns occur are also affected by this force. Musical gravity seems to be a subtle force when compared to musical magnetism and musical inertia because its influence appears to be less direct and less powerful than the other forces. Larson and VanHandel (2005:123) write that the effect of musical gravity is more significant when there is a stable platform with the notes perceived as above that stable platform. In contrast with musical magnetism, the effect of musical gravity is clearer in global trajectories than in local trajectories. Musical magnetism can in some cases overcome musical gravity (Larson, 1999:292). Larson (2012:157) writes that “[l]ower-neighbor patterns defy both gravity and inertia, so they need the magnetic pull of half-step magnetism to overcome gravity and inertia.” An example of musical magnetism that overcomes musical gravity and musical inertia is 5-4<sup>#</sup>-5 where musical magnetism overcomes the tendencies to descend. These tendencies to descend are governed by musical gravity and musical inertia.



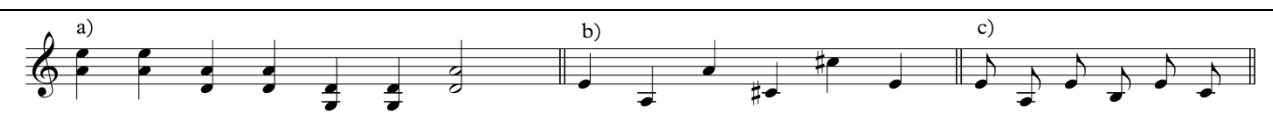
*Example 2-13: Larson (2012:83) gives this example and writes that the starting note (C) forms the gravity point towards which all other subsequent notes are drawn downwards.*

<sup>35</sup> Musical gravity is also reflected in principles of composition and harmony, for example a fourth species counterpoint which requires the downward resolution of suspensions (Larson & VanHandel, 2005:122).

<sup>36</sup> Larson (1993:99) gives an example for musical gravity: “in a context where C is heard as stable and the D above it is heard as unstable, listeners experience musical gravity as a tendency of the D to descend to C.”

### 2.3.4 Musical Inertia

Larson (1993:99) identified a third force in addition to musical magnetism and musical gravity, namely musical inertia, which he describes as “the tendency of a pattern of musical motion to continue in the *same* fashion (where what is meant by ‘same’ depends upon how that musical pattern is represented in our internal hearing).”<sup>37</sup> Sequences can be heard as “giving in to inertia.” (Larson & VanHandel, 2005:125.) Inertial expectations are not limited to the size and direction of intervals, thus inertial expectations apply similarly to small and large intervals. Regarding the source domain of physical motion, inertia is considered to be both the tendency of an object to keep on moving and the tendency of an object to remain at rest. The impact of inertia is stronger than gravity and more pervasive than magnetism, thus inertia tends to continue the motion of a pattern beyond stability points toward which objects are drawn by other forces (Larson & VanHandel, 2005:125). Larson and VanHandel (2005:125-126) hypothesize the following concerning musical inertia: like musical magnetism and musical gravity, musical inertia affects the strength with which a melodic pattern moves towards completion and the frequency at which patterns occur; the effect of musical inertia is stronger than the effect of musical gravity and musical magnetism; the perception of this force may be less dependent on learning; musical motions are carried beyond stable positions which are the goals of musical magnetism and musical gravity because this is a tendency of musical inertia; musical inertia may combine with musical magnetism and musical gravity in order to create motions that are smooth and which tend towards an equilibrium with musical magnetism and musical gravity. Hatten (2004:116) considers inertia as merely the tendency of a pattern or gesture to continue and that it offers no impedance to the energy implied in a gesture.



The image shows a musical staff with three measures labeled a), b), and c). Measure a) shows a broken chord with notes G4, A4, B4, C5, D5, E5. Measure b) shows a melodic line with notes E4, A4, B4, C5, D5, E5. Measure c) shows a melodic line with notes E4, A4, B4, C5, D5, E5. The staff is enclosed in a rectangular box.

*Example 2-14: Larson (2012:99) gives this example to illustrate that different perceptions of the E-A dyad or broken chord suggest different inertial tendencies.*

<sup>37</sup> Larson (1993:99) gives an example for musical inertia: “if a pattern of musical motion begins ‘C-D-E, D-E-F,’ listeners may experience musical inertia as a tendency to continue the pattern ‘E-F-G’, and so on.

### 2.3.5 Musical Magnetism, Musical Gravity and Musical Inertia

The discussions above of musical magnetism (§2.3.2), musical gravity (§2.3.3) and musical inertia (§2.3.4) situate each force with respect to the other forces in terms of similarities and differences. In the following paragraphs the effect of the different musical forces will be discussed, as well as the agreement and disagreement of the musical forces.

#### 2.3.5.1 The Effect of Musical Magnetism, Musical Gravity and Musical Inertia

The effect of musical gravity is weaker than the effect of musical magnetism and musical inertia. Also, the effect of musical gravity is clearer in global trajectories than in local trajectories (Larson & VanHandel, 2005:123-124). The effect of musical magnetism – which depends on proximity – is stronger than the effect of musical gravity and that effect is clearer in local trajectories than in global trajectories. The effect of musical inertia is stronger than the effect of musical gravity and musical magnetism (Larson & VanHandel, 2005:125).

#### 2.3.5.2 Agreement and Disagreement of Musical Magnetism, Musical Gravity and Musical Inertia

Larson and McAdams (2004:462) write that in some cases musical forces may agree or disagree. When musical forces agree, Larson and McAdams (2004:462) writes that in certain contexts where melodies move within the major scale and members of the tonic triad are considered the stable pitches, musical gravity will cause a melodic beginning 5-4-? to go down and result in 5-4-3; musical magnetism suggests that the melodic beginning 5-4-? will result in 5-4-3 because 3 is the nearest stable pitch; musical inertia suggests that the pattern will continue by going in the same direction in which it started and thus also result in 5-4-3.

Concerning instances when musical forces disagree, Larson and McAdams (2004:462) writes that in certain contexts when melodies move within the major scale and members of the tonic triad are considered the stable pitches, musical gravity and musical magnetism cause a melodic pattern 5-6-? to become 5-6-5. The pattern will become 5-6-5 because in the case of musical gravity, closure and stability are sought in a downward direction, and, in the case of musical magnetism the pattern will continue by moving to the nearest stable pitch. In both cases this requires resolution to scale step 5. Musical inertia will cause the melodic pattern 5-6-? to become 5-6-7-8 because the pattern will continue by going in the same direction in which it started.

## 2.4 Musical Forces and Musical Gestures

### 2.4.1 Introduction to Musical Gestures

In discourse on music the term 'musical gesture' is employed to refer to a wide range of aspects of music and musical performance. This term is also often confused with other musical terms.<sup>38</sup> Literature regarding musical gestures reveals different fields of study where the concept is utilized and these fields of study can be categorized into eight groups: (1) musical forces; (2) understanding musical meaning and emotions through semiotics; (3) the expression of musical characteristics and socio-cultural meanings of gestures; (4) embodiment in music; (5) sound patterns; (6) communicative movements of conductors; (7) movements and kinesthetic actions of artists during musical performances; and (8) dance and theatre. In each field of study there are several understandings and definitions of the term 'musical gesture'. In order to avoid the philosophical debates regarding musical gestures I will focus on Steve Larson's interpretation. Larson is thus far the only theorist who wrote about musical gestures and musical forces. In this section of my report I will first write how his theory of musical forces can be applied to musical gestures from Larson's writings. I will then expand Larson's ideas on musical gestures and give a working definition for the term 'musical gesture' which will be relevant to this specific study.

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<sup>38</sup> Arnie Cox (2006:57) compares the understanding of the term 'musical gesture' with other terms it is often confused with. These are terms like 'figure', 'motive' and 'leap'. There are also many other terms which are used in the literature to describe the term 'musical gesture' wrongfully, according to Cox.

Larson (2012:326) writes that the theory of musical forces can be employed in Robert Hatten's (2004) theory of musical gestures because Hatten<sup>39</sup> (2004:115-117) writes about "virtual environmental forces" that influence the shape and meaning of musical gestures. Larson (2003:2) therefore suggests<sup>40</sup> that "thinking about musical gestures in terms of musical forces may help us better understand the creation, experience, and understanding of music" (Gritten & King, 2006:xxii; Larson, 2006:73). Larson (2006:61) further explains that musical gestures derive part of their character from musical forces: "[j]ust as every physical gesture derives its character in part from the ways in which it moves with respect to physical forces, so every musical gesture derives its character in part from the ways in which it moves with respect to musical forces." Larson hereby implies that musical gestures create a strong sense of movement because of musical forces. Because musical forces exist between unstable tones which are drawn toward a stable platform, it is implied that a point of stability is present in all gestures. Larson also writes about the point of stability in musical gestures and that the point of stability plays an important role when multiple forces are considered. Larson explains how musical forces act upon multiple musical gestures: when two gestures combine, the first gesture can either continue smoothly into the second or the first gesture pauses before the second gesture continues. When the two gestures combine smoothly, inertia carries motion through the point of elision – which is a stable point – where the one gesture ends and the other gesture begins. When the first gesture pauses before changing direction to begin the second, the pause of the first gesture is at a stable point (Larson, 2006:61). In his article *Swing and Motive in Three Performances by Oscar Peterson*, Larson (1999:285) writes that "this analogy holds for every level of structure on which we are capable of hearing musical gestures as embodying physical connections between points of stability." From this explanation we learn that musical gestures

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<sup>39</sup> Robert Hatten is a leading researcher in the field of musical gestures and his best-known publication is *Interpreting Musical Gestures, Topics and Tropes: Mozart, Beethoven, Schubert* (2004). Although Hatten works toward a theory of musical gestures, his views in his book on musical gestures are conflicting and it is unclear whether he also considers sound patterns as musical gestures. Therefore, I will not use or discuss Hatten's theory of musical gestures in this dissertation because the wider discourse in music regarding musical gestures are largely irrelevant for this study.

<sup>40</sup> Larson wrote about musical gestures in terms of musical forces only once in the book *Music and Gesture* (2006) by Anthony Gritten and Elaine King and his chapter was based on a paper he delivered on a conference on music and gesture. Although he uses the term 'musical gesture' in his book *Musical Forces: Motion, Metaphor, and Meaning* (2012) he does not devote a section or chapter in this book to explain or expand his views of musical gestures fully.

are not always unconnected but gestures can also combine. Because gestures can combine, an ambiguity occurs with regard to the segmentation of these gestures. The ambiguity between combining gestures can then be clarified by means of the identification of the point of stability and the interaction of musical forces.

#### 2.4.2 Musical Gestures and Musical Forces in Debussy's *Syrinx*

It becomes clear from the above discussions that musical gestures cannot be separated from musical forces. It is also evident that musical gestures are often confused with motifs. Motifs can, however, be reinterpreted as musical gestures when they meet certain requirements. These requirements are as follows. Firstly the motif must be a foreground salient musical pattern which fits within the boundaries of the perceptual present of approximately 3.5 seconds<sup>41</sup>. Secondly, there must be a point of stability towards which unstable tones are drawn, thus enabling the interaction of musical forces<sup>42</sup>. When motifs meet these requirements they can be understood and reinterpreted as musical gestures.

The motifs I identified in §2.2.5 do meet the requirements mentioned above: the motifs are within the boundaries of the perceptual present and a point of stability towards which other unstable tones are drawn to is present in each motif<sup>43</sup>. Because all the motifs identified in §2.2.5 meet the specific requirements they can be reinterpreted as musical gestures. In the remainder of this chapter, I will discuss each motif as a musical gesture.

*Example 2-15: The musical gestures in Debussy's Syrinx, discussed in terms of the three musical forces.*





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<sup>41</sup> Bob Snyder (2000:5) writes that the perceptual present of humans is 3 to 5 seconds and Justin London (2006:128) writes that the perceptual present of humans is 5 to 6 seconds. I use a mean of 3.5 seconds for this study. The 'perceptual present' is referred to by other writers as 'the limit of short-term memory'.




<sup>42</sup> Musical forces give identity to musical gestures.





<sup>43</sup> Points of stability are identified in §2.2.5.











