



Thesis for the Master of Music

Analysis of Qu**é**bec Composer Martin B**é**dard's acousmatic piece <Champs de fouilles>

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<Champs de fouilles>

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ABSTRACT

Analysis of Québec Composer Martin Bédard's acousmatic piece <Champs de fouilles>

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This thesis is an analysis of Martin Bédard's 2008 fixed media acousmatic composition *Champs de fouilles*. The result of this analysis is the creation of a Listening Score for the piece, which allows the composition to be broken down into three areas of study: Structural Analysis, Frequency Spectrum Analysis and Spatial Perception Analysis.

The analysis shows that clear structural outlines are present in the form. The form is subdivided into sections made up of groups of sound objects with similar sonic characteristics juxtaposed with contrasting groups of sound objects. The harmonic and melodic structures of the piece are analyzed with a traditional approach in that pitched objects are analyzed for their harmonic and melodic functions within the piece.

Finally, the analysis presents a subjective discussion about the narrative present throughout the piece resulting from the choice of sound objects used, their positioning within the aural image of the composition and the dynamic and panning gestures used to manipulate their location in the aural scene. Bédard's approach of using cinematographic procedures for the composition of an acousmatic piece successfully produces a listening experience that exemplifies a cinema for the ear.



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Introduction

Section 1. Introducing the Piece of Music

Title:	Champs de fouilles
Composer:	Martin Bédard
Genre:	Fixed media acousmatic music (Digital audio16 bit, 44.1 Khz)
Channels:	2 (stereo)
Duration:	10'40''
Year:	2008

The subject of this thesis is the analysis of Québec composer Martin Bédard's acousmatic composition *Champs de fouilles*.¹ The piece was commissioned for the 400th anniversary of the City of Québec, and touches upon unique social and physical identities of the city. The piece is also part of the research work for Bédard's doctoral thesis where he explores parallels between cinematic and acousmatic structures and compositional procedures.

The work is a purely acousmatic² piece, meaning there is no element of live performance, or sound source outside of the speakers we use to listen to the piece. The studio work uses culturally and socially recognizable sound sources and combines them with abstract sound materials to create a dialogue and ultimately a cinema for the ear.³

Champs de fouilles is a two track (stereo) audio composition. It should be noted that Bédard makes mention in his thesis that the piece is meant to be listened to in a concert hall in order for all the sounds to really come through in the room, a factor he was considering in the overall treatment of this composition. While figure 1.1.1. shows a technical diagram with only two speakers for diffusion, Bédard has, in the past,

¹ The English title for *Champs de fouilles* is *Excavations*.

 $^{^2}$ This term can tersely be defined as a sound we can hear without seeing where that sound is coming from. See Chion, *Guide des objets musicaux* p.18

 $^{^3}$ As described by Normandeau in "... et vers un cinéma pour l'oreille" this term will be discussed later in the thesis.

performed the piece under circumstances where he manually distributes, in real-time, the audio from two channels over a system of multiple speakers. *Champs de fouilles* has a running time of 10 minutes 41 seconds and is available on Martin Bédard's Electroacoustic CD, *Topographies.*⁴







Having studied electroacoustic composition at l'Université de Montréal in Québec, Canada, I became immersed in a particular style of writing that eventually became a part of my personal composition style. Perhaps not fully aware of it at the time, once removed from the school and the country as I began living and studying abroad, in the Republic of Korea, I quickly began to become more aware of the fact that this particular style was unique, in many ways, to Québec.

As a broad goal for this thesis, I intend to focus on the work of one particular Québec composer with whom I had the privilege of studying: Martin Bédard. By analyzing Martin's piece in detail, I hope to discover and uncover the building blocks and techniques used and shared by the composers of the unique and diverse society of Québec.

During the process of an in-depth analysis of Bédard's composition I realized it would be useful to have some sort of visual score to make reference to, as well as clearly depict

⁴ See the discography at the end of this thesis for album details.

ideas that might otherwise be abstract if only conveyed by text. Thus, a secondary objective is to produce a listening score for Bédard's *Champs de fouilles*.

The reasons for choosing to analyze a composition by Martin Bédard were quite obvious to me. First, being able to have direct contact and communication with the composer lends itself well to the understanding of the composition premise and background. Secondly, Bédard himself describes this piece in his Doctoral thesis⁵ so it provides us with an existing reference point. It is also interesting to discover how the composer's ideas and intentions at the time of composition may not always be what the listener perceives. In congruency with the New Criticism⁶ approach to author's intent, we may find that the author's intent only tells part of the story of the work of art. The listener can find relevant meanings in the work whether the composer was aware of these or not. Thus it is also an objective of this work to present *Champs de fouilles* as an analysis through the point of view of the listener, as opposed to the composer.

Finally, this gives me, the listener, an opportunity to validate Bédard's proposed take on 'cinema for the ear'⁷ by describing and analyzing the piece's structure and elements and how they all come together to create a veritable journey for our mind, imagery and a narrative akin to a cinematic experience.

Section 3. Research Method

3.1. Subdivision of the Analysis

While an effort will be made to include the composer's compositional techniques and perspectives, this analysis will generally be conducted through the perspective of the listener, who would otherwise have little or no knowledge behind the method or division of work established by the composer. As a result, one can compare the findings of the

understanding a work. (Brooks, The Sewanee Review)

⁵ Bedard's 2011 Doctoral Thesis (see the bibliography for reference information).
⁶ New Criticism refers to postmodern ideas about author's intent being irrelevant in

⁷ Composing acousmatic music with the same steps and processes used in cinema production (See Bedard's doctoral thesis 2011).

analysis to the author's intent. The analysis of the piece will be comprised of discussions from three areas of study: the structure of the piece broken down into its form and the elements that make it up, the frequency spectrum (tonality or pitches) apparent in the vertical and horizontal writing, and an analysis of the spatial image produced by the use of panning and dynamics, with regards to how they affect the narrative of the piece.

Table 1.3.1. Organizational Overview of Analysis

	(1) STRUCTURE
Form:	Subdivision of the piece in 2 major parts and a transitional section. Subsequent division of the major parts into subsections A through I.
Elements:	Explanation of the sound objects in the piece, their morphology and role in the structure.
	(2) FREQUENCY and PITCH CONTENT
Horizontal and Vertical Spectrum:	Transcription and analysis of the distinguishable pitches prominent in the piece.
	(3) SPATIAL PERCEPTION
Panning and Dynamics:	Visual representation of the panning and dynamic gestures used in <i>Champs de fouilles</i> (as part of the Listening Score).
Narrative (Cinema for the Ear):	Subjective explanation of the symbolism and narrative as a result of the compositional techniques used.

First, we will look at the structure of the composition. By structure, here we must assume an electroacoustic sense of the word. As Smalley points out,⁸ traditional musical structure can be reduced to one note, but electroacoustic analysis cannot really benefit from this system since electroacoustic gestures do not necessarily follow this notion. Instead, we will look indeed at the gestures that dictate the form of the piece. First, the piece will be broken down into sections divided by the type of musical objects that they are made up of. This is what we will refer to as the Form of the piece. Then, in the

⁸ Section on Structural Levels and Structural Functions in "Spectromorphology: explaining sound shapes," *Organised Sounds*, Smalley (p.114)

Element discussion, we will take a closer look at the makeup of the sound objects, as they appear and evolve in each section. Regarding the discussion of the sound objects: it will not be the goal of this analysis to engage in an exhaustive dissection of every fragment of sound that materializes in the composition. Instead, we will just look at the key sound objects. Objects that either have major relevance in the form or objects that appear more than once in the composition, that may be of interest in the conversation of form.

The second area of study will be the frequency and pitch content of the piece. The vertical spectrum can be thought of as an electroacoustic analogous counterpart to harmony in traditional music. In the case of this piece, it is very logical to approach this in a most traditional sense of the word harmony as well, since many of the musical objects have recognizable pitches that exist around a recognizable tonal center. The horizontal spectrum thus, would be the analogue to melody in the traditional sense.

In the area of study labeled Spatial Perception we will look at the techniques used by the composer to achieve a sense of space and imagery within the confines of an exclusively aural experience. The section on panning and dynamics will explain the symbols and logic used in the coinciding section of the Listening Score labeled 'Pan * Dynamics.' This covers the sense of movement, proximity and depth produced by the gestural techniques of panning and dynamic control within the composition. The abstract analysis, titled 'Cinema for the Ear' will explore a more subjective view on the imagery that ensues as a result from the use of the techniques presented in the section on perception, and in essence, from all the constructional tools, elements and structures used in the composition. The aim of this section is essentially to tie all of the preceding technical analysis to the role that the analyzed technique holds in the creation of an artistic composition. While the piece has a clear and distinctive form and structure on paper, it still manages to offer an unbounded imaginative cinematic experience in the aural domain.

3.2. Terminology

When dealing with a genre of music where no conventional or universally agreed upon terminology exists, it is important to establish a vocabulary of terms and define them with regards to their use in the given context. Many essays and volumes exist in attempts to address this problem alone. It is beyond the scope of this thesis to explore, much less invent a new glossary of terms to describe the music, which cannot be contained simply within the confines of traditional music notation.

Instead, for an existing vocabulary, we will look to important works that have already been established within the acousmatic and electroacoustic communities. For all intents and purposes, for the analysis of *Champs de fouilles*, the main typology described in Pierre Schaeffer's *Traité des objets musicaux* (abbreviated as TOM) will form the basis for classifying and referring to sound objects in this analysis. We will take a moment here to review some key words and points of perspective from Schaeffer's school of thought on the classification of musical objects which have been adopted for the purpose of this analysis. For further reference, this terminology is also further discussed in Michel Chion's *Guide des Objets Sonores*. While both Schaeffer and Chion discuss and describe these terms to exhaustion in their respective volumes on the subject, their writings have only been published in French. Table 1.3.2. shows a collection of English definitions of some of these terms, as presented by Schaeffer to address the analysis of acousmatic music, which will be used throughout this thesis.