04		B <sup>b</sup>	<p>The force of musical magnetism is prominent in beat 3<sup>b</sup> from the F acciaccatura where the scalar movement as in gesture 01 is pulled downwards to the B<sup>b</sup> on the first beat of m. 5. At that point the tones which were above the stable B<sup>b</sup> return to the B<sup>b</sup>.</p>	<p>Musical magnetism is an important force in this gesture. The B<sup>b</sup> on the first beat of m. 4 ascends in semitones to the B on the second beat, the C on the third beat and then to the D<sup>b</sup> on beat 3<sup>b</sup> which was heard in the previous gesture as a stable tone.</p>	<p>Musical inertia functions in two different ways in this gesture. At first the chromatic ascending pattern, interpolated by F<sup>#</sup>-G, is expected to continue on the third beat with the same rhythm and with a D<sup>b</sup>-F<sup>#</sup>-G in the next beat. That expectation is deliberately not met and the B<sup>b</sup>-F<sup>#</sup>-G is heard again on the first beat in m. 5 after a short digression.</p>
05		(A <sup>b</sup> )	<p>The A<sup>b</sup> is not a convincing point of stability in this gesture and therefore the forces of musical gravity and musical magnetism are unclear in this gesture.</p>		<p>Even if the A<sup>b</sup> is not the stable tone of the arpeggio, this gesture is expected to continue into the next octave because of the inertial tendencies of arpeggios. However, the arpeggio is bluntly stopped when the upper A<sup>b</sup> is reached.</p>
06		B <sup>b</sup>	<p>Although the B<sup>b</sup> is not heard prominently here, it was already established as the point of stability in the previous gestures. With the B<sup>b</sup> in mind as point of stability, the duration of the C<sup>b</sup> is meaningful: it is a semitone above the B<sup>b</sup> and the force of musical gravity is reinforced. The D<sup>b</sup> which was heard in previous gestures as a stable tone is heard here only as a crotchet which serves as a passing note to the first E<sup>b</sup> of the composition. The E<sup>b</sup> is pulled downwards by the force of musical gravity to the stable B<sup>b</sup>. Because the C<sup>b</sup>, D<sup>b</sup> and E<sup>b</sup> are perceived as unstable in comparison with the B<sup>b</sup>, musical magnetism does not support musical gravity.</p>		<p>This gesture could repeat because of musical inertia, but because the long note values are a disturbance of the rhythmic flow of the composition, musical inertia is restrained.</p>
07		B <sup>b</sup>	<p>See discussion at gesture 01</p>		


08		B <sup>b</sup>	<p>This gesture is very similar to the first gesture because it also starts with the descending movement from the stable B<sup>b</sup>. However, when the G<sup>b</sup> is reached on the third beat, the contour changes and moves upwards. The stable B<sup>b</sup> is surpassed by the ascending movement but tones are drawn downwards again to the B<sup>b</sup> by the force of musical gravity.</p>	<p>The G<sup>b</sup> acciaccatura serves as the turning point of the movement and the melodic material is drawn downwards to the D<sup>b</sup> which is the nearest stable point. The D<sup>b</sup> leaps downwards to the B<sup>b</sup> which is the point of stability of the gesture.</p>	<p>Similar to the first gesture, musical inertia creates the expectation that the pattern which was heard in the first two beats will be continued from the G<sup>b</sup> onwards but is then overcome by musical gravity. At first, musical inertia creates the impression that the ascending movement from the G<sup>b</sup> will continue to ascend from the E<sup>b</sup> in the rhythm of sixteenth notes. Nonetheless, the melodic contour changes at the G<sup>b</sup> acciaccatura and the melodic material is pulled downwards by the force of musical gravity and musical magnetism. These two musical forces overcome musical inertia in this gesture.</p>
09		B <sup>b</sup>	<p>This gesture starts on the stable B<sup>b</sup> and the turning point of the contour is the lower D<sup>b</sup> which is also a stable tone. The ascending movement surpasses the point of stability and is again drawn downwards to the B<sup>b</sup> by the force of musical gravity.</p>	<p>The force of musical magnetism is prominent from the G<sup>b</sup> in m. 12 and is pulled upwards – as in gesture 08 – to the B<sup>b</sup> in the first beat which is the closest stable tone. The contour continues upwards and surpasses both the B<sup>b</sup> and D<sup>b</sup> until the direction of the contour changes at the G<sup>b</sup> acciaccatura. Musical magnetism causes the contour movement from the F to descend to the D<sup>b</sup> which is the closest stable tone.</p>	<p>Musical inertia creates the impression that the ascending movement from the D<sup>b</sup> on the third beat of m. 11 will continue to ascend from the E<sup>b</sup> in the rhythm of 32<sup>nd</sup> notes. However, the melodic contour changes at the G<sup>b</sup> acciaccatura and the melodic material is pulled downwards by the force of musical gravity and musical magnetism. Musical inertia is thus overcome by musical gravity and musical magnetism.</p>

10		(E <sup>b</sup> )	<p>These descending movements can be heard as governed by the force of musical gravity even though the E<sup>b</sup> is not yet a convincing point of stability.</p>	<p>The chromatic descending patterns can be said to be pulled downwards by the force of musical magnetism, but these downward pulls are undirected because the E<sup>b</sup> is not yet a convincing point of stability.</p>	<p>Musical inertia plays an important role in this gesture because the pattern heard on the first beat of m. 13 is repeated in the second and third beat. It is the first time in the composition that a pattern is stated three times. The leaps between repetitions are minor thirds, followed by a descending chromatic movement. The inertial tendency is, however, brought abruptly to an end when the melodic material changes from the E<sup>b</sup> (onwards) in the first beat of m. 14.</p>
11		E <sup>b</sup>	<p>The G<sup>b</sup> acciaccatura forms a leap of a minor third with the E<sup>b</sup> and descends chromatically to the E<sup>b</sup>. This chromatic movement intensifies the descent to the stable E<sup>b</sup>.</p>	<p>The G<sup>b</sup> acciaccatura, followed by the F and F<sup>b</sup> are all drawn downwards to the stable E<sup>b</sup> which is the closest stable tone. The movement to the E<sup>b</sup> is also intensified by three descending chromatic tones. It is the first time in the composition that a point of stability is approached with three consecutive semitones. This descending movement in semitones is meaningful because the E<sup>b</sup> must be established strongly as the new point of stability.</p>	<p>The centripetal movement of gesture 11 is mostly because of musical gravity and musical magnetism which pulls the melodic material to the E<sup>b</sup>. Musical inertia creates the expectation that the gesture will repeat on the E<sup>b</sup> with the same rhythm as the previous pattern. However, the pattern first comes to a rest with an E<sup>b</sup> crotchet and is then continued in gesture 12 with F-F<sup>b</sup> which descends to the stable E<sup>b</sup>. On the E<sup>b</sup> of gesture 12 in m. 15, inertia commences significantly. The pattern heard in the first beat of m. . 15 is repeated exactly on the second beat and altered in terms of pitch height at the second repetition on the third beat of m. 15 in order to</p>
12		E <sup>b</sup>	<p>This gesture starts with an F-F<sup>b</sup> movement which descends to the stable E<sup>b</sup>. The E<sup>b</sup>s on the strong beats are each followed by acciaccaturas and a descending chromatic movement towards the lower</p>	<p>The gesture starts with an upbeat with F and F<sup>b</sup> which are pulled downwards to the E<sup>b</sup>, the closest stable pitch. Musical magnetism pulls all the tones that follow downwards to the E<sup>b</sup> which is</p>	

			stable E <sup>b</sup> . These chromatic descending movements are caused by the force of musical gravity which pulls the unstable tones towards the E <sup>b</sup> s.	the closest stable pitch to the G <sup>b</sup> s, Fs and F <sup>b</sup> s.	descend to the D in m. 16.
13		→D <sup>b</sup>	This gesture commences a tonal eroding from E <sup>b</sup> to D <sup>b</sup> by using D as an eroding tone. This tonal instability makes the musical forces of gravity and magnetism unclear.		The repetition of material in gesture 12 was set off by musical inertia and therefore one might expect the triplet on the first beat of m. 16 to repeat with different pitch content. The repeated triplets are, however, ended by the ascending four-quaver pattern in m. 16. This pattern, however, does not create inertial tendencies.
14		→D <sup>b</sup>		See discussion at gesture 13	When gesture 13 is brought into consideration, new inertial tendencies come to light. However, my aim is not to draw parallels between gestures and therefore I will not discuss the inertial tendencies of this gesture here.
15		→B <sup>b</sup>	Although the B <sup>b</sup> is not heard prominently in this gesture, this gesture is tonally progressing towards the B <sup>b</sup> . Because the D <sup>b</sup> was heard as the point of stability in the previous gesture, and this gesture moves towards the B <sup>b</sup> , the interaction of musical gravity and musical magnetism is not clear.		Because of the few stable tones and the tonal movement towards the B <sup>b</sup> , musical inertia plays no significant role in this gesture.
16		→B <sup>b</sup>	This gesture is – like gesture 15 – tonally moving towards the B <sup>b</sup> to re-establish B <sup>b</sup> as the point of stability. The B <sup>b</sup> versus the E <sup>b</sup> as point of stability in this gesture is at first ambiguous, until the descent F-E <sup>b</sup> -D <sup>b</sup> -C <sup>b</sup> resolves (with a semitone C <sup>b</sup> -B <sup>b</sup> ) to the B <sup>b</sup> which is heard for the first time again as a stable tone. The ascent is pulled downwards to the B <sup>b</sup> with the forces of musical gravity and musical magnetism.		The fact that the point of stability is not established yet and still unclear, musical inertia plays no significant role in this gesture.

17		B <sup>b</sup>	<p>A combination of ascending and descending movements is present in this gesture. The force of musical gravity pulls the melodic material above the stable B<sup>b</sup> downwards and the B<sup>b</sup> is reached on the second and third beat in m. 21. However, the gesture immediately continues the descending movement. (The material that follows is drawn upwards to the B<sup>b</sup> by the force of musical magnetism.)</p>	<p>In the first two beats the melodic material is pulled downwards to the B<sup>b</sup> which is the closest stable pitch. The magnetism to the B<sup>b</sup> is intensified by the C<sup>b</sup> which is a semitone from the B<sup>b</sup>. (When the B<sup>b</sup> on the second beat is reached, musical inertia commences.) The B<sup>b</sup> in m. 23 is the result of a potential magnetic pull towards the B<sup>b</sup> from the G<sup>b</sup> and the magnetic pull is intensified by the chromatic movement of the A<sup>b</sup>-A to the B<sup>b</sup> which is the closest stable pitch.</p>	<p>Musical inertia commences on the B<sup>b</sup> in the second beat of m. 22 when the material of the first beat is repeated with altered pitch content and the same rhythm. However, when the B<sup>b</sup> on the third beat is reached the pattern (neither the rhythm nor contour) is not repeated. The B<sup>b</sup> crotchet in m. 23 makes an obvious end to the pattern heard in the third beat of m. 23 and thus prevents musical inertia to commence in full.</p>
18		B <sup>b</sup>	<p>The two trills in this gesture are each drawn to the lower B<sup>b</sup> because of the gravitational force which acts upon the melodic content of these two ornaments.</p>	<p>Because musical gravity is so strong it is difficult to hear the effect of musical magnetism in these two trills. The appoggiatura run from the F is drawn upwards to the B<sup>b</sup> by musical magnetism because that B<sup>b</sup> is the closest stable pitch to the F.</p>	<p>Because of musical inertia a listener may expect more repeats of the trill figure which is transposed every time it repeats. This inertial tendency is, however, not realized.</p>
19		B <sup>b</sup>	<p>See discussion at gesture 01</p>		

20		B <sup>b</sup>	<p>The B<sup>b</sup> is the first tone heard in this gesture and it is also perceived as a point of stability. This returning movement to the B<sup>b</sup> is a result of the force of musical gravity.</p>	<p>The descent from the F<sup>b</sup> is pulled downwards to the D<sup>b</sup> which is the closest stable tone. The D<sup>b</sup> then leaps downwards to the B<sup>b</sup> which is the point of stability in this gesture, but this downward pull to the B<sup>b</sup> can be ascribed to musical gravity rather than to musical magnetism. Musical magnetism is not clear in this gesture, because the D<sup>b</sup> is not yet established as a stable tone and the movement of the F<sup>b</sup>-E<sup>b</sup>-D<sup>b</sup> is too fast to clearly perceive the effect of musical magnetism.</p>	<p>Because this gesture has a centripetal movement, musical inertia could drive this gesture to repeat on the B<sup>b</sup> on the third beat of m. 27. However, this gesture is heard only once – musical inertia was overcome by musical gravity and musical magnetism in this gesture. The centripetal movement of the gesture can also be ascribed to the forces of musical gravity and musical inertia.</p>
21		B <sup>b</sup>	See discussion at gesture 01		
22		B <sup>b</sup>	See discussion at gesture 01		
23		B <sup>b</sup>	See discussion at gesture 01		
24		D <sup>b</sup>	<p>The point of stability (D<sup>b</sup>) is prominent in this gesture and all the melodic activity in this gesture is above the D<sup>b</sup>. The force of musical gravity then pulls the unstable tones towards the lower D<sup>b</sup>.</p>	<p>Musical magnetism and musical gravity collaborate in this gesture to pull the melodic material above the point of stability (D<sup>b</sup>) downwards, also because the D<sup>b</sup> is the closest stable tone for each descending movement of the melodic material. However, the effect of musical magnetism is weakened, first by the E-D<sup>b</sup> (minor third interval) and then by the A-G-D<sup>b</sup> movements.</p>	<p>Because of the two triplets heard in this gesture, musical inertia creates the expectation that a third statement of the triplet will be heard. Even if this musical force creates this expectation, it is not accomplished.</p>

25		D <sup>b</sup>	<p>The D<sup>b</sup> was established well as the point of stability in the previous gesture; therefore the material in mm. 33-34 is heard as unstable to the D<sup>b</sup>. The B, A, G and E<sup>b</sup> are the tones which do not feature prominently in the first gesture when B<sup>b</sup> was the tonal centre, therefore they are stated here and are pulled down to the D<sup>b</sup>. The force of musical gravity becomes more intense as the descent moves closer to the D<sup>b</sup>.</p>	<p>Musical magnetism and musical gravity collaborate in this gesture, because the unstable tones are pulled downward to the stable D<sup>b</sup>. Musical magnetism strengthens from the F and pulls the contour further downwards to the D<sup>b</sup> which is the closest stable tone.</p>	<p>Because Debussy uses the whole tone scale for this gesture, the listener expects this gesture to continue descending in whole tones. Musical inertia collaborates with musical gravity and musical magnetism to pull the movement of this gesture downwards to the stable D<sup>b</sup>.</p>
<p>It is the first time in this composition that all three forces collaborates to direct the movement of a gesture in one direction (towards the stable D<sup>b</sup>). It happens meaningfully in this closure gesture.</p>					

## 2.5 Conclusion

The musical forces in the musical gestures of Debussy's *Syrinx* are now part of the mental model of the orchestrator. Orchestrators can now identify the musical forces they wish to use in their orchestration and use their mental model of the composition to clarify the structure, musical gestures and musical forces, and even amplify the forces. In the following chapter I will show examples from my orchestration of Debussy's *Syrinx*. In this orchestration I used the analysis of Cogan and Escot as well as my suggestions for filling in the shortcomings of Cogan and Escot's analysis as a basis for this composition. This orchestration is an attempt to clarify the tonal and thematic processes of *Syrinx* by amplifying certain musical forces of the musical gestures in *Syrinx*.

# CHAPTER 3

## ORCHESTRATION OF MUSICAL GESTURES IN *SYRINX* BY CLAUDE DEBUSSY

### 3.1 Introduction

In this chapter I will show how I orchestrated the musical gestures that I identified in Chapter 2 in terms of musical forces in order to create a new composition entitled *Ananke*. (Please see Addendum B for the full orchestral score.) The different ways of working with the point of stability and ways of amplifying musical forces will be discussed in more detail in this chapter using the most relevant examples from my orchestral composition, *Ananke*. Although *Ananke* is based upon the musical gestures I identified in Claude Debussy's *Syrinx* for solo flute, it is not a faithful orchestration of *Syrinx* in terms of style and expression. The instrumentation of the orchestra is, however, similar to the instrumentation of *La Mer, trois Esquisses symphoniques pour Orchestre* by Claude Debussy.

The first section of this chapter concerns points of stability. As mentioned in the previous chapter, points of stability are essential in order for the musical forces of gravity and magnetism to function. I will first discuss how Debussy established and eroded the primary and secondary points of stability in *Syrinx* and then show how the main point of stability and the secondary point of stability are established and eroded in my orchestral composition *Ananke*. After discussions of the establishment and erosion of these points of stability in my orchestral composition, each of the three musical forces – musical gravity, musical magnetism and musical inertia – will be discussed. Because Debussy did not consciously employ aspects of the theory of musical forces in *Syrinx*, I will discuss the amplification of the three musical forces only with regard to my orchestral composition.

### 3.2 Points of Stability: Establishment and Erosion

*Syrinx* for solo flute by Debussy starts on a B<sup>b</sup> which is established as the primary point of stability. This primary point of stability is then eroded in order to create a tonal shift to the D<sup>b</sup>. However, the D<sup>b</sup> is not established as a point of stability and the primary point of stability (B<sup>b</sup>) returns. Without another erosion of the B<sup>b</sup>, the D<sup>b</sup> returns and is heard as the secondary point of stability, which is also established by Debussy as the new point of stability at the end of his composition.

Debussy establishes the B<sup>b</sup> as the primary point of stability (mm. 1-12) in *Syrinx* for solo flute by placing the B<sup>b</sup> on strong beats, sustaining the B<sup>b</sup>, and starting and ending musical motions on the B<sup>b</sup>. The D<sup>b</sup> is established as the secondary point of stability (mm. 31-35) by repeating the D<sup>b</sup>, placing D<sup>b</sup> on strong beats, and sustaining the D<sup>b</sup>.

The primary point of stability (B<sup>b</sup>) is eroded by Debussy because the B<sup>b</sup> is avoided from mm. 13-19 and because the B<sup>bb</sup>s in m. 16 and m. 18 do not resolve to the B<sup>b</sup>. Instead, the E<sup>b</sup> is firstly heard as a potential new point of stability in mm. 14-15 because the E<sup>b</sup> is repeated on strong beats and approached with stepwise descending semitone movements. However, the E<sup>b</sup> is only used as a transient tone to support the erosion of the primary point of stability (B<sup>b</sup>) towards the secondary point of stability (D<sup>b</sup>) by means of a chromatic tonal descend in the outlines of the section in mm. 14-19. I will now discuss my approach to the establishment and erosion of the points of stability with examples from my orchestral composition *Ananke*.

#### 3.2.1 Establishment of the Primary Point of Stability

The first fourteen bars of the orchestral composition establish the primary point of stability (B<sup>b</sup>). Please see Example 3-1. The composition starts with all the instruments in unison on the B<sup>b</sup> and the B<sup>b</sup> is presented in different registers and with different timbres: trills in the flutes, a combination of sustained and shorter notes in the other woodwind and brass instruments, a timpani tremolo, glissandi in the harps, tremolo harmonics in the violins and violas and pizzicati in the cellos and contrabasses.

Example 3-1

**A**

*J* = c. 60

Piccolo  
Flute I  
Flute II  
Oboe I  
Oboe II  
Cor Anglais  
Clarinet I in Bb  
Clarinet II in Bb  
Bassoon I  
Bassoon II  
Contrabassoon  
2 Horns in F I  
2 Horns in F II  
Trumpet I in Bb  
Trumpet II in Bb  
Trumpet III in Bb  
Cornet I in Bb  
Cornet II in Bb  
Trombone I  
Trombone II  
Trombone III  
Tuba  
Timpani  
High Tamtam  
Low Tamtam  
Triangle  
Cymbals  
Bass Drum  
Glockenspiel  
Harp I  
Harp II  
Violin I  
Violin II  
Viola  
Violoncello  
Contrabass

**A**

*E-F-G#A#B-C#D#*

Example 3-1 continued

9 10 11 12 13 14

Picc. *f* *mf* - - - - -

Fl. I *f* *mf* - - - - -

Fl. II *f* *mf* - - - - -

Ob. I *f* *mf* - - - - -

Ob. II *f* *mf* - - - - -

C. A. *f* *mf* - - - - -

Cl. I *f* *mf* - - - - -

Cl. II *f* *mf* - - - - -

Bsn. I *f* *mf* - - - - -

Bsn. II *f* *mf* - - - - -

Cbsn. *f* *mf* - - - - -

Hn. I&II *f* *mf* *p* - - - - -

Hn. III&IV *f* *mf* *p* - - - - -

Tpt. I *f* - - - - -

Tpt. II *f* - - - - -

Tpt. III *f* - - - - -

Cor. I *f* - - - - -

Cor. II *f* - - - - -

Tbn. I *f* - - - - -

Tbn. II *f* - - - - -

Tbn. III *f* - - - - -

Tba. *f* - - - - -

Timp. *f* - - - - -

H. Tam  
L. Tam  
Tr.  
Cmb.  
B.D.

Glock. *f* - - - - -

Hp. I *f* *mf* *E♭F♯G♭A♯* *mp* *p* *mp*

Hp. II *f* *mf* *E♭F♯G♭A♯* *mp* *p* *mp*

Vln. I *mp* *p* *pp* *p*

Vln. II *mp* *p* *pp* *p*

Vla. *mp* *p* *pp* *p*

Vc. *mp* *p* *pp* *p*

Cb. *p* *pp* *mp* *p*

The B<sup>b</sup> is also heard with several other timbres and in different rhythms. The rhythmic pattern of the first musical gesture is employed to repeat the B<sup>b</sup> in the clarinets (mm. 1, 3-8), the first trumpet (m. 2), first and second violins (m. 3), and the percussion (mm. 1-13). The two harps are tuned in such a way that they are able to play *bisbigliando* on the B<sup>b</sup> and A<sup>#</sup> in order to present the primary point of stability with different timbres. The neighbouring tones of B<sup>b</sup>, i.e. C and A<sup>b</sup>, are also heard together with the B<sup>b</sup> in m. 4 and m. 6 in order to colour the primary point of stability with dissonance.

The orchestral texture becomes thinner from m. 1 towards m. 8 in order to place emphasis on the return to the primary point of stability in m. 9, which is again announced in all the instruments of the orchestra. Mm. 9-12 are an augmentation of the outlines of the first musical gesture (B<sup>b</sup>-A<sup>b</sup>-G<sup>b</sup>-F-E-D<sup>b</sup>) and as the motion of the music moves further away from the primary point of stability, the orchestral texture becomes thinner until only the strings, percussion and the harps are heard in m. 14.

The establishment of the point of stability – using a wide variety of timbres, the specific performance techniques mentioned above and specific densities in the orchestral texture – becomes a perceptual beacon for listeners in order to mark the establishment of a point of stability. After an unstable segment in mm. 39-49, the primary point of stability returns (mm. 50-55) and is treated in a similar way as during the first establishment of this primary point of stability. In §3.2.2 I will discuss how the secondary point of stability is established in a similar way as the primary point of stability.

### 3.2.2 Establishment of the Secondary Point of Stability

The secondary point of stability is D<sup>b</sup>. I extended the establishment of this secondary point of stability in my orchestral composition (mm. 65-76). Please see Example 3-2. In the first four bars (mm. 65-68) I used altered statements of gesture 2 and statements of the descending sixteenth note pattern of gesture 1 in order to amplify the movement to D<sup>b</sup>. The secondary point of stability (D<sup>b</sup>) is established in mm. 71-72, in ways similar to the establishment of the primary

Example 3-2

Musical score for Example 3-2, measures 65-70. The score is written for a full orchestra and includes the following parts:

- Picc.
- Fl. I
- Fl. II
- Ob. I
- Ob. II
- C. A.
- Cl. I
- Cl. II
- Bsn. I
- Bsn. II
- Cbsn.
- Hn. I&II
- Hn. III&IV
- Tpt. I
- Tpt. II
- Tpt. III
- Cor. I
- Cor. II
- Tbn. I
- Tbn. II
- Tbn. III
- Tba.
- Timp.
- H. Tamt
- L. Tamt
- Tr.
- Cmb.
- B.D.
- Glock.
- Hp. I
- Hp. II
- Vln. I
- Vln. II
- Vla.
- Vc.
- Cb.

The score features various dynamics such as *f*, *mf*, *ff*, *mp*, and *mf<sup>3</sup>*. The key signature is three flats (B-flat major or D-flat minor) and the time signature is 3/4. The score is divided into measures 65 through 70.

Example 3-2 continued

71 72 73 74 75 76

Picc.

Fl. I *mf*

Fl. II *mf*

Ob. I *mf*

Ob. II *mf*

C. A. *mf*

Cl. I *mf*

Cl. II *mf*

Bsn. I *mf*

Bsn. II *mf*

Cbsn. *mf*

Hn. I&II

Hn. III&IV

Tpt. I *f*

Tpt. II *f*

Tpt. III *f*

Cor. I *f*

Cor. II *f*

Tbn. I *f*

Tbn. II *f*

Tbn. III *f*

Tba. *f*

Timp.

H. Tamt

L. Tamt

Tr. *f*

Cmb. *mf* *f* *mf* *f*

B.D.

Glock.

Hp. I *f* *rit.* *rit.*

Hp. II *f* *rit.* *rit.* FGGABBC

Vln. I *f* *ff* *f* *ff* *f*

Vln. II *f* *ff* *f* *ff* *f*

Vla. *f*

Vc. *f*

Cb. *f*

point of stability ( $B^b$ ) discussed above: by unisons of  $D^b$  in different octaves for the woodwind and brass instruments and with tremolos in the first violins, second violins, violas, and cellos. The harps contribute to the perceptual beacon that marks the establishment of a point of stability when they play ascending glissandi followed by bisbigliando,  $D^b$  and  $C^\sharp$ , in mm. 72-73.