Table	1.3.2.	Definition	s of	Terms	Used
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TERM	DEFINITION
Sound object:	This refers to the building block of electroacoustic music. It is what the single note is to traditional music notation when describing pieces or atomic levels within a structure. Because of the common practice of abstraction and further processing of sounds in the studio prevalent in electroacoustic music, objects, unlike single notes, can have characteristics that include but are not limited to complex pitch content, micro or macro durations, unnatural attack, decay and reverberation properties. Synonymous with the use of the word Element.
Mass:	Within the context of the sound object, the mass of an object refers to the frequency spectrum present within its duration. This means it is not limited to one pitch and can also vary within the life span of the object.
Texture:	This refers to the relief (in the topographical sense of the word) of the sound object. It can be thought of as the fabric of the sound if it was a tangible characteristic. It can be defined at the limits as being smooth or grainy. This is referred to as <i>grain</i> in Schaeffer's TOM.

Balanced or formed duration:	An object that has a predictable or shaped profile with a clear start and finish. To the listener, this is the limit between something happening too slowly or too quickly to form an opinion before the object has completely elapsed. For duration, these terms describe an object that starts and ends within a period of time that is long enough to perceive but not so long that the end becomes unpredictable. A good point of reference for the limit of the balanced and formed duration would be a musical gesture as in traditional music, that could be maintained within the natural limitations of one breath.
Balanced or formed mass:	For mass, the term balanced falls under a recognizable pitch or combination of pitches that don't vary excessively or aren't too complex to decipher. White noise or a cymbal crash would be good examples of objects with <i>un</i> balanced mass. Variation of a pitch or pitches within the mass can be considered acceptable or balanced so long as they fall within the range of a perceivable direction and pitch range such as a glissando performed on a traditional instrument.
Tenure:	In this thesis, tenure is used to describe the flow of the energy within the dynamic profile of the object. It can either be sustained or iterative (see Sustain and Iteration). A variation of the word as defined in the dictionary; it is used here in the same vain as described in the TOM.
Sustain (sustained):	Energy appears to flow in an uninterrupted stream.
Iteration (iterative):	Energy is subject to breaks in flow, cyclic or random. It should be noted here that an iteration of energy could also be labeled as 'formed' if its overall dynamic profile (the complete series of iterations) falls within a balanced duration.
Impulse:	A short burst of energy, analogue to the striking of a drum membrane where the majority of the energy is dispersed at the moment of impact. Of course, in electroacoustic music, the impulse phenomenon is not limited to an actual percussive gesture of any sort, and can also be a short or micro-fragment of a sound with no real attack or decay characteristics.
Trame:	In the case of the <i>trame</i> , the original French word will be used throughout the thesis. This avoids the need to coin a new term while limiting the confusion that may occur from the duality, especially in the study of audio and acoustics inherent in the English equivalent of the word: track. In the scope of this thesis, it describes an object with a constant flow of uninterrupted energy within the temporal domain but whose overall duration is too long to be considered balanced. Note that for the purposes of this thesis, <i>trame</i> will encapsulate all the homogeneous massed bodies as well as the variable massed bodies, whereas Schaeffer delimits the use of the word <i>trame</i> to the latter.
Morphology:	Refers to the description of the overall form, quality and characteristics of a sound object and how they change or stay the same over time.

Fig. 1.3.1. is an English translation of Pierre Schaeffer's categorization table for sound objects known as TARTYP⁹ followed by an explanation of the symbols used within the table. Note that the bottom row of the table has been left out because it caters to special cases and objects of unpredictable mass, which go beyond the scope of analysis for this thesis.

		unbounded duration (macro-objects) unpredictable form (temporally)			Measurable duration (balanced) reduced duration (micro-objects)			unbounde (macro- unformed (temporally)	d duration -objects) unpredictable form	
fixed mass	defined pitch	ES			formed sustain	impulse	formed iteration			
			(En)	Hn	N	N'	Ŋ"	Zn	SNOLL (An)	
	complex pitch	AMPI	(Ex)	Hx	х	X,	x"	Zx	(Ax)	
son varia	newhat able mass	N N	(Ev)	Tx Tn special case trames	Y	Y'	Y"	Zy special case pedals	OV (Ay)	
<pre>sustained sounds</pre>					ds		i	iterative sounds		

Fig. 1.3.1. Schaeffer's TARTYP Table (translated to English)

The nine central cells of the TARTYP table represent the balanced or formed objects. The capital letter N stands for Note and refers to sounds with a defined pitch. The X is for compleX and refers to sounds with complex pitch. Complex pitch covers anything more than a single pitch as far as white noise. The important differentiation between this row and lower rows in the table is that the mass does not vary for the duration of the object. The final row of the balanced objects it Y, which represents sounds with a somewhat variable mass. As an example, a glissando performed on a violin or an orchestral tutti performing a glissando in the same direction (the same goes for a defined or complex mass example).

⁹ *TAbleau Récapitulatif de la TYPologie* (Summarizing table of typology) – a table that identifies and classifies sound objects by type. *Traité des objets musicaux*, fig. 34 p.459

Now that we have covered the central cells from top to bottom, we will look at how they evolve, moving from the right to the left of the table. The first thing that we might notice is the prime symbol along the letters in the second central row and the double prime along the letters of the third central row. The absence of the prime symbol in the first central row indicates that the object is of a sustained tenure. One prime represents an impulse and a double prime represents an iteration of impulses (formed – since the central nine cells are all balanced / formed objects). As an example, a traditional flutist playing a single note for beat of music at a moderately paced tempo would fall under the classification N, a violinist playing a pizzicato note would fall under N' and the same violinist playing that same note with a crescendo and decrescendo gesture over its duration would fall under N''.

To the left of the central cells we remain within the domain of sounds with a sustained tenure but whose durations become unformed. A sustained object that sounds beyond the threshold of a formed duration is referred to as a *trame* and is designated by the letter H in the two upper rows to indicate their homogeneous (non-variable) mass. The lower case n indicates a defined pitch while the lowercase x is reserved for complex pitch. Upper case T, moving down within the *trames* represents a *trame* of somewhat variable mass with lower case n and x consistently distinguishing defined and complex pitch masses respectively.

The bordering left column of the table is reserved for objects with a variable texture or timbre/tone. These sounds are classified as samples, denoted by the uppercase E (from the equivalent French word for samples: *Échantillon*). In this case of the samples column, from top to bottom lower case n and x represent defined and complex pitch as expected while lower case v stands for variable mass. An example of an object that would fall under the En classification would be a beginner violin player who bows a continuous note of defined pitch but because the novice grip on the bow is not controlled, the tone varies in an unpredictable manner.

Now, if we turn our attention to the column on the right side of the central nine cells we will find the pedal objects, denoted by an uppercase Z. A pedal is an instance where an iteration of impulses has no predictable ending - i.e., it goes beyond the threshold of the

formed objects. As we can deduce by now, lowercase n and x indicate the type of pitch (mass) while lowercase y indicates a variable mass.

Finally, to the far right of the table lie the accumulations, labeled as A. One way of describing an accumulation would be to imagine several pedals happening at the same time so that it becomes difficult to hear where one impulse begins and another ends. The example given by Chion in *Guides des Objets Musicaux* is that of the sound of hundreds of pebbles falling to the ground. We only need to imagine different possible masses in these situations to see how we could have objects that would be classified by An, Ax or Ay depending if the mass were defined, complex or variable.

Finally, when discussing the structure of the composition it is important to draw a distinction from traditional music analysis where a note is the lowest level structure, which makes up larger structures, motifs and form through various groupings and transpositions. Acousmatic music is not necessarily based around any one sound object. Even though the sound object is the fundamental building block for this type of music, one piece of music can contain a multitude of variations and incarnations of several unrelated elements. It is more logical to group these objects in a manner that considers how they are presented, in what context and how an object or grouping of objects contrasts to others around it.

3.3. A Note on the Listening Score

The Listening Score¹⁰ is made up of 4 lines (akin to staves of a traditional score) representing the elements, panning and dynamic gestures, frequency spectrum (pitches) and form (sections) of the piece.

The discussion on form and structure makes reference to the fourth line of the Listening Score: a graphic representation of the actual waveform of the composition over a linear time ruler, annotated with the subdivisions that constitute the form of the piece.

 $^{^{10}}$ The Listening Score, which was created to aid in the analysis of the composition discussed in this thesis, is found in the appendix to this thesis.

The discussion on the sound objects will refer to the first line of the Listening Score. The sound objects are illustrated with a symbol that is shaped more or less as an allusion to the morphology of its corresponding sound. A table that serves as a legend for the symbols used to represent objects as well as classify them within Schaeffer's typology can be found in section 3.5. in the body of this thesis (fig. 3.5.1.).

The discussion on spatial perception makes reference to the second line in the score. This system has a horizontal division representing the left channel and right channel in the upper and lower halves respectively. The gestures are represented by symbols that relate to the movement of energy within the stereophonic image of the piece. The symbols are explained in the corresponding section of the thesis (5.1. Panning / Dynamics).

The discussion on frequency and pitches will refer to the third line of the score and make use of a traditional music staff with pitched notation. In the case of this particular composition, pitches are very recognizable and seem to revolve around a tonal center, enough to justify analyzing them with this traditional method. Still, this method will only be used to serve as a reference to a musical idea, motive or harmony present within sections of the piece and should not be mistaken for a literal transcription of the composition since many sections of this piece contain non-pitched sounds.



Body

Section 1. The Composer

1.1. Life and Environment

Martin Bédard was born in 1970 in Québec City, Québec, Canada. He currently resides in Montréal, a major city in the province of Québec. The City of Québec remains even today very connected to the past as one of the oldest cities in North America. In the center of the city we can still find the colonial fortifying walls as well as historical cannon and battle sites.

Québec, a vast province rich in natural beauty with abundant bodies of fresh water and mountain chains spread out over large flat areas of forest, holds a rich, complex and unique history within Canada. Notably, it was originally a French New World colony and its capital city Québec was founded by Samuel de Champlain in 1608 as part of the French colonial empire.¹¹ This history lives on today with Québec being the only province in Canada having a predominantly French-speaking population, and the only province that uses only French as the official language.

This unique history along with Aboriginal and various immigrant influences gives Québec's musical culture a quite distinctive flavor. Traditional music has a certain folk flavor with rhythms stomped out by the feet of the musicians as the feet of others jig and line dance. The traditional instruments include harmonica, fiddle, accordion and spoons.