### 3.2.3 Erosion of the Primary Point of Stability

Although the  $D^b$  is heard in mm. 1-35 as a stable tone, it is not heard here as a secondary point of stability yet. However, the  $D^b$  is approached in mm. 39-49 in such a way that its establishment as a secondary point of stability is suggested, and that ensures the erosion of the primary point of stability. Please see Example 3-3.

The erosion by Debussy of the primary point of stability ( $B^b$ ) is described in §3.2 above. I relied on Debussy's approach in order to erode the primary point of stability. The primary point of stability ( $B^b$ ) is avoided from mm. 39-48<sup>2</sup> and  $E^b$  (mm. 47-48<sup>1</sup>, 49<sup>1</sup>) and  $A^b$  (mm. 48<sup>2</sup>) are now heard as sustained tones. The  $B^{bb}$  in the ascending part of gesture 13 (mm. 43 and 45) does not resolve to the  $B^b$ . This pattern is consciously doubled in the first violin and viola in m. 43 and the movement is interrupted by rests that follow in m. 44. The tone  $E^b$  plays no significant role in the first 38 bars of the orchestral composition or the first segment of Debussy's composition and the  $E^b$  is also merely a transient tone from m. 39 onwards. The  $E^b$  can be perceived at first as a new point of stability in mm. 39-41. However, because of its placement on strong beats and because it is approached with stepwise descending semitone movements, the  $E^b$  is only led through a chromatic tonal movement to the  $D^b$  from mm. 43-47. These movements of  $D^b$ ,  $D$  and  $E^b$ , which constitute the unstable segment, are amplified by the material in the brass instruments, mm. 41-45. However, the  $D^b$  is not established as the secondary point of stability yet. Instead, the primary point of stability ( $B^b$ ) returns at m. 50.

Example 3-3

39 **D** 40 41 42 43 44

Picc. - - - - -  
Fl. I - - - - -  
Fl. II - - - - -  
Ob. I - - - - -  
Ob. II - - - - -  
C. A. - - - - -  
Cl. I - - - - -  
Cl. II - - - - -  
Bsn. I - - - - -  
Bsn. II - - - - -  
Cbsn. - - - - -  
Hn. I&II - - - - -  
Hn. III&IV - - - - -  
Tpt. I *mf* *f* *f* *mf* *mf* *mf*  
Tpt. II *mf* *f* *f* *mf* *mf* *mf*  
Tpt. III *mf* *f* *f* *mf* *mf* *mf*  
Cor. I *mf* *f* *f* *mf* *mf* *mf*  
Cor. II *mf* *f* *f* *mf* *mf* *mf*  
Tbn. I *mf* *f* *f* *mf* *mf* *mf*  
Tbn. II *mf* *f* *f* *mf* *mf* *mf*  
Tbn. III *mf* *f* *f* *mf* *mf* *mf*  
Tba. *mf* *f* *f* *mf* *mf* *mf*  
Timp. - - - - -  
H. Tamt. - - - - -  
L. Tamt. - - - - -  
Tr. - - - - -  
Cmbl. - - - - -  
B.D. - - - - -  
Glock. *mp* - - - - -  
Hp. I - - - - -  
Hp. II - - - - -  
Vln. I *mf* *f* *f* *mf* *mf* *mf* *pizz.*  
Vln. II *mf* *f* *f* *mf* *mf* *mf* *pizz.*  
Vla. *mf* *f* *f* *mf* *mf* *mf* *pizz.*  
Vc. *mf* *f* *f* *mf* *mf* *mf* *pizz.*  
Cb. - - - - -

Example 3-3 continued

45 46 47 48 49

Picc. - - - - -

Fl. I - - - - -

Fl. II - - - - -

Ob. I - - - - -

Ob. II - - - - -

C. A. - - - - -

Cl. I - - - - -

Cl. II - - - - -

Bsn. I - - - - -

Bsn. II - - - - -

Cbsn. - - - - -

Hn. II&III *mp* *mf* - - - - -

Hn. III&IV *p* *mp* - - - - -

Tpt. I *mf* *mf* *f* - - - - -

Tpt. II *mp* *mf* *f* - - - - -

Tpt. III *mf* *f* - - - - -

Cor. I *mf* *f* - - - - -

Cor. II *mp* *mf* *f* - - - - -

Tbn. I *mf* *f* - - - - -

Tbn. II *mp* *mf* *f* - - - - -

Tbn. III *mp* *mf* *f* - - - - -

Tba. *mf* - - - - -

Timp. *mf* - - - - - *f*

H. Tam *mf* - - - - -

L. Tam - - - - -

Tr. - - - - -

Cmb. *mf* - - - - - *f*

B.D. - - - - -

Glock. - - - - -

Hp. I - - - - -

Hp. II - - - - -

Vin. I *pizz.* *mp* *mf* *mp* *mf* *f*

Vin. II *arco* *mp* *mf* *mp* *mf* *f*

Vla. *arco* *pizz.* *mp* *mf* *mp* *mf* *f*

Vc. *pizz.* *mp* *mf* *mp* *mf* *f*

Cb. *mp* *mf* *mp* *mf* *f* *pizz.*

### 3.3 Amplification of Musical Gravity

In order to discuss and illustrate how I amplified the force of musical gravity, I will use two short examples from the orchestral composition. Although musical forces collaborate and more than one musical force is sometimes present, I will only discuss the examples in terms of the musical force under consideration, often artificially separating the effects of the forces. Example 3-4 is part of gesture 18 and shows how trills in the flute and piccolo (mm. 53-54) are pulled downwards to the primary point of stability ( $B^b$ ). The first trill in the first flute is between the  $E^b$  and  $D^b$  (m. 53). These two tones are heard as above the primary point of stability ( $B^b$ ) and are pulled downwards to the  $B^b$ . The second trill is between the  $G^b$  and  $F$  (m. 54), also heard as above the primary point of stability and also as being pulled downwards to the  $B^b$ . This gesture is orchestrated in such a way that the primary point of stability ( $B^b$ ) is only sustained in the clarinets and horns and heard as sixteenth notes played *bisbigliando* in the harps. When the primary point of stability ( $B^b$ ) sounds, the  $B^b$  is amplified when instruments are added and heard in different registers. This amplification of the  $B^b$  contributes to the amplification of the force of musical gravity because all the musical activity is pulled downwards to the  $B^b$ .

Example 3-5 (mm. 39-41) shows triplets which are chromatically pulled downwards to the  $E^b$ . The descending chromatic motion intensifies the pull towards the  $E^b$ . Because the triplets are repeated, I amplified the descending pull to the  $E^b$  even more by adding an instrument which doubles the melodic material each time a triplet is repeated. The  $E^b$  is also sustained in the brass instruments, the glockenspiel and strings, in order to amplify the downward pull to that  $E^b$  which is the closest stable tone and also placed on the strong beats.

In both the gestures discussed above, the point of stability was amplified by adding instruments to make the arrival at the point of stability more prominent. The musical motion also returned to the points of stability on the strong beats in each of the two examples discussed above. The point of stability was also sustained in other instruments, as shown in Example 3-5, in order to amplify the gravitational pull to the point of stability for all the tones which are above that point of stability.

Example 3-4

Musical score for Example 3-4, measures 53-54. The score includes parts for Piccolo, Flutes I & II, Oboes I & II, Clarinet in A, Clarinets I & II, Bassoons I & II, Contrabassoon, Horns I & II, Horns III & IV, Trumpets I, II, & III, Cor Anglais I & II, Trombones I, II, & III, Tuba, Timpani, H. Tam, L. Tam, Tr., Cmb., B.D., Glock., Harp I & II, Violins I & II, Viola, Violoncello, and Contrabass. The key signature is three flats (B-flat major/C minor) and the time signature is 4/4. Dynamics include *f*, *mf*, and *pizz.* (pizzicato).

Example 3-5

Musical score for Example 3-5, measures 39-40. The score includes parts for Piccolo, Flutes I & II, Oboes I & II, Clarinet in A, Clarinets I & II, Bassoons I & II, Contrabassoon, Horns I & II, Horns III & IV, Trumpets I, II, & III, Cor Anglais I & II, Trombones I, II, & III, Tuba, Timpani, H. Tam, L. Tam, Tr., Cmb., B.D., Glock., Harp I & II, Violins I & II, Viola, Violoncello, and Contrabass. The key signature is three flats (B-flat major/C minor) and the time signature is 4/4. Dynamics include *mf*, *f*, and *mp*. A rehearsal mark 'D' is present at the beginning of measure 39.

### 3.4 Amplification of Musical Magnetism

Musical magnetism is often overcome by musical gravity but musical magnetism and musical gravity also collaborate often. The spatial exploration in *Syrinx* for solo flute is limited and therefore musical gravity can easily overcome musical magnetism, especially in segments where the primary point of stability is made clear. In this section I will show examples of how I amplified the force of musical magnetism in ascending passages.

The first example I will use here is the last four bars (mm. 89-101) of my orchestral composition *Ananke*. Please see Example 3-7. The point of stability in this segment is  $D^b$ . A sixteenth note triplet in the piccolo starts a chromatically ascending pattern on the  $D^b$  towards the  $D^b$  an octave above. This chromatic ascending line is pulled upwards to the point of stability ( $D^b$ ) by the force of musical magnetism. This force of musical magnetism is amplified by adding woodwind instruments that double the motion as well as chromatic ascending sixteenth notes in the brass instruments that amplify the magnetic pull towards the upper  $D^b$ . While the woodwind instruments, the brass instruments and the strings are playing the ascending chromatic line, the point of stability ( $D^b$ ) is sustained *bisbigliando* between  $D^b$  and  $C^\sharp$  in the harps in order to intensify the tendency to resolve to that point of stability.

Example 3-8 (mm. 51-55) shows how musical magnetism is amplified in two different ways at three different places. Firstly, I used gesture 17 from Debussy's *Syrinx* (see Example 3-6 below) and amplified the last beat of m. 22 of *Syrinx* in terms of musical inertia. This amplification can be seen in the cellos, m. 51 of Example 3-8, in the orchestral score of *Ananke*. Debussy interrupts the descending chromatic movement  $B^b-A-A^b-G^b$  with a leap to a lower D and a leap to the  $G^b$  which continues the ascent  $G^b-A^b-A-B^b$ . In the orchestral composition I used musical



Example 3-6: *Gesture 17 from Syrinx by Claude Debussy*

Example 3-7

89 90 91 92

Picc. *f cresc.*

Fl. I *f cresc.*

Fl. II *f cresc.*

Ob. I *f cresc.*

Ob. II *f cresc.*

C. A. *f cresc.*

Cl. I *f cresc.*

Cl. II *f cresc.*

Bsn. I *f cresc.*

Bsn. II *f cresc.*

Cbsn. *f cresc.*

Hn. I&II *mf cresc.*

Hn. III&IV *mf cresc.*

Tpt. I *mf cresc.*

Tpt. II *mf cresc.*

Tpt. III *mf cresc.*

Cor. I *mf cresc.*

Cor. II *mf cresc.*

Tbn. I *mf cresc.*

Tbn. II *mf cresc.*

Tbn. III *mf cresc.*

Tba. *mf cresc.*

Timp. *ff*

H. Tamt. *ff*

L. Tamt. *ff*

Tr. *ff*

Cmbl. *ff*

B.D. *ff*

Glock. *ff*

Hp. I *ff*

Hp. II *ff*

Vin. I *pizz.* *arco*

Vin. II *pizz.* *arco*

Vla. *pizz.* *arco*

Vc. *pizz.* *arco*

Cb. *pizz.* *arco*

*ff* circa 500"

Example 3-8

This musical score, labeled 'Example 3-8', covers measures 51 through 55. It is written for a full symphony orchestra and includes parts for woodwinds, brass, percussion, strings, and harp. The score is in a key signature of three flats and a 4/4 time signature. The woodwind section (Piccolo, Flutes I & II, Oboes I & II, Clarinets I & II, Bassoons I & II, and Contrabassoon) and the brass section (Trumpets I, II, and III; Cornets I & II; Trombones I, II, and III; and Tuba) feature complex rhythmic patterns, including triplets and sixteenth-note runs. The percussion section includes Timpani, Snare Drum, Bass Drum, and Cymbals. The string section (Violins I & II, Viola, Violoncello, and Contrabass) and the Harp provide harmonic support, with the Harp and Violoncello parts featuring glissando markings. Dynamics range from *mf* (mezzo-forte) to *ff* (fortissimo). The score concludes with a final *ff* dynamic marking in measure 55.

inertia to repeat this pattern two more times while the interval of the leap becomes smaller. As this interval becomes smaller the force of musical magnetism is amplified because of the stepwise movement of the music. The last statement of this pattern in the orchestral composition is  $B^b-A-A^b-G^b-F-G^b-A^b-A-B^b$  and the tendency to resolve to the  $B^b$  grows stronger because of the amplification of musical magnetism.

There are stepwise ascending movements in m. 52 and m. 54, both pulled upwards to the point of stability ( $B^b$ ). In both motions the intensifying growth towards the point of stability is supported by adding instruments which double the ascending movement to the point of stability and make the orchestral texture denser in order to amplify the musical magnetic force towards the point of stability ( $B^b$ ).

In the examples above I showed how the force of musical magnetism is amplified when a point of stability is approached. In the following examples I will show how musical magnetism is amplified when the point of stability retreats. Example 3-9 (mm. 20-22) shows the first and second musical gestures from Debussy's *Syrinx* in the orchestral composition. The retreat of the point of stability in m. 20 and m. 22 in each gesture is made clear by the orchestral texture that becomes thinner and the sustain of the point of stability ( $B^b$ ) in the clarinets (m. 20 and m. 22) and the first violins (m. 20). In this way musical magnetism is amplified.

Example 3-10 (mm. 56-59) shows the augmentation of the first musical gesture in Debussy's *Syrinx*. This example also shows how the orchestral texture becomes thinner when the point of stability ( $B^b$ ) retreats.

These examples and discussions show that musical magnetism can be amplified when the point of stability is approached or when it retreats. One of the ways to approach such an amplification of musical magnetism is a dense orchestral texture towards the points of stability or a thinner orchestral texture away from the point of stability. Example 3-7 also shows that musical inertia can be employed in order to support the amplification of musical magnetism.

# Example 3-9

20 21 2

Picc.  
 Fl. I  
 Fl. II  
 Ob. I  
 Ob. II  
 C. A.  
 Cl. I  
 Cl. II  
 Bsn. I  
 Bsn. II  
 Cbsn.  
 Hn. I&II  
 Hn. III&IV  
 Tpt. I  
 Tpt. II  
 Tpt. III  
 Cor. I  
 Cor. II  
 Tbn. I  
 Tbn. II  
 Tbn. III  
 Tba.  
 Timp.  
 H. Tamt  
 L. Tamt  
 Tr.  
 Cmb.  
 B.D.  
 Glock.  
 Hp. I  
 Hp. II  
 Vln. I  
 Vln. II  
 Vla.  
 Vcl.  
 Cb.

Musical score for Example 3-9, spanning measures 20, 21, and 2. The score is written for a full symphony orchestra. The key signature is three flats (B-flat major or D-flat minor), and the time signature is 3/4. The score includes parts for Piccolo, Flutes I and II, Oboes I and II, Clarinet in A, Clarinets I and II, Bassoons I and II, Contrabassoon, Horns I and II, Horns III and IV, Trumpets I, II, and III, Cornets I and II, Trombones I, II, and III, Tuba, Timpani, and various percussion instruments (Harp, Tam-tam, Triangle, Cymbal, Bells, Glockenspiel). The string section includes Violins I and II, Viola, Violoncello, and Contrabass. Dynamics markings such as *mf*, *mp*, *f*, and *pizz.* are present throughout the score.

Example 3-10

56 **E** 57 58 59 **F**

Picc.

Fl. I

Fl. II

Ob. I

Ob. II

C. A.

Cl. I

Cl. II

Bsn. I

Bsn. II

Cbsn.

Hn. I&II

Hn. III&IV

Tpt. I

Tpt. II

Tpt. III

Cor. I

Cor. II

Tbn. I

Tbn. II

Tbn. III

Tba.

Timp.

H. Tamt

L. Tamt

Tr.

Cmbl.

B.D.

Glock.

Hp. I

Hp. II

Vln. I

Vln. II

Vla.

Vc.

Cb.

*f*, *mf*, *ff*, *pizz.*, *tr.*

FG♭A/C♯

FG♭A/C♯

### 3.5 Amplification of Musical Inertia

I combined the first and second musical gestures in Debussy's *Syrinx* in order to realize and amplify the inertial tendencies of Debussy's first musical gesture. This realization and amplification in the orchestral composition is shown in Example 3-11 (mm. 16-19). This example shows how the sixteenth note descent in beat 3 of mm. 16 is continued for another two beats and then merges with the second musical gesture. The second musical gesture is also repeated three times in the clarinets, strings and cor anglais. The rhythm of the second musical gesture is similar to the rhythm of the first two beats of the first musical gesture and the repetition of the second musical gesture can be understood as a further realization of the inertial tendencies of the first musical gesture.

Example 3-12 (mm. 24-26) shows how the inertial tendency of the arpeggio in the harps is realized and amplified by continuing the ascent two octaves higher in different registers as well as adding the piccolo, flute, oboe and clarinet, which double the ascending arpeggio. Similar approaches are evident in mm. 36-39, mm. 50-52 and mm. 89-100 of the orchestral composition. A more explicit example of spatial exploration, which exists because of the amplification of inertial tendencies, is evident in the orchestral composition mm. 53-55.

The examples above show one possibility of how inertial tendencies can be realized and amplified. When these tendencies are realized and amplified the musical space of that gesture is also explored and extended. Example 3-13 shows how the inertial tendencies of gestures 11 and 12 of *Syrinx* are realized and amplified when the triplet motifs of those gestures are repeated without exploring or extending the musical space. The amplification of the inertial force in these gestures is done by adding instruments which double the triplets in unison and in effect make the orchestral texture denser.

Example 3-11

Musical score for Example 3-11, measures 16-19. The score is in 3/4 time and features a key signature of three flats (B-flat major or D-flat minor). A section marker 'B' is present at the beginning of measure 16. The instruments and their parts are as follows:

- Picc.**: Piccolo, rests in measures 16-19.
- Fl. I**: Flute I, plays a melodic line starting in measure 16 with a *mf* dynamic, continuing through measure 17 and ending in measure 18.
- Fl. II**: Flute II, rests in measures 16-19.
- Ob. I**: Oboe I, rests in measures 16-19.
- Ob. II**: Oboe II, rests in measures 16-19.
- C. A.**: Clarinet in A, rests in measures 16-19.
- Cl. I**: Clarinet I, plays a melodic line starting in measure 16 with a *mf* dynamic, continuing through measure 17 and ending in measure 18. A *f* dynamic is marked in measure 18.
- Cl. II**: Clarinet II, rests in measures 16-19.
- Bsn. I**: Bassoon I, rests in measures 16-19.
- Bsn. II**: Bassoon II, rests in measures 16-19.
- Cbsn.**: Contrabassoon, rests in measures 16-19.
- Hn. I&II**: Horns I and II, rests in measures 16-19.
- Hn. III&IV**: Horns III and IV, rests in measures 16-19.
- Tpt. I**: Trumpet I, rests in measures 16-19.
- Tpt. II**: Trumpet II, rests in measures 16-19.
- Tpt. III**: Trumpet III, rests in measures 16-19.
- Cor. I**: Cor Anglais, rests in measures 16-19.
- Cor. II**: Cor Anglais, rests in measures 16-19.
- Tbn. I**: Trombone I, rests in measures 16-19.
- Tbn. II**: Trombone II, rests in measures 16-19.
- Tbn. III**: Trombone III, rests in measures 16-19.
- Tba.**: Tuba, rests in measures 16-19.
- Timp.**: Timpani, rests in measures 16-19.
- H. Tamt**: Hand Drum, rests in measures 16-19.
- L. Tamt**: Large Drum, rests in measures 16-19.
- Tr.**: Triangle, rests in measures 16-19.
- Cmbl.**: Cymbal, rests in measures 16-19.
- B.D.**: Bells, rests in measures 16-19.
- Glock.**: Glockenspiel, rests in measures 16-19.
- Hp. I**: Harp I, plays a rhythmic accompaniment of eighth notes throughout measures 16-19.
- Hp. II**: Harp II, plays a rhythmic accompaniment of eighth notes throughout measures 16-19.
- Vln. I**: Violin I, rests in measures 16-19.
- Vln. II**: Violin II, rests in measures 16-19.
- Vla.**: Viola, rests in measures 16-19.
- Vc.**: Violoncello, rests in measures 16-19.
- Cb.**: Contrabasso, rests in measures 16-19.

Measures 16-19 show various dynamics including *mf* (mezzo-forte) and *f* (forte). The score includes a section marker 'B' at the beginning of measure 16.

# Example 3-12

24 25 26

Picc. Fl. I Fl. II Ob. I Ob. II C. A. Cl. I Cl. II Bsn. I Bsn. II Cbsn. Hn. I&II Hn. III&IV Tpt. I Tpt. II Tpt. III Cor. I Cor. II Tbn. I Tbn. II Tbn. III Tba. Timp. H. Tamt L. Tamt Tr. Cmb. B.D. Glock. Hp. I Hp. II Vln. I Vln. II Vla. Vc. Cb.

*mf* *f* *ff* *ff* *f*

*p* *p*

Example 3-13

39 **D** 40 41

Picc. - - -  
Fl. I - - -  
Fl. II - - -  
Ob. I - - -  
Ob. II - - -  
C. A. - - -  
Cl. I - - -  
Cl. II - - -  
Bsn. I - - -  
Bsn. II - - -  
Cbsn. - - -  
Hn. I&II - - -  
Hn. III&IV - - -  
Tpt. I *mf* *f* *f* *f*  
Tpt. II *mf* *f* *f* *f*  
Tpt. III *mf* *f* *f* *f*  
Cor. I *mf* *f* *f* *f*  
Cor. II *mf* *f* *f* *f*  
Tbn. I *mf* *f* *f* *f*  
Tbn. II *mf* *f* *f* *f*  
Tbn. III *mf* *f* *f* *f*  
Tba. *mf* *f* *f* *f*  
Timp. - - -  
H. Tamt. - - -  
L. Tamt. - - -  
Tr. - - -  
Cmb. - - -  
B.D. - - -  
Glock. *mp* - - -  
Hp. I - - -  
Hp. II - - -  
**D**  
Vln. I - - -  
Vln. II - - -  
Vla. - - -  
Vc. - - -  
Cb. - - -

### 3.6 Collaboration of Musical Gravity, Musical Magnetism and Musical Inertia

Musical gesture 25 (see Example 3-14) in Debussy's *Syrinx* is an example of how all three musical forces – musical gravity, musical magnetism and musical inertia – collaborate to pull musical motion downwards to one stable tone.



*Example 3-14: Musical gesture 25 in Debussy's Syrinx*

My orchestration of gesture 25 is shown in Example 3-15 (mm. 80-87).  $D^b$  is the point of stability in this musical gesture, therefore all the other tones are heard as above  $D^b$  and as being pulled downward to the point of stability ( $D^b$ ). Musical magnetism collaborates with musical gravity in order to pull the musical motion downwards to the  $D^b$ . This gesture is orchestrated in an imitative counterpoint which amplifies inertia. When the  $D^b$  is reached in one instrument group it is sustained in order to amplify the gravitational and magnetic pull to the  $D^b$ . More  $D^b$ 's are heard with every entrance of an instrument group and the pull towards  $D^b$  is amplified. Musical inertia functions also in a less-obvious way: this gesture is based upon a whole tone scale and musical inertia creates the expectation that all descending tones will be a whole tone apart until a stable tone or the point of stability ( $D^b$ ) is reached. The descending whole tone movement, or in effect musical inertia, is amplified in the orchestral composition when the descent is played in different registers and in different instruments of the instrument group. A short part of the descent is also repeated in m. 85 before the point of stability ( $D^b$ ) is coloured by its chromatic neighbouring tones and sustained in m. 86.

Example 3-15

80 **G** 81 82 83 84 85 86 87

Picc. *f* 3

Fl. I *mf* *f* *mp* *f*

Fl. II *mf* *f* *mp* *f*

Ob. I *mf* *f* *mp* *f*

Ob. II *mf* *f* *mp* *f*

C. A. *mf* *mp* *mp* *f*

Cl. I *mf* *f* *mp* *f*

Cl. II *mp* *f* *mp* *f*

Bsn. I *mf* *f* *mp* *f*

Bsn. II *mf* *f* *mp* *f*

Cbsn. *f* *mp* *f*

Hn. I&II *mf* *f*

Hn. III&IV *mf* *f*

Tpt. I *mf* *mp* *ff*

Tpt. II *mp* *ff*

Tpt. III *mp* *ff*

Cor. I *mf* *mp* *ff*

Cor. II *mf* *mp* *ff*

Tbn. I *mf* *mp* *ff*

Tbn. II *mf* *mp* *ff*

Tbn. III *mf* *mp* *ff*

Tba. *mp* *ff*

Timp. *ff*

H. Tamt

L. Tamt

Tr.

Cmb.

B.D.