1.2. Education

Bédard completed a PhD in electroacoustic composition in 2011, under the Québec composer Robert Normandeau at l'Université de Montréal. He also studied at the Conservatoire de musique de Montréal for five years with composers Yves Daoust and André Fecteau.

¹¹ Liebel, Jean Pierre Dugua, sieur de Mons, fondateur de l'Acadie et de Québec. Paris (1999)

His doctoral thesis *Du langage cinématographique à la musique acousmatique : Ecritures et structures* (From cinematic language to acousmatic music : Writings and Structures) seeks to organize the form of electroacoustic music in a way that can be related to the cinematic structures of moving pictures. To support his research he produced three compositions that offer parallels with the steps involved in cinematic production to those involved in electroacoustic composition. He offers a lexicon of cinematic terms that serve as parallels to every step of the composition process from capturing the sounds, classifying them, processing them, mixing, editing them and finally performing them. *Champs de fouilles* is one of the three compositions he presents in his thesis.

1.3. Musical Career and Body of Works

Bédard has had his works presented in numerous events, including national and international stages. His works have received mention or won prizes in twelve international competitions, notably an Award of Distinction at the 2010 Prix Ars electronica (Linz, Austria).¹² He has also received awards from several Canadian societies including the Canada Council for the Arts (CCA), the Conseil des arts et des lettres du Québec (CALQ), internationally from the Centre de création musicale Iannis Xenakis (CCMIX, France), and locally from the Université de Montréal and the City of Montreal.

Bédard has been involved in the creation of sound design for theater for several Montréal and Québec City stages including Théatre d'aujourd'hui, Prospero, La Licorne, Monument-National, Espace Geordie and Périscope. He has been teaching electroacoustic composition at l'Université de Montréal, auditory perception, composition and analysis of electroacoustic music at the Conservatoire de musique de Montréal.

His 2013 CD *Topographies* is a collection of acousmatic works composed between 2004 and 2012. The CD title serves as a theme for his works during this time period. These works are reflections about society and culture, with symbolic and referential material that connects to the City of Québec, its relics and its people.

¹² Biography notes from Bédard's *Topographies* (2013) CD liner.

Section 2. Distinctions of the Piece

2.1. Among Québec Composers

As a student of other Québec composers before him and as a native to Québec, Bédard's work reflects the essence of Québec electroacoustic composition. Here we touch upon an idea that could produce an entirely separate thesis, but for the scope of the current study, we will look at the identity of Québec electroacoustic music in a broad and general sense to establish a point of reference and sense of context for Bédard's piece. We will briefly look at relevant examples of some work of a few prominent Québec composers to reveal a common thread that exists among all their works.

We begin this overview with a composition by French composer Francis Dhomont. Although Dhomont is not actually a Québec composer, he spent over 20 years dividing his time between France and Québec, composing and teaching at l'Université de Montréal. This effectively makes him a pioneer and forefather of electroacoustic music in Québec. We will look at one of the pieces he produced in his studio in Montréal, *Espace/Escape*. Within the first few minutes of listening to the piece, four compositional factors become apparent. There is a mix of referential and non-referential material that effectively creates a mix of realism within an imaginary sonic world. There is a clarity and cleanliness to all the sounds, which gives the impression that every sound object in the piece was subject to a meticulous selection process and cautious processing. Every object is carefully placed and manipulated within the spatial image in order to create a deliberate sense of space. Finally, the composition progresses in a series of what is referred to in French as *tableaux*: object groupings that contrast each other in such a way that gives the listener the feeling of passing from one frame of a storyboard to the next. Dhomont cites in his program notes for this piece that the elements he has chosen for the composition are related by specific criteria. As we will see with Bédard's work, he establishes a palette of sounds made up of denotative and connotative material where sounds are presented as literal references to their sources in the former and with symbolic intention in the latter.

Next, we will look at a work from Québec composer Marcelle Deschênes. Deschênes was born in Price, Québec but she studied in Paris with Pierre Schaeffer between 1968-

1971¹³ before returning to Québec and initiating, developing and directing the electroacoustic composition program for all three degrees (bachelors, masters, doctorate) at l'Université de Montréal. One of her notable compositions, *Le bruit des ailes* premiered at the *Festival des musiques sacrées* (Festival for sacred music) in Québec City. In Deschênes' piece, we can observe the same crisp-sounding audio quality and care for each individual object. Her composition relies heavily on the juxtaposition of near and far objects in the spatial image of the piece. One striking similarity between Deschênes and Bédard's work is the management and use of reverb. Often times we hear reverb being treated as an object on its own, independent of the original sound source. This technique is effective in creating a landscape, wide foundation or layer upon which other objects are placed. A second similarity we can observe are the long *trame*-type objects that evolve through various filters allowing different parts of the spectrum to emerge as the piece progresses.

Finally, moving chronologically down generations, we will look at the work of Robert Normandeau, a student of Dhomont and Deschenes and the first doctoral graduate from l'Université de Montreal. Normandeau also employs the concept of 'cinema for the ear' in his works. There is a trend that follows the juxtaposition of sounds exploited for a meaning or symbolic purpose with others, used for their more referential qualities that emerges in this philosophy when applied to electroacoustic composition. Normandeau's piece *Éden*, brings the idea of 'cinema for the ear' to the front of the stage. A distinction of this piece is that there are two versions of it: stage and concert. As an adaptation of the music for a play, the concert version contains extra elements added to represent the world of sound produced by the play, while the stage version inherently incorporates the sounds of the play. Thus, we can acknowledge the importance given to the balance between what is referential and what is abstract. The track itself is also based on a long *trame*. In a style that is similar to Deschênes and Bédard, the *trame* evolves through a series of filters and based on an unreferenced reverb object.

¹³ Biography notes from Deschênes' *petits Big Bangs* (2006) CD liner.

2.2. Commission

Champs de fouilles is a work that was commissioned by the *Erreur de type 27* (ET27) ensemble within the frame of activities surrounding the celebration of the 400th anniversary (1608-2008) of Québec City. Bédard presents his piece as an homage, honoring the unique history and character of Québec City.

Bédard describes the work's subject as a poetic and personal perspective of the social community and existing environment of the city. He also encourages the listener to reflect on cultural identity and sense of belonging through the use of source material chosen for its symbolic and cultural reference. Furthermore, *Champs de fouilles* is a work that followed a year of research, readings and reflections that led Bédard toward the creation of works based on a collective sonic heritage or sonic cultural scenery of Québec. Particularly, works based on sonic elements that could be considered as mementos and symbols to this collective Québec heritage.

2.3. Sonic Palette

Sonic palette refers to the sound materials used in an electroacoustic composition. We could think of this as the equivalent to the traditional term of instrumentation. Since this is a purely acousmatic piece of work, there are no traditional instruments in play, at least not in the traditional sense. While it is of interest to list the very sources Bédard sites in his doctorate thesis,¹⁴ it is also important to mention that we may not perceive sound objects within the piece to be literal references to their original sources. In the section that covers the elements (sound objects) of the piece, we will treat and discuss objects from a listener's perspective. For now, we will simply become familiar with the material used by the composer so that we may draw parallels between intention and perception.

Bédard classifies the sound material used in this piece into four categories:

¹⁴ Bédard, Du language cinématographique à la musique acousmatique: Écritures et structures section
9.2 Champs de fouilles (2008)

- Non-referential sounds
- Referential sounds of the city
- Sound objects derived from samples of Monteverdi's music (non-referential)
- Referential sounds of nature

The non-referential sounds are mostly made up of samples of Monteverdi's music and the result of the processing of the material from the other categories. These make up the bulk of the composition, and as Bédard puts it, "form the basis upon which the referential sounds are etched." The layering and structuring of the sounds within the piece are inspired by the archeological layers present in the excavation sites of the city, hence the title of the piece. The more an object references the past, the deeper it is lodged in the lower layers or strata of the composition and consequently less used and more isolated. Inversely, as we rise to the upper layers, the objects will appear in greater numbers and become more present. These are the referential sounds of the present city appearing more often than the materials that evoke a sense of past, like the Monteverdi samples and the referential sounds of nature. The referential sounds captured were mostly from a rail yard by the train tracks and communication signals used in the rail system. The referential sounds of nature are mainly from the river that runs along the coast of the city, and the sounds of the spring migrations of white geese.

Bédard also points out that his piece, *Champs de fouilles*, makes nearly exclusive use of fixed position microphone setups at the time of source capturing. He goes on to say that the piece nonetheless, is filled with natural¹⁵ sound movement because many of the recorded subjects were in motion even if the microphone was not.

2.4. Form: The Composer's Perspective

Bédard divides his piece, conceptually, into two parts. He labels the subject of the first part 'Contextual.' The second part he labels 'Personal' in a poetic and dreamy sense. Fig. 2.2.1. is Bédard's diagram, which shows his organization and distribution of the sound

¹⁵ Natural meaning not a result of post recording panning or dynamic gestures, but inherent in the original recording.
material of *Champs de fouilles*. Bédard describes the first part as maintaining a direct relationship with the subject of the piece through the exploitation of mainly referential sound material. Furthermore, there is a discourse between the intrinsic (he refers to the sounds for their parametric and morphological qualities) and the extrinsic (referring to objects for their semiotic and extra-musical possibilities). He describes the music of the first part as being based on sections of impacts and transitions that take us from one section to the next. He subdivides the first part in 6 sub sections (beginning at 0'00, 1'45, 2'14, 3'41, 4'08, 5'15).

The second part he describes as detached from the semantic content of the work. He describes the extra-musical references as being more rare in this section and treated as dreamy remnants of their earlier forms. He also mentions that it is based on a horizontal structure of material with a confirmed harmonic content. He subdivides this part into three sections (beginning at 6'09, 8'21, 9'16).



Fig. 2.2.1. Bédard's Hierarchy and Stratification of Sound Material in Champs de fouilles¹⁶

¹⁶ This is the diagram that Bédard presents in his doctoral thesis - translated to English.