Glock. *ff*

Hp. I *B<sup>2</sup>*

Hp. II

**G**

Vln. I *mf* *f* *mp* *ff* *mf*

Vln. II *mf* *f* *mp* *ff* *mf*

Vla. *mf* *f* *mp* *ff* *mf*

Vc. *mf* *f* *mp* *ff* *mf*

Cb. *mf* *f* *mp* *ff* *mf*

### 3.7 Conclusion

The discussions of examples from my orchestral composition *Ananke* show that musical gestures can indeed be orchestrated in different ways in order to amplify the musical forces that act upon the musical gestures. However, it is important that the point of stability must be well established because two of the three musical forces cannot be explained or understood if the point of stability is unclear. The point of stability can be sustained while the gesture moves above the sustained point of stability. When the point of stability is sustained while the gesture keeps on moving, the direction and goal of musical forces become clearer.

The orchestral texture also plays an important role in the amplification of musical forces. The composer can choose to use either a denser or thinner orchestral texture for material according to their proximity to the point of stability. I decided that approaches of the point of stability would be associated with a growing density in the orchestral texture and that the retreat of the point of stability would be associated with a decrease in the density of the orchestral texture. Density of orchestral texture is thus determined by the proximity of the material to the point of stability, and this is especially relevant for musical gravity and musical magnetism.

The realization and amplification of inertial tendencies in the orchestrated versions of the gestures show that musical space can be explored in different ways. When the musical space of musical gestures is kept constant, those gestures are merely repeated. When the musical space is explored, different registers and tonal levels of those gestures are also explored. The effect of musical inertia also becomes clearer when it is supported by a directed motion which explores different musical spaces.

The three musical forces can also collaborate in a single gesture and be orchestrated in such a way that the effect of all three forces becomes evident and clear. This orchestration of musical gestures in terms of musical forces enables me to construe principles of orchestration. These principles will be discussed in Chapter 4.

# CHAPTER 4

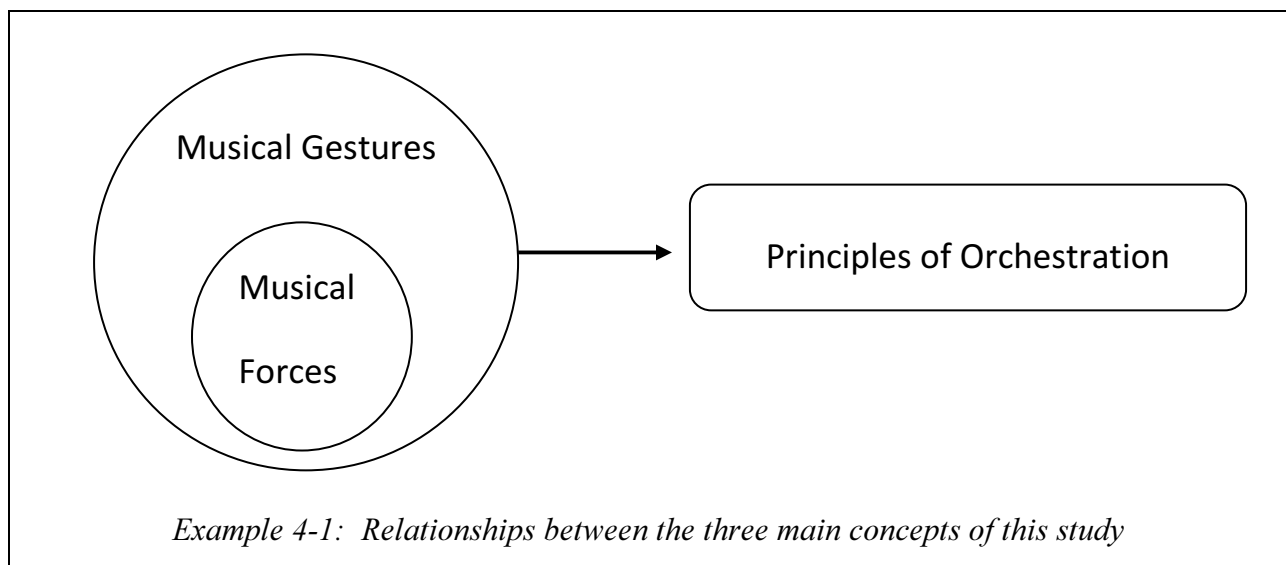
## PRINCIPLES OF ORCHESTRATION, CONCLUSION AND SUGGESTIONS FOR FURTHER STUDY

### 4.1 Introduction

This dissertation will be concluded in this chapter with three sections. In the first section the relationships between the three main concepts of this research will be discussed. These three main concepts are musical gestures, musical forces and principles of orchestration. I will then discuss my research findings and show how my research fulfills my research objectives and answers the research question. This chapter will be concluded with suggestions for further study.

### 4.2 Relationships between Main Concepts

The three main concepts in this study are musical gestures, musical forces and principles of orchestration. These three concepts are presented in Example 4-1.



Musical gestures can be understood in many different ways and from different perspectives. Musical gestures are understood in this research report as salient sound patterns that can be understood through hearing. One of the factors that influence the salience of sound patterns is the interaction of musical forces and the presence of a point of stability. Larson (2006:73) and Gritten and King (2006:xxii) write that we understand music better if we think of musical gestures in terms of musical forces. Musical forces give meaning to musical gestures and are thus an integral part of music. Musical forces, however, can be understood independently of musical gestures.

Understanding gestures in terms of musical forces is the approach followed in this study. Other approaches to the study of musical gestures are, of course, also possible. Furthermore, when musical gestures are not understood in terms of musical forces, but in terms of other approaches, musical gestures can still be researched in order to construe principles of orchestration, as in this study, but likely with different results. Principles can then be construed for example in terms of thematic processes and orchestration, or musical emotion and orchestration, or musical meaning and orchestration, or the expression of musical characteristics and the socio-cultural meanings of musical gestures in orchestration, and so on.

This study is specifically an exploration of one of the ways in which principles of orchestration can be construed when musical gestures are understood in terms of musical forces. In this study musical gestures are taken as a 'medium' to show how principles of orchestration can be construed when the musical forces present in musical gestures are amplified in an orchestration. If only the musical forces were researched, principles of orchestration could also be construed but with a less structured approach towards the principles of orchestration. In this study, my orchestration/recomposition of the chosen work should be understood as part of the analytic process which leads to the construction of principles of orchestration.

From the discussion above it is clear that the relationships between the main concepts of this study are one-directional: musical gestures and musical forces are studied in order to construe principles of orchestration. However, there are important relationships between these main concepts and the one-directionality confirms that the approach followed in this research– to use musical gestures in terms of musical forces in order to construe principles of orchestration – is indeed a suitable approach.

#### 4.3 Research Findings: Principles of Orchestration

The main research question is as follows: how can principles of orchestration be construed when Cogan and Escot's analysis of Claude Debussy's *Syrinx* for solo flute is reinterpreted and orchestrated in terms of musical gestures? In order to answer this research question, four secondary research questions were asked in order to lead discussions in this research report towards answering the main research question. I will now discuss these secondary research questions in the paragraphs that follow.

The first secondary research question concerns the identification of musical gestures in *Syrinx* by Claude Debussy. In order to identify the musical gestures in *Syrinx* and in order to contextualize my unusual approach to musical analysis in terms of a more conventional musical analysis, I used Cogan and Escot's analysis of *Syrinx* as a point of departure. A critical evaluation of Cogan and Escot's analysis led to an enhanced analysis after I made suggestions to extend their analysis, specifically in terms of its usefulness for orchestrating *Syrinx*. My analytical suggestions include a segmentation of *Syrinx* and identification as well as classification of motifs. These motifs were then reinterpreted as musical gestures and 25 musical gestures were identified.

After the musical gestures were identified, I classified them into paradigms in order to answer the second secondary question which was as follows: how can the musical gestures in *Syrinx* by Claude Debussy be classified into paradigms? I used a quasi-paradigmatic analysis, related to those employed in semiotic music analysis, in order to classify the 25 musical gestures into three paradigms according to their similarities and differences. When I classified the musical gestures into paradigms I found that there are certain musical gestures that do not fit into one of the three

paradigms I created. These musical gestures were difficult to fit into paradigms because of certain ambiguities or unclear thematic relationships to other patterns in other paradigms. Other musical characteristics of those musical gestures were then considered in order to classify them. The classification of musical gestures was also problematic because Debussy composed the patterns in such a way that all musical gestures can be regarded as patterns within a single paradigm. This means that the musical patterns could also be presented on a continuum in order to show how one musical pattern transforms into another. However, I decided upon the quasi-paradigmatic analysis because I wanted to group the musical gestures which were perceptually salient and similar into one paradigm. This grouping was important for all phases of the analysis, including the orchestral composition. The first and second paradigm contains nine musical gestures each and the third paradigm contains five musical gestures. Please refer to Example 2-9 for a detailed diagram.

The third secondary question concerns the way in which musical gestures in *Syrinx* can be orchestrated. There are indeed many different ways to orchestrate the musical gestures in *Syrinx*. Deciding upon a suitable way of orchestration, musical gestures will entail decisions regarding the style that the orchestration must reflect and the techniques employed to orchestrate the musical gestures. The focus of this research report was to orchestrate the musical gestures in terms of musical forces and amplify the musical forces in the orchestration. Because I chose to focus on the amplification of musical forces, my orchestration does not faithfully reflect the style and meaning of Debussy or the so-called Impressionistic period. My orchestral composition *Ananke* thus became a semi-original composition based upon material from Debussy's *Syrinx*. As mentioned, the musical gestures in *Syrinx* were orchestrated in such a way that the musical forces that act upon them (or which generate them) were amplified.

Musical gravity can be amplified in different ways. One of the ways is by sustaining the point of stability in some instruments of the orchestra. Tones which are heard above that point of stability are perceived as unstable in respect to the point of stability and will thus be pulled downwards to the point of stability even more strongly because listeners cannot confuse the point of stability with other tones when this point of stability is sustained. Another way in which the force of musical gravity can be amplified is by emphasizing the point of stability with octave doublings and by creating a dense orchestral texture only when the point of stability occurs. Musical gravity and musical magnetism often collaborate to drive musical forces to a point of stability, especially when the musical motion is descending.

Musical magnetism can be amplified in ways similar to those in which musical gravity can be amplified. When the point of stability is sustained, musical motions above, below or rotating around the point of stability will be drawn towards that point of stability or the closest stable tone<sup>44</sup>. The force of musical magnetism intensifies as the motion moves closer to the point of stability. When the motion is retreating from the point of stability, that motion will still be pulled downwards by the force of musical magnetism. Musical magnetism can then be amplified in such a way that it overcomes musical gravity. This can be done with orchestral textures: when the point of stability is approached, the orchestral texture can become denser by adding instruments to each step of the descent. When the material retreats from the point of stability, the orchestral texture can become more transparent. The composer can also decide to reverse this approach of density of the orchestral texture and make perceptual associations for listeners between a transparent orchestral texture and an arrival at the point of stability. Example 3-8 from §3.4 also shows how the force of musical inertia was employed in order to create and commence a musical magnetic pull between the repetitions of patterns.