Section 3. Structural Analysis

3.1. The Big Picture

From a listener's perspective, *Champs de fouilles* can clearly be separated into 2 major and distinguishable parts. The point of separation will be analyzed as existing within a transitional section of the piece, but for the time being we will draw an imaginary line dividing Part 1 from Part 2 at the 5'35'' mark. This not only is this a time in the development where we can acknowledge that the form clearly moves into an importantly different section, but also marks the halfway point of this composition, which is just over 10'40'' in duration. In his description of the work, Bédard divides his piece at 6'09, but this is an example of how intent and perception may yield different conclusions. There are sound objects that begin before 6'09 and not only lead into, but also continue well into the second part of the piece. This is an indication that Bédard considers certain objects to be dynamic, in the sense that their role in the structure can change depending on the presence or absence of other surrounding objects. A new object, that listener might acknowledge as the beginning of a section, is actually intended by the composer as an anticipation, that eventually transforms into a new section once other objects are added.

When looking at the composition from a distance (fig 2.3.1.), we could say that Part 1 (fig. 2.3.2. and 2.3.3.) is a series of sections of groupings of iterative impulses, and Part 2 (fig. 2.3.5.) is generally one big homogeneous block of sound. The global view of the waveform that represents the entire piece (in figure 2.3.1.) allows us to see even at a glance, the very uniform nature of Part 2 in that its waveform has a distinct eye shaped global profile, compared to the more staggered appearance of the peaks and valleys of the waveforms in Part 1. When we then zoom in to Part 1, we see a second level of back and forth dialogue between iterative impulse objects and homogeneous (*trames*) objects. If we can imagine each of these blocks of iterative impulses broken up by smaller *trame* blocks (within Part 1) as one giant iterative object in its own right (within the global view), it becomes clear that the piece is one big juxtaposition of an iterative impulse section (Part 1) against a *trame* section (Part 2).



Fig. 2.3.1. Overview of the Structure for Champs de fouilles



3.2. Form of Part 1

The form (4th) line of the Listening Score shows a waveform image of Part 1 divided into nine sub-sections lettered from A to I. These sub-sections alternate between being filled with iterative impulse objects and being filled by homogeneous *trame* objects and are labeled X" and H accordingly. We will see that no section is purely or exclusively only iterative, nor solely homogeneous in a later discussion of the elements, but this first subdivision is useful in drawing an outline of the global form of Part 1. We can see in the table above that these sub-sections are in essence just a further subdivision of Bedard's intended *tableaux*.¹⁷ The form is essentially a dialogue between these two contrasting types of musical objects. When subdivided in this way it is easy to see the various pairings of *trames* and iterations, even by the amount of time one section occupies before giving way to its counterpart. Of course each section has a fair amount of tension and

¹⁷ As described in section 2.1., the French word describes divisions within the composition akin to frames of a storyboard.

musical gestures that tie it to its succeeding and preceding sections, but for the discussion on the form of the piece, we will focus on the exchange that occurs between the iterative impulse objects and the *trame* objects.

Section A groups together with B, C with D, and E with F, as distinctive section pairs of iterative impulse objects and *trame* type objects. G pairs with I, where G is mostly made up of iterative impulse objects with a *trame* object undertone and I is made up of mostly one trame object with iterative impulse objects as undertones. The hybrid section H is a special transitional block that foreshadows the eventual transition of Part 1 into Part 2, but also leads into I much like F leads into G. These final four sections have a dichotomy in terms of their role in the structure of the piece and we will refer to them as the overlapping sections of Part 1. Part of the dichotomy lies in the fact that F can be the logical sequential pairing to E, but F is also arguably to section G what H is to section I. This is because the elements that make up F continue to exist in some form within G just as the elements that make up H continue to exist in some form within section I. The roles are reversed in terms of the type and quantity of the elements that make up each section and one is like an inverse or negative image of the other. We will look at the elements that make up the form in a later discussion but suffice it to say for now that these sections suggest not only a back and forth dialogue, but also a stronger interlocking structure with interest in creating stronger bonds that hold the global structure of the entire piece together as it eventually progresses and transitions to Part 2.

Section A, the very start of the piece up to the 14" mark, is instantly very busy with sounds that move around quickly in the temporal domain and there is no real sense of any one sustained sound. The sounds are generally of an impulse nature. Nearly every sound seems to also be echoed, giving more impulses that are scattered in the development of section A. Section B, however, is less obvious in definitely being a *trame* section because it is also not made up of any form of clearly sustained object, not at first anyhow. In fact, the argument for labeling it as part of the *trame* section as early as the 14" mark is based on the fact that the material stops being iterative and there is a clear break in all the busyness of the impulse sounds as well as a drop in volume (material going from the foreground to the background). This in effect creates the illusion of silence, and even while the first part of section B does in fact have remnants of the iterative objects from

section A in the distance, we can argue that this apparent silence acts in itself as a *trame* when juxtaposed to the absence of the iterations of section B. Perhaps more importantly, this *trame* gesture foreshadows the more defined *trame* that appears in the second half of section B. Here at the 21" mark we hear a good solid *trame* within an object that holds its form for remaining duration of section B.

Fig. 2.3.2. Form of Part 1 (Sections A-D)



Section C reintroduces the material from section A and again is very busy and loaded with objects of impulse nature. However, there is a quick passage that returns to a *trame* between the 37" and 44" mark within section C. If we delimit section C to run from approximately the 28" mark up to the 55" mark, this brief passage to the *trame* should not be thought of as a new section of the form, rather it is a compositional element within the section. It mirrors the iterative objects that appear as a secondary figure over the main *trame* in section D around the 1'04" mark. Since the *trame* in section D remains intact while the iterative objects are only a thin secondary layer for an equally brief period of time it may be more intuitive to perceive this as continuity within a section and not the start of a new section. We can argue that the short duration of the *trame* in section C is in fact what makes it part of the structure, since it is too brief to exist as an entire section for the sake of analysis. Furthermore, the fact that this compositional technique (of having a *trame* object appear briefly in a impulse section or an impulse object in a *trame* section) appears again in section D, reflects the composer's intention of maintaining a dialogue of contrast with a back and forth between these two types of objects.



Section E is a firm return to the iterative type impulses from sections A and C but this time they are much more dense in both quantity of impulses per second within the iterative object as well as individual object masses. The mere increase in quantity of the impulses accents the transition from the preceding section. This section confirms the existence of a dialogue between two distinctive and opposing types of sound objects. At this point, we must look ahead to acknowledge with hindsight that this would in fact be the last stand, so to speak, of the more pure examples of iterative impulses. Section E, residing between the 1'27" and 1'47" marks of the piece, is well nestled inside the confines of Part 1 and it firmly declares its role as an iterative impulse section, through volume, density and speed. Along with section F, it serves as a structural node within the composition. E establishes a firm sense of being within the realm of the iterative impulses before giving way to section F, which in its own right is an important link to the trame realm that resides in Part 2. Section F, very similar in duration to E, plays an important role as part of this structural node of the piece. If we look back for a moment to section B, we might recall how the first part was a foreshadowing (or mini trame) segment that alluded to the arrival of the much more established *trame* in the second part (all within B). In this respect, F can be thought of as an echoing to the first part of section B, in that it alludes to the arrival of a much bigger trame: the eminent arrival of Part 2. Section F also leads into, and is in fact a part of, the overlapping sections made up of F going into G and H going into I.

Fig. 2.3.3. Form of Part 1 (Sections E-I)



Section F as a part of the overlapping sections of Part 1 establishes a *trame* type object that will finally merit its name as described in the TOM. The duration of the *trames* contained in earlier sections are perhaps arguably of minimum lengths that could be considered too long to be well balanced but the *trame* in section F goes far beyond this. The part of the *trame* contained within Section F is a *trame* in its own right when contrasted by the juxtaposition of the preceding section E, but it is really just the

beginning of a much longer *trame* object that continues well into section G. Although it is subjected to significant morphological changes, it is clearly one intact object that is moving between the background and foreground of section G.

This brings us to the question pertaining to Section G; is it a *trame* section or an impulse section? The beginning of the section is denoted by the return of strong impulse iteration type objects (at $\sim 2'16''$), but the *trame* that started in Section F also continues to evolve as a part of G. Other sections up to this point had been denoted by the sharp contrast of one type of object ending and its counterpart object beginning. Up until this point have admittedly been small crossover regions where some remnants of previous sections' objects have faded out or decayed more or less naturally over that time, but the *trame* that begins in section F does not fade away. At first, it may feel like it has been pushed to the background because of the foreground presence of the new impulse objects but the *trame's* volume then begins to increase and returns to the foreground. It continues to establish its importance in this section by evolving within its own morphological composition. All the while, impulse iterations of various nature move between the foreground and background, so section G is really a section where the two types of objects begin to interlock.

Section H is special because it introduces a new type of object altogether. The beauty of this section lies in the irony embedded within it. While section H contains neither a *trame* nor a formed impulse iteration, it does contain the equivalent of a hybrid of these two types of objects: the accumulation. Section H, for all intents and purposes contains iterative impulses but they are different, in two important ways, from the ones presented earlier in the piece. The first, and perhaps more obvious, way that they are different is in that they are made up of a completely new sound texture that has not been used or introduced before its initial occurrence at the beginning of section H. The second way, and of interest as far as our discussion on form goes, is that the impulse iterations of section H can be all grouped together as one singular object. At this point, if only for a brief moment we must discuss how the elemental nature of the objects comes to affect the form. Until this point in the piece, all the impulse iterations have been of a formed tenure (N''). However, as per the description in the TOM, when impulse iteration objects become unpredictable in duration or too long to be considered balanced, they are defined

as *accumulations*.¹⁸ What ties this so neatly in the progress and discussion of this piece is that an *accumulation* is actually the equivalent of a *trame* on the opposite side of the balanced objects in the TARTYP. We could describe an *accumulation* as being a *trame* object with an iterative texture as opposed to having a uniformly sustained texture. So, this section essentially goes beyond interlocking the two objects to the confines of their back and forth discussion within the piece; it has combined them at the atomic level, creating a new independent object. Section H, thus, is another node in the global view of the composition's structure. It both represents the epitome of a dialogue, where the two speakers have essentially become one voice, and it pushes the grand dialogue of the piece. Section H signals the approach of the next big movement, Part 2.