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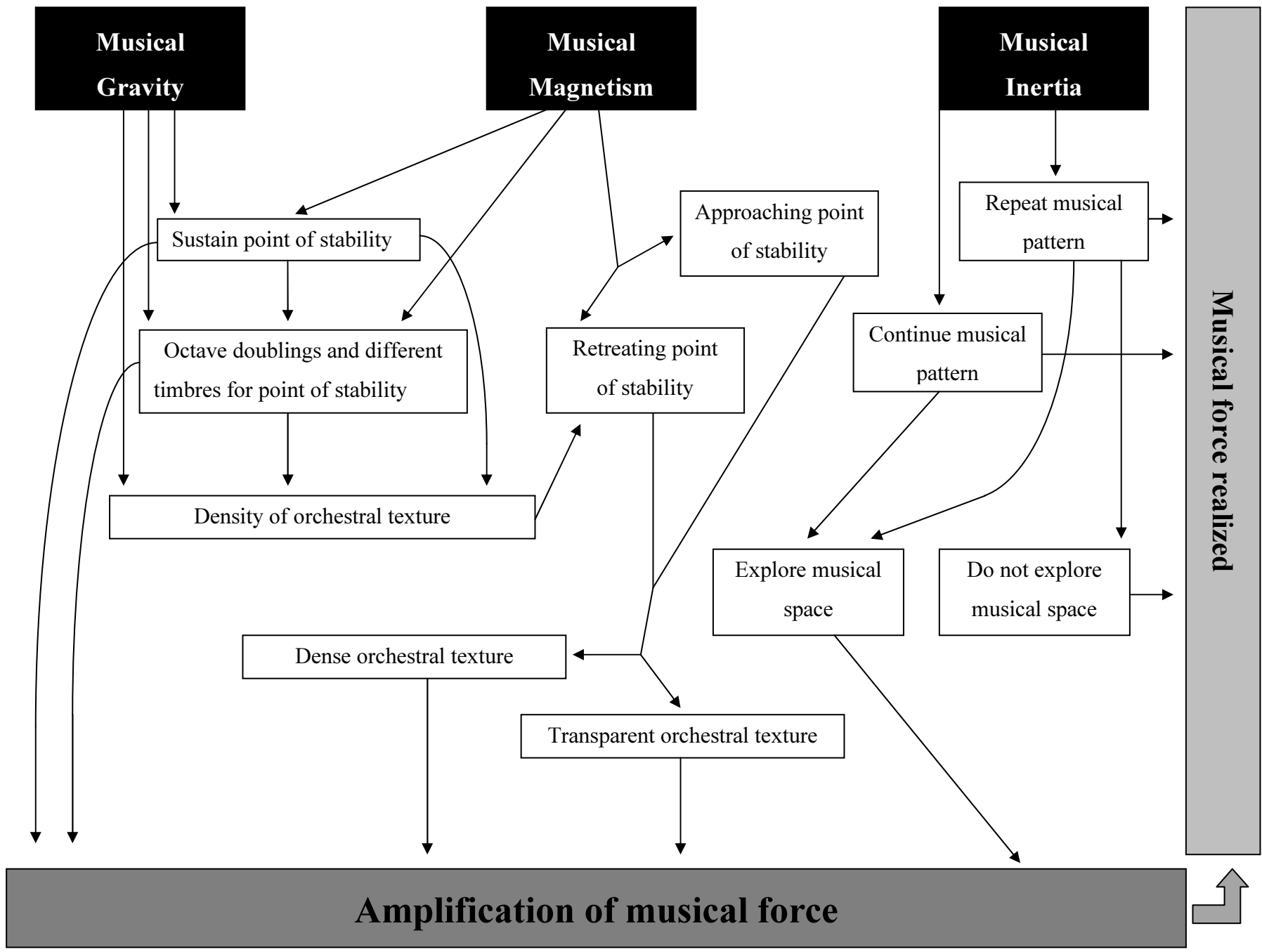
<sup>44</sup> In this research report I focused on the amplification of musical forces in terms of the proximity of unstable tones to the point of stability more than I focused on the proximity of unstable tones to more stable tones. The reason is because stable tones are supported by the point of stability: the point of stability and stable tones can mostly be stacked upon each other in order to form a triad.

I found that the inertial tendencies of musical patterns can be realized in one of two ways. The first way is to continue to repeat the musical pattern with the result that musical inertia is also amplified. The second way is to continue repeating the musical pattern in the same fashion and direction in which the expectation was created by the force of musical inertia. When a pattern keeps on ascending or descending in one direction because of the force of musical inertia, musical space will be explored and expanded as a result. On the other hand, when a musical pattern is repeated, the composer or orchestrator decides whether the musical space must be explored or expanded in order to realize the inertial tendencies, or whether it should remain unchanging. When the musical space is explored in one direction when a pattern is repeated, the effect of musical inertia is amplified and expectations of continuation will be created according to the direction of the musical space which is explored.

As argued and illustrated in the previous chapter, all three musical forces can collaborate in a single gesture and this gesture can also be orchestrated in such a way that all three musical forces are amplified. Combinations of the orchestration techniques discussed above can be used in order to amplify all three the musical forces when they act upon a single musical gesture.

The different ways in which musical forces can be amplified through orchestration, as discussed above, are summarized in Example 4-2.

The last secondary question directly leads to the main research question. This secondary research question is as follows: which principles concerning orchestration are suggested when the different possibilities for orchestrating the musical gestures in Debussy's *Syrinx* are investigated? In this research report I showed that the three musical forces from Steve Larson's theory on musical forces – musical gravity, musical magnetism and musical inertia – can be employed in the compositional process as a first overarching principle of orchestration.

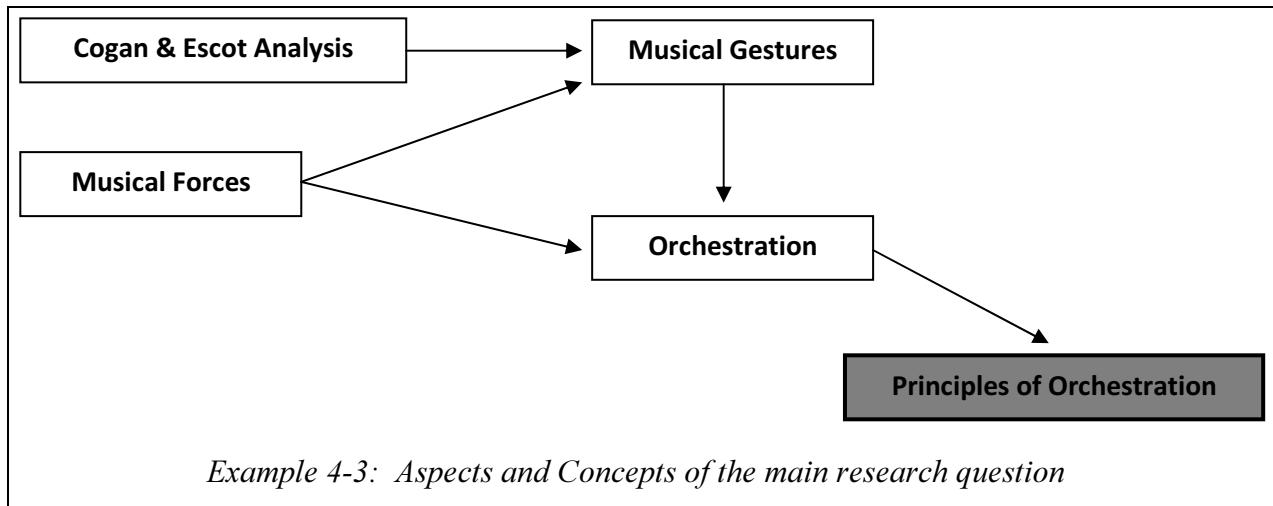


When orchestrators work with the theory of musical forces in their orchestrations, these musical forces can be realized or amplified. This is a second principle: either realizing or amplifying a force. When a musical force is realized, the tendency of that musical force to pull musical motion towards a certain point is merely accomplished. When a musical force is amplified, the effect and expectation of that force towards a specific point is intensified. The amplification of musical forces can be done in several ways by means of orchestration. This can lead to the formulation of several sub-principles.

The importance of the point of stability becomes prominent when one wishes to amplify musical forces because musical forces cannot exist without a point of stability. Establishing the point of stability is another important principle. Composers' possibilities are limited when they want to establish a point of stability in a piece of monodic music. However, with an orchestra the point of stability can be established thoroughly without the presence of any melodic or thematic material because the orchestra offers an unlimited combination of possibilities regarding textures and timbres which can be used in order to establish the point of stability. Salient perceptual beacons can be composed in order to create associations – for the listener – with the establishment of the point of stability. These perceptual beacons can then be used later in the composition to support the tonal processes of the composition: when the primary point of stability is eroded in order to modulate to another tonal level, these perceptual beacons can be used to announce the new point of stability.

The three musical forces can also be treated separately when they are amplified. Musical gravity and musical magnetism can be amplified in similar ways of orchestrating because the proximity to the point of stability is important in both musical forces. Musical inertia, on the other hand, must first be realized by repeating or continuing a pattern before the musical force can be amplified. This suggests a principle that can be stated in the form of a choice: either amplify the musical forces individually, or amplify them together. This principle is relevant only when two or more musical forces are present. One musical force can then be amplified and the other musical forces merely realized. More than one musical force and the collaboration of these two musical forces can also be amplified.

I will now return to the main research question of this research report which is: how can principles of orchestration be construed when Cogan and Escot's analysis of Claude Debussy's *Syrinx* for solo flute is reinterpreted and orchestrated in terms of musical gestures? My answer to the main research question can be illustrated with reference to Example 4-3.



My whole research report is a demonstration of my answer to the main research question. The analysis by Cogan and Escot enabled me to identify musical gestures in Debussy's *Syrinx* for solo flute. According to the approach followed in this study, musical gestures cannot exist or be understood without an understanding of the interaction of musical forces. An understanding of musical gestures in terms of musical forces is needed in order to orchestrate the musical gestures and amplify the musical forces. This orchestration is then used to construe the principles of orchestration discussed above. It becomes clear that each aspect and concept of the research question plays an integral role in answering this research question: principles of orchestration can be construed when musical gestures are orchestrated in terms of musical forces when the musical forces are amplified in the orchestration based upon gestures deduced from an analysis of the relevant composition.

#### 4.4 Suggestions for Further Study

In §1.1.1 I discussed the fact that composing and arranging for orchestra is a skill which is hard to learn and hard to teach. Most literature which is used in the teaching-learning process takes existing orchestral compositions as a point of departure and uses fragments from these compositions in order to illustrate certain rules of thumb. The inverted approach I followed in this research report can be investigated in real teaching-learning processes when music analysis is taken as point of departure in order to teach or learn techniques of orchestration.

In this research report I use the analysis of musical gestures in terms of musical forces in order to construe principles of orchestration. However, other approaches to music analysis can also be investigated. Present day semiotic research by researchers like Eero Tarasti (2006) and research regarding aural sonology by Lasse Thoresen (2009) can also be employed in a similar study in order to construe principles of orchestration. One can also take these two approaches as points of departure, an approach similar to the one followed in this study and also the inverse of the approach followed in the literature when studying orchestration. However, other points of departure besides the two suggested here can also be investigated from which principles of orchestration can be construed.

Because the study of musical gestures is currently an unfamiliar but still growing field of study, I could not find a formal approach to the study or musical analysis of musical gestures which are understood as sound patterns. Speculative writings on how musical gestures must be understood or treated give different approaches which are debated and even posited as contrasting by different researchers who are sometimes not even consistent about musical gestures in their own writings. This field of study thus calls for a neutral approach according to which musical gestures can be identified and analyzed: an analytical strategy. Because musical forces are an inseparable part of musical gestures, the theory of musical forces will be an important aspect of such an analytical strategy. Apart from understanding musical gestures in terms of musical forces and using an analytical strategy, other ways in which musical gestures are understood could also be investigated, for example musical gestures which are understood in terms of musical meaning. I deliberately did not keep the meaning of the musical gestures when I

recomposed *Syrinx* by Debussy. The outcome of another orchestration of Debussy's *Syrinx* can be explored when the orchestrator attempts a faithful orchestration of *Syrinx* where the meaning of Debussy's musical gestures and the style of the so-called Impressionistic era is reflected in that orchestration.

*Syrinx* for solo flute by Debussy was used in this research project because it is a piece of monodic music and very little guidance is provided in the literature on 'remaking' monodic music into a composition for orchestra. This research is, as far as I could establish, the first substantial music composition analyzed in terms of the theory of musical forces by Steve Larson. However, when musical forces are further investigated, more complex music, for example polyphonic music, can be analyzed. Compositions from different periods and different composers can also be used for the analysis of musical forces according to Larson's theory on musical forces.

Orchestrations of existing compositions can be analyzed in order to determine if and how musical forces are amplified in those orchestrations. These orchestrations can be by a composer who orchestrated one of his own works or an orchestrator who orchestrated an existing composition by another composer. Different approaches and combinations of some of the suggestions above can be employed in order to perform such research.

Musical forces are amplified in this study, because musical forces are a basis for musical gestures and are thus present in musical gestures. Research can also be conducted in order to determine how musical forces can be counteracted or hidden in orchestrations. Composers like Schönberg and Webern who worked with the twelve-tone system in composition deliberately avoid tendency notes in order to avoid tonality, for example. An approach that builds upon the theory of musical forces can investigate how musical forces can be counteracted.

# CHAPTER 5

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# **ADDENDUM A**

## **SYRINX FOR SOLO FLUTE BY DEBUSSY**

Please turn over.

# Syrinx

for Solo flute

Claude Debussy  
1913

Très modéré

*mf*

4 *p* *p* *p*

9 Un peu mouvementé (mais très peu) *p*

12 *mf* *p*

15 Cédez Rubato *p* *p* *p* *p* *p*

20

23 (trille) (trille) au Mouvementé (très modéré) *mf*

28 *dim.* *p* *p*

31 En retenant jusqu'à la fin *p* marqué *perdendosi* Très retenu 5

# **ADDENDUM B**

## **ANANKE FOR ORCHESTRA BY MEYER**

Please turn over.