Section I, beginning around the 4'10" mark would appear to be the beginning of another *trame* section, if only because of the crescendo approach that leads into it at the end of section H, as this has been a method for juxtaposition thus far. It is indeed a *trame* that begins and continues through most if not all of section I, but it remains in the background consistently through to the 5' mark. In the foreground, remain short but clear and present impulse iterations. This compliments the interlocking objects of section G and does it justifiably in a mirrored but opposite way after the convergence that occurs in section H. The 5' mark is actually not only the tail end of section I, but also the start of the main transitional section.

3.3. Form of the Transitional Section

The transitional section begins with an overlap with the end of Part 1 and ends with an overlap of the beginning of Part 2. The area that we are delimiting as the transitional section is approximately from the 5'11'' to 6'06'' mark (fig. 2.3.4.). It is actually the end of Part 1 and the beginning of Part 2 but given a label to take it out of the context of the main diametrically fluctuating dialogue that happens in Part 1 and the continuous *trame* that happens in Part 2. It makes more sense to discuss this transitional section in detail within the confines of the elemental analysis, so we will only look for now, at how the

¹⁸ As defined by Schaeffer, see terminology section (TARTYP table fig.1.3.1.).

content of this form relates to the structure of the global dialogue. In figure 2.3.4. we can note the labels of H and N'' to denote *trames* and iterative sections respectively.



Fig. 2.3.4. Form of the Transitional Section

The analogy of a sword fight between the two different types of objects involved in our discussion thus far (iterative vs. trame) seems an appropriate way to describe this section's function in the overall outlook of the piece's structure. The steep crescendo of the trame at the beginning of this section (a continuation of a trame that was otherwise maintaining a consistent volume in the previous section) grows very loud and is not interrupted but rather met, at its very edge by very clean and sharp sounding impulse iterations. Clean, in the sense that there are no underlying *trames* in the background or in any layer for that matter. This passage is firm, but brief. It too, is not interrupted by the incoming *trame*, rather it seems to slide against it much like a spade deflecting an opponent's attack. The opponent here is a *trame* striking with the force of a quick rise and drop in volume, and holding its ground firmly from here on, arguably until the end of the piece. The impulse iteration side retaliates with one last strong burst of energy. It is difficult to say for sure whether or not the trame, that otherwise clearly carries over into Part 2, is indeed or not present even if in the furthest background or if it does indeed cut out for the briefest of moments. Regardless, the valiant effort of the impulse iterations retreat to the sidelines and the piece finally transitions into part 2.



3.4. Form of Part 2

We can consider the start of Part 2 as beginning more or less at the 5'32'' mark where a trame that basically remains present for the remainder of the composition, makes its initial appearance. There is, of course the 'final stand' of the impulse iterations as described in the form analysis of the transitional section but in the global view of Part 2 as a structure and furthermore the global view of the entire composition, this 'final stand' can be considered a remnant of Part 1. The one homogeneously formed trame that makes up the entirety of Part 2 settles any remaining doubt of the existence and presentation of a grand dialogue between the impulse iterations and the *trames*. This large *trame* within the piece, undoubtedly goes through several and various morphological changes throughout its tenure, but again, to satisfy its role in the form, it is undoubtedly one long and carefully sustained gesture that outlines the very profile of Part 2. In the form line of the Listening Score we can see the overall waveform amplitude in Part 2 increase and then decrease. This helps to illustrate how this trame is very evenly distributed over the duration of the second part. The mid point of the trame, where the large volume crescendo gesture finally turns toward a very slow decrescendo happens just before the 8" mark. This dissects Part 2 nearly precisely in half, recalling the theme of symmetry that has existed in several manifestations throughout the piece.

Fig. 2.3.5. Form of Part 2

	H	 anı tanın tahihi	a a second de la companya de la comp	al els salations and an element general gy antisection and an				
	4				ostarton	eg 10:000	10/20/200	10750700
ד				Hx		 		
L				м				

There are (with no intention of concealing their existence) numerous impulse iterations that continue to propagate as Part 2 runs its course. These are at once clearly not part of the morphological evolution of the main *trame*, but also not presented with gestures that disrupt the general form of Part 2 they way they would have in Part 1. Instead, they appear to linger over the main *trame* as if to remind it of the big role they played in Part 1. This is quite analogous to the role the *trames* played in Part 1, when they appeared to be foreshadowing the arrival of the main *trame* in Part 2.

Part 2 is also in a position to be responsible for the conclusion of the piece. The continuous presence of the *trame* is in itself soothing as it brings a sense of security. This helps to bring a rather peaceful message at the end of this battle of forms. The interactions that exist between the iterative objects and the main *trame* are rather playful, unobtrusive, and reassure that the composition is presenting a dialogue and not an argument.

More can be said about the role of the second part of the piece, but it lends itself much better in the discussions of elements and perception, where this part will be discussed again in depth. Suffice it to say that it is the absence of clear and distinguishable sections as there were in Part 1 that proves to be the biggest argument that holds the supposition that this composition is a grand juxtaposition of two different types of objects. The macro view of Part 2 provides the juxtaposing block to Part 1. It follows the pattern established on a micro scale in Part 1: a series of breaks followed by a long uninterrupted *trame*.

3.5. Elements of Part 1

Our discussion of the elements of Part 1 will make reference to the same sectional divisions that were introduced in the discussion on the form of Part 1. The sectional division is useful in grouping the objects, but the waveform is less relevant in this case because we are not interested in the peaks and valleys of the sound as much as we are with the texture and nature of the individual sounds that make up the discourse in the composition. The first line of pages 1 and 2 of the Listening Score represent the sound objects of Part 1. Each object is represented by a symbol as described in table 2.3.1. Each object has been given a name and a symbol which more or less aim to describe the object in such a way that it can at once be referred to in the English language, as well as work as an indicator to point out the object in question to the reader, through recognizable analogies. The linear time ruler also aims to assist in the location of the sound objects in question while the vertical plane of the graphic score represents the super imposition, or vertical composition, of multiple sound objects. At this point, the reader is encouraged to consult both Table 2.3.1. and the first line of the Listening Score to get acquainted with the nomenclature of the objects and their appearances in the score.

Symbol	Name	TARTYP classification	Description/Sounds like				
A	Rollercoaster	Y"	A rollercoaster cart speeding along rails past a fixed listening point.				
44	Metal Plates	N''/Y''	Two small metal plates being clapped together, sometimes several plates being shaken about.				
11/1	Flare-shot	X'	Flare projectile sound.				
6000	Electric Spring	X''->Ax	Electric hum and buzzing.				
Ohh	Choir	Hx	Resembling a processed or synthetic choir singing Ah / Oh vowel sounds.				
***	Water	Hx	A frequency cluster resembling white noise or the sound of running water.				
P	Switch	X'	An industrial switch flipped on or off.				
BBB	Jackhammer	X''->Ax	Low-pitched objects resembling the sounds emitted by hammering type construction machinery.				
\bowtie	Horn	Hx->Tx	An amalgamation of the sound emitted from a train's breaks and horn.				

Table 2.3.1. Description of the Elements

	Bell	Zx	A typical railroad bell sound.			
24	Birds	Ax/Ay	A flock of birds (geese) flying and vocalizing.			
	Pole	X'->X	Metallic pipe or pole type object struck with a mallet, and ensuing resonance.			
Æ	Water- coaster	Y	Water object with an applied gesture of that resembles the Rollercoaster object.			
h	Harmonic (Choir)	Hn	Harmonics of the 'Choir' object, they are defined pitches of immeasurable duration.			
CADI	Harmonic (Horn)	Hn/En	Harmonics of the Horn object, sometimes with sustained timbre, but also appear with variable timbre.			
	Reverb box	N/A	This symbol wrapped around an object indicates that the particular object has an embedded reverberation nature in its morphology.			

Figure 2.3.6. shows a visual representation of the distribution of the sound objects used in the piece, within the TARTYP table classification. We can see a general trend in the composer's choice of sound object types, with the majority running right across the middle of the table.



	unbounded duration (macro-objects) unpredictable unformed form (temporally)			Measurable duration (balanced) reduced duration (micro-objects)			unbounded duration (macro-objects) unformed (temporally) form	
				formed sustain	impulse	formed iteration		
defined pitch fixed	ES	(En)	Hn hai h	N	N'	N"	Zn	SNOL
mass complex pitch	AMPI	(Ex)	E Onh Hx	x 🛙	C X'	0000 bbb X"	‱₿₿₿ <u>ᠿ</u> Zx	
somewhat variable mass	J N	(Ev)	Tx Tn special case trames	Y	Y'	کوم ۲"	Zy special case pedals	V V V V V V V V V V V V V V V V V V V
sustained sounds					iterative sounds			

Fig. 2.3.6. Distribution of Sound Objects within the TARTYP

The main sound objects of section A are the Rollercoaster, the Metal Plates and the Flare Shots. The Rollercoaster object is an object that appears numerous times throughout the composition. It is a complex sound in that it covers a wide range in the frequency spectrum and it is almost always used in conjunction with a strong panning or dynamic gesture. To best describe this object we will submit to source bonding¹⁹ and describe this object as a combination of the three sources that make up its composition. First, there is the sound of a train's wheels passing by a stationary point along metallic rails, then its freight carts and the rushing wind sound as a result of the passing train. The many wheels passing through one point create little gaps of air pockets between the sounds of each set of wheels that we perceive as an iterative pulse. The freight car makes a clunk that adds weight and beats to this impulse as it all rides on the whistle of wind and the hum of the metal rails. It could be argued that the wind and rail hum are continuous, and while they might be, their mass is less relevant in the core of this object and serve as a platter to serve the iterative object on. The Rollercoaster would normally fall under the category of the unformed impulse iteration, but the use of dynamics to quickly introduce and

¹⁹ Smalley (1997) pp. 110 : source bonding referring to the phenomenon of associating a familiar sound to its source.

extinguish the object in section A keep it in the realm of formed iterations. Several Rollercoaster objects are staggered throughout section A and make up the bulk of the sound material in this section.