*In order to avoid the impression that my composition is a faithful orchestration of Debussy's Syrinx in terms of style and expression, I titled my composition Ananke. 'Syrinx' in Debussy's title refers to a nymph Syrinx. According to the ancient Greek myth, the god Pan fell in love with Syrinx but she did not return his love and decided to transform herself into a reed and hide in the marshes. Pan decided to make pipes for himself and went to cut some reeds. When he cut Syrinx, he killed his love.*

*I followed Debussy's lead by taking the name of a figure from Greek mythology for a title when I decided upon Ananke. Ananke was a Greek goddess and her name refers to 'force', 'fate' and 'destiny'. In Philosophy the name Ananke refers to 'laws of nature'. The theory of musical forces is often explained by Steve Larson in terms of natural forces which, according to certain rules, are attracted to a certain point or 'destiny'.*

This score is notated in C.

Piccolo  
2 Flutes  
2 Oboes  
Cor Anglais  
2 Clarinets in Bb  
2 Bassoons  
Contrabassoon  
4 Horns in F  
3 Trumpets in Bb  
2 Cornets in Bb  
3 Trombones  
Tuba  
Timpani  
Tamtams  
Triangle  
Cymbals  
Bass Drum  
Glockenspiel  
2 Harps  
Strings

# Ananke

Opus 12;12

An Original Composition based upon *Syrinx* for Solo Flute: Claude Debussy (1913)

R.J. Meyer

The score is for a full orchestra and harp. It begins with a tempo marking of  $\text{♩} = c. 60$  and a dynamic marking of  $mf$ . The key signature is three flats (B-flat major/D-flat minor). The score is divided into measures 1 through 8. A section labeled 'A' is marked at the beginning and again at the end of the page. The orchestration includes Piccolo, Flute I and II, Oboe I and II, Cor Anglais, Clarinet I and II in B-flat, Bassoon I and II, Contrabassoon, 2 Horns in F I and II, Trumpet I, II, and III in B-flat, Cornet I and II in B-flat, Trombone I, II, and III, Tuba, Timpani, High and Low Tamtam, Triangle, Cymbals, Bass Drum, Glockenspiel, Harp I and II, Violin I and II, Viola, Violoncello, and Contrabass. The harp parts include a chord sequence: E-F-G-A-B-C-D-E. The score features various dynamics such as  $f$ ,  $mf$ ,  $mp$ , and  $p$ , and includes performance instructions like *gliss.* and *pizz.*

$mf$  Establishment of the point of stability (B $\flat$ )

9 10 11 12 13 14 15

Picc. *f* *mf*

Fl. I *f* *mf*

Fl. II *f* *mf*

Ob. I *f* *mf*

Ob. II *f* *mf*

C. A. *f* *mf*

Cl. I *f* *mf*

Cl. II *f* *mf*

Bsn. I *f* *mf*

Bsn. II *f* *mf*

Cbsn. *f* *mf*

Hn. I&II *f* *mf*

Hn. III&IV *f* *mf* *p*

Tpt. I *f*

Tpt. II *f*

Tpt. III *f*

Cor. I *f*

Cor. II *f*

Tbn. I *f*

Tbn. II *f*

Tbn. III *f*

Tba. *f*

Timp. *f* *f*

H. Tamt  
L. Tamt

Tr.  
Cmb.  
B.D.

Glock.

Hp. I *f* *mf* *E♭F♯G♭A♯* *mp* *p* *mp*

Hp. II *f* *mf* *E♭F♯G♭A♯* *mp* *p* *mp*

Vln. I *mp* *p* *pp* *p*

Vln. II *mp* *p* *pp* *p*

Vla. *mp* *p* *pp* *p*

Vc. *arco* *mp* *p* *pp* *mp* *p*

Cb. *p* *pp* *mp* *p*

16 **B** 17 18 19 20 21 22

Picc. *mf*

Fl. I *mf*

Fl. II *mp*

Ob. I *mf*

Ob. II *mp*

C. A. *f*

Cl. I *mf*

Cl. II *f*

Bsn. I *mf*

Bsn. II *mf*

Cbsn. *mf*

Hn. I&II

Hn. III&IV *mf*

Tpt. I *mf*

Tpt. II *mf*

Tpt. III

Cor. I *f*

Cor. II *f*

Tbn. I *f*

Tbn. II *f*

Tbn. III *f*

Tba. *f*

Timp. *f* *ff*

H. Tamt

L. Tamt

Tr.

Cmbl.

B.D.

Glock.

Hp. I

Hp. II

**B**

Vln. I *f* *mp*

Vln. II *f* *mf* *pizz.* *f* *mf arco*

Vla. *f* *mf* *pizz.* *f* *mf arco*

Vc. *f* *mp* *mf*

Cb. *f* *mf*

Gesture 01      Gesture 02      Gesture 01      Gesture 02      Gesture 01

Picc.

Fl. I

Fl. II

Ob. I

Ob. II

C. A.

Cl. I

Cl. II

Bsn. I

Bsn. II

Cbsn.

Hn. I&II

Hn. III&IV

Tpt. I

Tpt. II

Tpt. III

Cor. I

Cor. II

Tbn. I

Tbn. II

Tbn. III

Tba.

Timp.

H. Tamt

L. Tamt

Tr.

Cmbl.

B.D.

Glock.

Hp. I

Hp. II

Vln. I

Vln. II

Vla.

Vc.

Cb.

*mf*

*f*

*ff*

*p*

*mp*

Gesture 04

Gesture 05

Gesture 06

28 29 **C** 30 31 32 33

Picc. *mp*

Fl. I *mf*

Fl. II *mf*

Ob. I *mp*

Ob. II *mf*

C. A. *mp*

Cl. I *mf*

Cl. II *mf*

Bsn. I *mf*

Bsn. II *mf*

Cbsn. *mf*

Hn. I&II *mf*

Hn. III&IV *mf*

Tpt. I

Tpt. II

Tpt. III

Cor. I

Cor. II

Tbn. I

Tbn. II

Tbn. III

Tba.

Timp. *mf*

H. Tamt

L. Tamt

Tr.

Cmbl.

B.D.

Glock.

Hp. I *mf* *gliss.*

Hp. II *mf* *gliss.*

Vln. I *ff* **C**

Vln. II *ff*

Vla. *ff*

Vc. *ff*

Cb. *ff*

Gesture 07

Gesture 08







Picc. *ff*

Fl. I *f* *ff* *f* *mf*

Fl. II *f* *ff* *f* *mf*

Ob. I *ff* *f* *mf*

Ob. II *ff* *f* *mf*

C. A. *ff* *f* *mf*

Cl. I *mf* *ff* *f* *mf*

Cl. II *mf* *ff* *f* *mf*

Bsn. I *ff* *f* *mf*

Bsn. II *ff* *f* *mf*

Cbsn. *ff* *f* *mf*

Hn. I&II *mf* *ff* *f* *mf*

Hn. III&IV *mf* *ff* *f* *mf*

Tpt. I *f* *ff* *f* *mf*

Tpt. II *f* *ff* *f* *mf*

Tpt. III *f* *ff* *f* *mf*

Cor. I *f* *ff* *f* *mf*

Cor. II *f* *ff* *f* *mf*

Tbn. I *f* *ff* *f* *mf*

Tbn. II *f* *ff* *f* *mf*

Tbn. III *f* *ff* *f* *mf*

Tba. *f* *ff* *f* *mf*

Timp. *f* *ff*

H. Tamt *f* *ff*

L. Tamt

Tr.

Cmb. B.D.

Glock. *f* *ff* *f* *ff*

Hp. I *f* *ff* *f* *mf*

Hp. II *f* *ff* *f* *mf*

Vln. I *f* *ff* *f* *mf*

Vln. II *f* *ff* *f* *mf*

Vla. *f* *ff* *f* *mf*

Vc. *f* *ff* *f* *mf*

Cb. *f* *ff* *f* *mf*

*pizz.*

*gliss.*

*gliss.*

*ff<sup>3</sup>*

*F#G#A#C#*

*F#G#A#C#*

**E**

Gesture 18

Gesture 19



65 66 67 68 69 70 71

Picc. *f*

Fl. I *f* *mf* *f* *mf*

Fl. II *f* *mf* *f* *mf*

Ob. I *f* *mf* *f* *mf*

Ob. II *f* *mf* *f* *mf*

C. A. *f* *mf* *f* *mf*

Cl. I *f* *mf* *f* *mf*

Cl. II *f* *mf* *f* *mf*

Bsn. I *f* *mf* *f* *mf*

Bsn. II *f* *mf* *f* *mf*

Cbsn. *f* *mf* *f* *mf*

Hn. I&II *f* *ff* *f*

Hn. III&IV *f* *ff* *f*

Tpt. I *f* *mf* *mf*

Tpt. II *mf* *f* *mf*

Tpt. III *mp* *f* *mf*

Cor. I *mf* *f* *mf*

Cor. II *mp* *f* *mf*

Tbn. I *mp* *mp* *mf*

Tbn. II *mp* *mp* *mf*

Tbn. III *mp* *mp* *mf*

Tba. *mp* *mp* *mf*

Timp. *mf* *f* *mf* *f*

H. Tamt

L. Tamt

Tr.

Cmbl.

B.D.

Glock. *f* *ff* *mf*<sup>3</sup> *f* *mf*<sup>3</sup> *f*

Hp. I

Hp. II

Vln. I *ff* *f* *ff* *f*

Vln. II *ff* *f* *ff* *f*

Vla. *ff* *f* *ff* *f*

Vc. *ff* *f* *ff* *f*

Cb. *ff* *mf* *f*

Gesture 02

Establishment of D<sub>5</sub> as new point of stability



G

79 80 81 82 83 84 85 86 87

Picc. *f* *tr tr*

Fl. I *mf* *f* *mp* *f*

Fl. II *mf* *f* *mp* *f* *mf*

Ob. I *mf* *f* *mp* *f*

Ob. II *mf* *f* *mp* *f* *mf*

C. A. *mp* *mf* *mp* *f* *mp* *f* *mf*

Cl. I *mf* *f* *mp* *f*

Cl. II *mp* *f* *mp* *f* *mf*

Bsn. I *mf* *f* *mp* *f*

Bsn. II *mf* *f* *mp* *f*

Cbsn. *mf* *f* *mp* *f*

Hn. I&II *mf* *f*

Hn. III&IV *mf* *f*

Tpt. I *mf* *mp* *ff*

Tpt. II *mp* *ff*

Tpt. III *mp* *ff*

Cor. I *mf* *mp* *ff*

Cor. II *mp* *ff*

Tbn. I *mf* *mp* *ff*

Tbn. II *mf* *mp* *ff*

Tbn. III *mf* *mp* *ff*

Tba. *mp* *ff*

Timp. *ff*

H. Tamt  
L. Tamt

Tr.  
Cmbl.  
B.D.  
Glock. *ff*

Hp. I *B $\natural$*

Hp. II *B $\natural$*

Vln. I *mf* *f* *mp* *ff* *mf*

Vln. II *mf* *f* *mp* *ff* *mf*

Vla. *mf* *f* *mp* *ff* *mf*

Vc. *mf* *f* *mp* *ff* *mf*

Cb. *mf* *f* *mp* *ff* *mf*

G

Gesture 24 *mf* *f* *mp* *ff* *mf*

Gesture 25 *mf* *f* *mp* *ff* *mf*

Gesture 25 *mf* *f* *mp* *ff* *mf*

Gesture 25 *mf* *f* *mp* *ff* *mf*

Gesture 02 *mf* *f* *mp* *ff* *mf*

88 89 90 91 92

Picc. *f* *cresc.* *fff*

Fl. I *f* *cresc.* *fff*

Fl. II *f* *cresc.* *fff*

Ob. I *f* *cresc.* *fff*

Ob. II *f* *cresc.* *fff*

C. A. *f* *cresc.* *fff*

Cl. I *f* *cresc.* *fff*

Cl. II *f* *cresc.* *fff*

Bsn. I *f* *cresc.* *fff*

Bsn. II *f* *cresc.* *fff*

Cbsn. *f* *cresc.* *fff*

Hn. I&II *mf* *cresc.* *fff*

Hn. III&IV *mf* *cresc.* *fff*

Tpt. I *mf* *cresc.* *fff*

Tpt. II *mf* *cresc.* *fff*

Tpt. III *mf* *cresc.* *fff*

Cor. I *mf* *cresc.* *fff*

Cor. II *mf* *cresc.* *fff*

Tbn. I *mf* *cresc.* *fff*

Tbn. II *mf* *cresc.* *fff*

Tbn. III *mf* *cresc.* *fff*

Tba. *mf* *cresc.* *fff*

Timp. *fff*

H. Tamt. *fff*

L. Tamt. *fff*

Tr. *fff*

Cmbl. *fff*

B. D. *fff*

Glock. *fff*

Hp. I *fff*

Hp. II *fff*

Vln. I *fff*

Vln. II *fff*

Vla. *fff*

Vc. *fff*

Cb. *fff*

*pizz.* *arco*

*gliss.* *gliss.*

*C4*

*fff* *fff* *fff* *fff* *fff*

circa 5'00"