Fig. 2.3.7. Elements in Part 1 (0'00-2'30)



Next we find the Metal Plates in two slightly different morphologies. The Metal Plates have a rather uniform dynamic tenure and are usually presented in a short string of percussive impulses, not unlike the sound of two small cymbals being struck against each other. There is no real way of knowing when this object will begin or end except for its slight changes in dynamic. In section A, the Metal Plates disappear almost as soon as we can acknowledge their arrival, so for this reason, they too can be considered formed iterations. At first, their timbre is rather dark and they tail off the end of a Rollercoaster object around the 7" mark (fig.2.3.7.). Then, they return with a much brighter timbre, this time directly above the final Rollercoaster object of section A. The Metal Plates continue to briefly trail off beyond the final Rollercoaster serving the role of transition between two sections. At the onset of the second Metal Plate object there is the first occurrence of the Flare-shot object. The Flare-shot object is an impulse object of short duration and complex mass. The energy profile of the impulse attack and quick dispersion could be compared to that of a small gong cymbal struck by a felt mallet. On its own it represents only one formed impulse but it seemingly always appears in pairs. So, not quite enough to group together as a formed iteration object with complex pitch (X'') but rather a sequence of two impulsive objects with complex pitch (X'). In real life, Flares are used to alert others of some presence or looming danger. The Flare-shots seem to serve a similar role in this composition. They appear, not at the very end of section A, but just a few moments before as a precursor to the beginning of section B.

Section B introduces the Electric Spring object. This object has a very interesting morphological profile for two reasons. First, it has a very active internal movement of energy where the mass fluctuates between near recognizable pitch and a very complex mass of energy. In the moments when the mass is complex it approaches white noise. Second, it sits on the line between a formed tenure and an iterated tenure. It at once can be perceived as a very quick succession of impulses or a complex saw-tooth wave. Of course, even the purest sine wave is in essence a succession of impulses. So, it is difficult to label this object as purely iterative or purely formed tenure. For this reason it is able to have a function of duality in the piece, sometimes lending itself to the iteration 'team' and other times to the *trame* 'team.' It is possible however, to acknowledge how it is part of the *trame* team in this section. The Electric Spring leads into a brief explosion of the objects that appeared in section A, and then the Electric Spring continues over the first real trame object: the Choir object. The Choir object has no formed tenure and even at times when its presence in the piece may be short lived, the listener never has any idea how long it may continue for, since it has a synthetic nature and can be expected to continue forever. Its mass is complex in that the pitch that is sometimes very recognizable is subject to variation and the appearance of harmonics. In this instance, it is coupled with the Water object. The Water object lives almost like a parasite along the life of the Choir object in this section, but it is to high and detached in the frequency spectrum to argue its place within the Choir object. Moreover, in later sections, the Choir object reappears independently of the water object. The Water object itself is a complex mass that has no real temporal indications of a beginning or end landing it a place among the objects of type Hx (sustained, quasi unformed, complex pitch).

The Metal Plates return, announcing the approach of section C. In section C we hear a return of the Rollercoaster objects of section A, sometimes coupled with a new object: the Switch object. The Switch object is another impulse of complex mass. It sounds like a fuse or light Switch being flipped in a big empty room or cavern. It is used several times in this section, at first as a pivot point between objects of different nature. As its name would imply it acts as an instantaneous Switch between the *trame* of section B and the onslaught of Rollercoaster object iterations that make up most of section C. Then, it is used again to Switch back to the brief return of the *trame*. Before that, it is also used between two Rollercoaster objects. In this case, it is used with a gestural significance. It

prepares a silence after one Rollercoaster object, before a new one can return with a certain amount of built-in suspense. At the end of this section the Rollercoaster objects are tailed not by the Metal Plates, but by the Flare-shot objects. Again in a set of two, they announce the arrival of the next section, but this time with less notice, acting more as the actual transitional objects between the two sections. The white noise-like quality of the Flare-shot objects overlapping the Choir object in the next section also serve to signal (by means of contrast) that the Water object that was previously coupled with the Choir object is now absent.

Section D is a gradual accumulation of objects that we have seen up to this point. The accumulation is well constructed so that it feels like the Choir object is actually growing and the other objects are a part of its growth. The Electric Spring objects begin appearing seemingly sporadically at first but gradually closer together, nearly chaining into a single longer object. As this happens, the Water object appears seemingly out of nowhere almost surprising us but at the same time adding to the great accumulation of objects. The Water acts as a blurring effect to melt the otherwise impulse type objects into a section that is more *trame*-like and uniform in nature. As the water object grows in volume, the Flare-shots are added on top and their texture is very similar to that of the water so they seem quite unobtrusive in this *trame* context. This time the Flare-shot objects will be doubled-up in numbers as well. A Switch object is heard pairing with a Flare-shot object, almost as if launching the second set of Flare-shot objects. Meanwhile, the Choir object itself is expanding its mass with added harmonics in the upper middle frequency spectrum. This super imposition of all these objects creates a build up of tension leading up to the transition to the next section.

A big Rollercoaster object sweeps across the two sections as a transition to a much less stable environment than the previous one. Section E begins with the introduction of a new sound object. The Jackhammer object is a formed iteration of impulses at first, but quickly becomes strung together to other Jackhammer thus approaching the profile (as a grouping of several of these objects) of an accumulation type object. All the while, a series of Metal-plate objects is placed above the string of Jackhammer objects adding chaos and confusion to this movement. The entire section seems to be held together by a series of sweeping Rollercoaster objects that are carefully strung together beneath this mass of iterative objects. The Rollercoaster objects here play a role of grouping the otherwise unformed iterations into one dense and compact section.

The very dense section E is paired with a very docile section F. Here we find the Choir object nearly undisturbed by any other objects. The Choir object exudes a sort of pulse in its temporal dynamic outline, which works as a soothing release to the contrasting aggressive objects from the previous section. We also perceive an expansion in the upper register of the mass of this object, in the form of harmonics of the Choir object. The high register of the harmonics combined with the rich texture of the Choir object by which they are formed allows them to add to the function of serenity granted by this section.

Fig. 2.3.8. Elements in Part 1 (2'30-5'00)



The Choir objects and its harmonics continue right into section G but recede into the background. A much louder Rollercoaster object announces the return of the Electric Spring object. The spring object returns with much more energy, seemingly charged as it imposes itself over the Choir *trame* that continues, unaffectedly, beneath it. The spring objects in the score at this point are drawn inside boxes to represent them sounding as though they have been placed in some sort of reverberation chamber (fig.2.3.7. and 2.3.8.). This reverberation is long and adds to the thick and imposing nature of this object's role in this section. Two completely new objects are introduced in this section. The first is the Horn object. The Horn object is a pitched object that varies between defined and complex mass. It sounds, even if subjected to any treatment, much like the probable source of this sound object: a train's horn. Because the sound source was recorded with a stationary microphone, the sound object itself contains a built in Doppler effect. It also gives the Horn object two inherent properties. One is that it is infused with the sound of the screaming of the metal wheels along the rails, and the second is that it by

nature has a soft crescendo attack as the object moves closer to the listener. Its role thus, would appear to be very literal as well, announcing the arrival of a train. The possible inferred metaphorical meaning of this train will be discussed further in the section on spatial perception / abstract. As the Horn object achieves a foreground level of volume it prepares the listener for the arrival of the Bell object. The Bell object also sounds true to its reference: the bell on a train having undergone little, if any treatment. The Bell has a distinct rhythmic pulse and consistently appears in the piece as a series of rings. This sways the judgment for its place in the TARTYP table to fall under an iteration, rather than impulse. Its role, besides the obvious reinforcement to the statement of an arriving train, also echoes the role of the metallic plates in earlier section as a member of the iterations 'team.' The section continues with a progression of the Electric Springs moving around over and within the accumulation of *trames* beneath, made up of the Choir object and the Horn object slowly moving toward the foreground with increasing volume. At this point the Electric Springs appear to stop for a moment and the Horn object is reinstated by this silence. The Horn object quickly ramps up in volume creating anticipation for the next section. The Electric Spring object is reinserted here to reinforce the anticipated arrival of section H.

Section H has few, if any remnant trails of the previous section G. It launches straight into a new world with the introduction of a new object: the Birds. The Birds object is the collection of the sounds of many birds, perceived as an iteration of one particular sound since we can not distinguish the cry of one bird from another. This makes the mass of the Bird object complex and the temporal duration undeterminable since their cries do not follow any particular dynamic curve. This object falls neatly in the type Ax (Accumulation of complex mass). As the birds cry out, we can hear the water of the river where this sound source was recorded. While the water is most likely part of the same recording it does not seem fitting to include it as a part of the sound object that we have labeled Birds. Instead, this water seems to have been so carefully introduced and managed in its insertion amongst the other objects of this piece we will consider it an object in its own right. This Water-coaster object can be perceived as a morphological descendant of the Water object, but the motion of the water coming and going in waves is very familiar since the Rollercoaster object has always been applied using this similar gesture of waves coming and going. Section H also has its own Rollercoaster object that runs along beneath the bird object. This Rollercoaster object is much more gradual in its arrival and departure than the others before it. Foreshadowing the more *trame*-like nature of Part 2 looming in the near future.

The final section of Part 1 has a main *trame* running though it formed by some superimposition and treatment of the Horn object and the Water object. They appear thinner and have a somewhat eeriness to them. This is coupled with something that seems to be the echoes or reverberations of the Birds object with the main Bird mass having been removed from the mix. A few Bell objects appear intermittently overhead and fade gently from background to foreground. As this happens we can also observe an object that resembles the Electric Spring object. However, if the object last appeared charged with energy, this time it appears depleted of its energy. The Electric Spring object is very dry and losing its initial electric charm. This transformation reinforces the idea of major change, first on a micro scale within the make-up of the objects and then to the eventual macro scale as the entire form of the composition is driven by this transformation.

3.6. Elements of the Transitional Section

The transitional section begins around the 5'00 mark when the water, Horn and Choir objects from section I in Part 1 begin to drastically increase in volume. We hear a few instances of the depleted spring object and then the Flare-shot object is launched in its usual pair. The Flare-shots focus our attention from the otherwise slow moving *trame* to the Switch object that launches a quick moving Rollercoaster object into the first node of the transitional section. Here we find the Electric Spring object to have regained some of its charge, but still an evolution that includes a texture similar to the depleted sounding spring into its new incarnation. This is an indication that elements have undergone dynamic change at this moment of transition within the composition.







A second Rollercoaster object closes off this node and we are left with a faint Choir object with Electric Spring and Metal Plates objects that hover around it (fig. 2.3.9.). The Water-coaster, another object very indicative of dynamic change amongst the sound objects, returns beneath harmonics of the Choir object and for the first time launches a lower harmonic, or undertone of the Choir object that we have not heard before. Then, a second Water-coaster object sweeps between the pads of undertones and harmonics to release the Flare-shot objects announcing the arrival of the second node in the transitional section.

The second node is led into with the iterative Metal Plates functioning as a precursor to what will be the last iterative block of the composition. This second node within the transitional section is very similar to the first, using a mix of quickly moving Rollercoaster objects, Metal Plates and Electric Spring objects to create a quick burst of iterative objects in high density. One exception to this otherwise mirrored node, is that there is the sounding of the Horn object just before the end of this section. The Horn object here is special in that it is void of its main mass and exhibits only a sort of harmonic or high register component of its original texture. This permutation of the Horn is annotated by a 'ho' marking in the score, differentiating it from 'h' that is reserved for the Choir object harmonics (and undertones).

3.7. Elements of Part 2

As it was argued in the discussion on the form of Part 2, the *trame* that is predominant throughout the duration of Part 2, and essentially the rest of the piece may indeed begin

within the transitional section, but for the purposes of this discussion on elements we will jump right into the meat of Part 2 and begin a few moments before the 6'00 mark (fig. 2.3.10.). After the Horn object has sounded we hear the Choir object in the distance. In their transitional roles, the Rollercoaster object launches a Flare-shot object pair as the Metal Plates objects trails off into the Choir object.

Fig. 2.3.10. Elements in Part 2 (6'00-8'00)



The Choir object begins to gain momentum with undertones and harmonics. A trailing Electric Spring object flutters overhead and a Metal Plate object is tied to a Horn object. All these objects are handled with gestures that link one to the other and maintain a notion of growth toward the underlying Choir *trame* object. This Horn object is brief however, and disappears into a new object. This sound object is the Pole object. It has some qualities of a percussive attack but also a very exaggerated reverberation tail crafted in such a way that the attack sounds less pronounced and the decay lasts just beyond the limits of a strictly impulsive sound. We can think of this object as a stretching of the impulse type object being pulled toward an object of formed duration. This reflects the slow moving *trame*-like nature of Part 2. This first Pole object is followed by a brief Electric Spring object. Then again, a second Pole object is heard. Too much time has elapsed to hear it as an iteration of the first, but we can sense a slow but strong propulsion, like that of a train as it begins its first motion forward, generated by these two impulse type objects stretched just far enough apart, adding to a growing series of objects that keep accumulating over and under the main Choir object.

At this time more and more harmonics appear in the upper spectrum. Both harmonics of the Choir object and the Horn object evolve in a play of layering and dovetailing. Up to the 6'46'' mark this evolving *trame* object remains mostly undisturbed when finally an

altered Rollercoaster object layers over the *trame*. This Rollercoaster object appears to be in a reverberating environment. This helps the Rollercoaster objects to blend in with the slow moving *trame* as its profile is less accented and generally less defined in the tail end. A similarly altered Rollercoaster is then coupled near the 7'06'' mark with Metal Plate objects that live in a similar reverberating environment. We see a progressive gesture towards making the purely iterative impulse objects from Part 1 into softer, less intruding objects that blend with the main, long tenure, objects of Part 2.

As the harmonics keep being added and the density of the *trame* nears its climax, several Flare-shot objects are launched, almost as fireworks to highlight the main event of the *trame*. These Flare-shot objects also have been altered to soften the edge of their texture trough the use of a reverberating environment. A Pole object is heard below with a lasting resonance marking the densest area of the *trame*. This is followed by a series of Flare-shot objects, Rollercoaster objects and spring objects. They remain far enough from the foreground and are spaced far enough apart from each other in such a way that they are not intrusive and manage to reveal a sense of play and dance contrasting to the much more aggressive nature with which these objects were handled with in Part 1.





At about the 8'36' mark a final Horn object begins a slow evolution of dynamic play that will last until the very end of the piece as various harmonics continue to evolve along a path that brings them from the foreground to the background and back at a soothingly slow rate. Eventually, they all but completely subside as the final tones can be heard ever so slightly right until the very end of the piece. The moment where the final Horn object is heard there is also a final release of the Flare-shot objects as a pair. This pair of Flareshot objects has the longest time of separation of any two up until this point. This continues to slow down the overall flow of the piece and sets the listener up to what would be a cadence movement for the finale. The pitches and cadence related matters will be further discussed in the section on vertical and horizontal spectrums.

Section 4. Frequency Spectrum Analysis

4.1. Vertical / Horizontal Spectrum (Global)

In spite of being an acousmatic piece, *Champs de fouilles* has an underpinning of strong harmonic material. It is largely based on the harmony of a G minor chord. Another way of phrasing this would be to say that it is largely built on the harmonic series based over G since most of the intervals we can hear appear in the harmonic order, but there is an ever present Bb throughout the piece which would not appear until much later in the harmonic sequence based on G. We will look at how this G minor chord is the harmonic foundation of this piece by finding examples of it throughout the piece. Notably, with emphasis being exchanged on harmonies exploiting the minor 6th interval between D and Bb, the major 3rd interval between Bb and D, the minor 3rd interval between G and Bb and of course octaves and further harmonics of G and D.

Melody on the other hand can be perceived in two main instances. The first, being the sound of referential objects with exact pitches that fit into the G minor chord playing a sort of repeated note melody, as they are sound objects of iterative nature. The second instance of melody is more of a notion of melody that we can extract from layers of harmony that fade in and out of a main mass chord-type object. As some harmonics diminish in volume we hear others more clearly, in a sense, appearing to emerge as a melodic note. The same can be said about harmonic layers that are added above or below the main harmonic mass with a large enough interval gap that singles them out as some part of a melody. *Champ de fouilles* has very strong harmonic implications within its sound material, but melody, outside of what we could call leading tones and the highlighting of certain tones within a chord structure is otherwise generally kept to a minimum.



We will use traditional staff paper and time markings to sketch prominent ideas of both harmonic movement (vertical movement of sound objects within the piece) and melodic material (horizontal propagation of sound objects with distinguishable pitch). The note durations should not be thought of as a literal representation of the duration, rather a tangible bearing to describe an idea or motif. The time markings beneath the staff should be used instead to locate the instances within the composition. The third line of the Listening Score gives an overview of the harmonic and melodic material throughout the piece. Time references from the text in the next two sections have been marked on the score beneath the staff. It should also be noted that while a closer look at the section of transition between Part 1 and Part 2 was useful in the discussions on form and elements, it is unnecessary here since there is not a great deal happening harmonically or melodically that can't just be included as either of the two major Parts.

4.2. Vertical / Horizontal Spectrum in Part 1

Some of the iterative objects have a distinct and recognizable pitch. Figure 2.4.1. shows the sketch for melodic and harmonic material between 0'15-0'40. At the 8'' mark we can hear a Metal Plate object ringing an unmistakable A pitch. A more complex massed Metal Plates object (less distinguishable) then sounds somewhat higher, but suffice to say that it is a dissonant interval until there is a clear return to the pitch A by the 15'' mark. This sort of back and forth play is reminiscent of an anacrusis before we hear the first real vertical chord structure at the 20'' mark. Even though a low distant undertone of G is seemingly present throughout, this first chord sounds like a 1st inversion of G minor. It is led into by a sudden burst of energy, which seems to reside around C. The bursting C energy is used to add tension to the transition between a calm area and a more intense section but it quickly disperses and we hear the G minor chord structure that suspends the arrival of the root note through a Bb, A, G melodic-type (horizontal) movement of appearing and disappearing harmonic (vertical) layers.



Fig. 2.4.1. Vertical and Harmonic Structure (0'15-0'40)



At the 29" mark we hear the return of the explosive C, led into by an intrusive B natural as the harmony is interrupted and makes way for a section of complex mass iterations. Once more within the iterative block, we hear a second C this time pitched an octave below. Though only for a brief amount of time, the G minor structure returns at the 40" mark. This time, the horizontal movement we heard stepping down at the 20" mark, moves upward in step motion from the G up to the Bb again. This harmonic section is abruptly interrupted, but the return at 55" does not have the C explosive transition. Instead, it is smoothly led in by a crescendo in the *trame* and two Flare-shot objects trailing off from the iterative block.

Fig. 2.4.2. Vertical and Harmonic Structure (0'55-3'41)



This vertical structure (at 55'') has a much more present lower end. We hear a strong outline of the G chord in the lower end, and the minor third between the G and the Bb trades moments of brightness in the mid register with the perfect fourth between that G and the D below (fig.2.4.2.). This continues through out the section, but around the 1'11'' mark we hear a new family of dissonant harmony slowly move in above the G minor structure. This dissonance is not a single note, but a group of notes that hold well enough together: a second inversion A minor. Since the A and C are common to both keys, only the E natural is the dissonant tone, but it is doubled up in the lower end as the section progress. This leads us to believe it is an indication of what is to come in the *trame* section (Part 2).



The iterative block between 1'27 and 1'44 is particularly interesting because two of the objects (Jackhammer and Metal-plates) have somewhat distinguishable pitches of a low C and middle G respectively. The C continues to reinforce the idea of interruption, and the G, normally part of the harmonic movements, is in line with idea of the piece moving forward and evolving just as the E dissonance appeared over the G minor harmony in the previous section. This back-and-forth dialogue theme that was discussed between *trames* and impulse iterations exists on a vertical structure of tones within the piece as well.

Between 1'46'' and 2'14'' the G minor is once again firmly established, but the root G lies far in the background as an undertone to the main focus. The more prevalent tones of the 2^{nd} inversion play on the harmony between the D and G above it as well as the D and the Bb above it. A very strong and unmistakable root function G is finally inserted, in the very low end near the 2'15'' mark. At this point, the G minor harmony remains embedded in the background while the Electric Spring object sounds a low pitched distorted G and a Bell object adds confusion in the upper register, being a referential object without defined pitch. This section comes to an end with a big crescendo on a D note produced by the Horn object. This gesture is clear in the realm of the G minor, and its gradual crescendo to what is possibly one of the loudest moments in the piece, creates a sort of melodic half cadence, as the piece approaches the transition to Part 2.

From 3'43" to 4'08" the harmonic dialogue is given a rest to make way for a referential sound object section. The Birds, Rollercoaster and Bell all work together without any defined pitch transporting the listener, essentially toward a new location.

Fig. 2.4.3. Vertical and Harmonic Structure (4'08-5'51)



In fact, at 4'08" we are presented with an eerie sounding Horn and Water object combination with a dense frequency mass making it difficult do discern any specific harmony (fig.2.4.3.). There is, however, a tone that keeps returning in the mid-register. This note is a C# that confirms the eeriness and departure from G minor. As this section

continues and the Horn and Water objects increase in intensity, an undertone emerges in the low register. This low B natural is also outside of the G minor harmony. The mood change here creates anticipation. There is no sense of arrival to a new key, as much as there does exist a sense of having left the well-established G minor. This section functions as a transition toward the second half of the piece. This section climaxes with a slow crescendo of a harmonic of the Horn object sounding a B natural, reinforcing the sense of dissonance and contrast.

Again from 5'23" to 5'29" there is a break in the harmonic structures, just before launching into the second part of the composition. There is the explosive C at 5'29" we had seen earlier when transitioning in between sections, and here again it only lasts a for a moment and slides down to a B natural. This reinstates a notion of transformation and change at a point where the two main parts of the composition meet.

4.3. Vertical / Horizontal Spectrum in Part 2

The second part of the composition begins with more tones of B natural. From 5'31 to 5'46 we hear an isolated B natural with a G appearing above it for a second at 5'43. This brief moment of vertical harmony reminds us of the first part but it is quickly taken away and the piece goes into another brief section of non-harmonic material.

Fig. 2.4.4. Vertical and Harmonic Structure (5'54 – 9'50)



At the end of the non-harmonic section we hear a brief, high-pitched B natural (5'51). Over the course of the next 25 seconds or so, there is a slow layering of B natural tones increasing upwards in the frequency spectrum as time moves forward (fig.2.4.4.). At the 6'21 mark, the Pole object is heard and launches a harmonic of the Horn object, but the

note is a high A natural. It continues to hold over the B natural undertones up to about the 6'35 mark, when it is finally supported by upper G harmonics.

Through a very natural process the G minor harmonics start to take over in all areas of the spectrum. At 7'21 we hear a strengthening G in the mid register, followed by a mid-register Bb at 7'30, and the very low-end Pole object at 7'39 sounds the deep G. The high A (diatonically related to the B natural) that came in at 6'21 had remained very present, but now slowly becomes enveloped by the G minor. Finally between the 8'08 and 8'12 mark the A loses energy and gives way to the more present Bb tones in that area of the spectrum.

Over the next minute of the piece, the Ds of the G minor harmonic structure that has all but completely moved back into the foreground of the harmonic discussion become more present throughout the spectrum. The strong sense of perfect fourths and fifths between the multiple G and D combinations bring a strong sense of return to the original key. There is a strong sense of conclusion, and as the piece continues to evolve during the 9th minute we hear the overall energy of the high frequencies diminished, favoring the warm low frequencies that remind us of a cadence. However, by the 9'35 mark we are left with energy from the middle of the spectrum that favors the Bb and G. At this point we hear the harmonic of the Horn object sound a high Bb. This note is held out as the whole piece begins a slow and gradual fade out into silence. The strong 3rd degree of the minor chord structure leaves the listener with a less resolved sense that was present in the middle of the 9th minute. This gesture seems to be inline with what will be discussed in the section on cinema for the ear, where we will look at the symbolism of a train that hasn't quite stopped. The ending of the piece, on the minor third appearing as a dominant melodic structure, in a sense leaves the listener with an open-ended dialogue, which invites the discussion to live on in the listeners mind even once the piece has ended.



Section 5. Spatial Perception Analysis

5.1. Panning / Dynamics

The second line of the Listening score is a graphical representation of some of the more important gestures that dictate the overall movement within the stereophonic image in *Champs de fouilles*. Arrows show objects moving from either the left or right channel toward the respective opposite channel. Circles depict areas of high-energy objects (higher amplitude/volume), while triangles depict areas of lower energy objects. These symbols should be considered as being relative to each other rather than an absolute representation of the overall volume of the track. Finally, crescendo and decrescendo markings are used to show areas where the overall volume is either increasing or decreasing. Longer markings describe a slower crescendo or decrescendo while shorter markings describe more abrupt increases or decreases in volume.

The discussion of these techniques will be intertwined within the context of the next section (5.2.), where we will see how these gestures give life to the composition.

5.2. A Cinema for the Ear

A 'Cinema for the ear' is a phrase that has been used to describe acousmatic music, and proposed as an approach for analyzing this music with the same language used in the analysis of film.²⁰ Here, we will discuss the narrative in *Champs de fouilles* as a product of the technical steps that were used to create it. There is, very obviously, a narrative type of progression that ties all the sections of the composition together, but the narrative is not a succession of ideas that tell one particular story. Rather, it is a narrative that moves the listener through different stages and different scenes where personal reflections can be evoked as the listener experiences a unique connection to the sonic landscapes of the piece. A distinction of the narrative is that it aims to create a setting and environment and is intent on placing cues and hints without limiting itself to one singular story. This allows the listener to fill in a part of the narrative with personal experiences. Figures 2.5.1.

²⁰ This concept is the main focus in Normandeau, "...vers un cinéma pour l'oreille", *Circuit: musiques contemporaines*, vol. 4, n.1-2, 1993 p. 113-126vers

up to 2.5.5. inclusively are included throughout the text as a courtesy reference to the second line of the Listening Score.

At the beginning of the piece, the listener is immediately launched into a state of confusion due to the use of quick back and forth hard panning, between the left and right channels of impulsive objects in the very near foreground. The timing between the panning is reminiscent of eye motion, where one would be looking toward corners, trying to locate the source of an unknown object in an unknown environment. This first section of the piece combines unrecognizable elements with fragments of familiar sounding objects that appear and disappear too quickly or are too far in the mix to identify with any type of assertion.

Suspense is then added to the equation with the sudden disappearance of the intruding object and an overall drop in volume. At the beginning of section B (0'14) all is but silent, as a fragment of pulsating energy incites the listener to brace for the probable return of the intrusive object. Low and behold, at the 0'18 mark a powerful dynamic gesture unfolds rapidly switching from a moderate crescendo to a sudden swoop toward a high pressure burst announcing the premise, the dialogue and harmony with a pitched object revealed with a big amplitude. This introduction passage insists on immediately capturing the attention of the listener and establishes a sense of urgency in that it leaves the listener no choice but to question the environment and proposed dialogues.





Now in a moment of somewhat calm before the next explosion at the beginning of section C (0'29), we hear more of the somewhat recognizable sounds. These sounds relate to people and community: the choir and organ of a church. There are also upper

range pitches that are far enough removed from the warm mid-range tones at the heart of this section, adding to the divine or esoteric type of symbolism that is delivered here.

Alas, the peaceful mood does not last for long, for the quick back and forth pan sweep is used again at 0'29 to launch us back into a chaotic realm. It is interesting to note the contrast this section asserts when compared to the section that precedes it. In the preceding section, space is created vertically through the use of a spreading out over the frequency spectrum. In the current section that space is taken away with the combination of several compositional gestures. First, the general volume is louder, giving the impression of the objects being closer and thus the listener feels to be in a smaller room or space. Next, the objects move from right to left and back very quickly, also adding to the sense of a small room where a nervous or claustrophobic enigma pans quickly about in tight quarters. This same movement from left to right and back then works to achieve the opposite goal of widening the space as this section progresses by slowing down the rate of back and forth as well as overall density of independent objects in the vertical spectrum. In doing so, the explosive attack at 0'33 while similar to the previous gesture at 0'18 has less of an alarming effect due to its surrounding environment. This gesture at 0'33 does not aim to launch us into another section, rather it is reintroduced to indicate how the space has changed and the so called Rollercoaster objects now have more room in which to be developed. The listener finally comes to a comfortable distance both dynamically and temporally to identify with this train on rails reference. Suddenly, this smoothness invites us to ride this train. The gesture sweeps us into the next section and 'click,' (0'39) we arrive in the next trame, the next frame, the next scene.

At once, very similar sounds from the first Choir *trame* object make us feel like we have returned to a safe place, but the moderately fading volume of the section pushes us back quickly to the train ride that returns in the middle of section C (0'44). So, in fact the use of familiarity in synchronization with the decrescendo and crossfading back to the train works to transfer that sense of security into the otherwise more hostile realm. One could say this is a sort of fastening of our safety belt as we prepare to take a ride through the world presented to us in *Champs de fouilles*.

In the second half of section C (0'44 - 0'54), the once confusing and panic-stricken realm has been tamed, establishing a sense of trust with the listener. This node in the

composition really acts as a platform for the imagination to start wondering about in the mix of referential and abstract sounds. This sense of tameness is established by reducing the distance between the far left and far right channels. Objects that used to appear only in the left now appear left and slightly center, and objects that appeared only in the right now appear right and slightly center. There are also small objects that live solely within the center of the audio image. This type of panning work gives a sense of close proximity circling above the head of the listener, more accurately around the brain: provoking and eliciting thoughts from the mind.

When the *trame* returns in section D (0'54), it is led into by a much more gradual fadein. It evolves in no particular rush, evolving over the longest period of time so far in the composition. Harmonics of the object slowly take turns hovering around its core through the boosting and attenuating of certain areas of the frequency spectrum. The smoothness of these transitions within the harmonic spectrum works together with the overall gesture that has been intent on slowing down the general pace of the composition. Nearly ten seconds into this section, short Electric Spring objects are brought in with moderate but effective gestures of growing dynamics, taking turns appearing in either channel. Gradually, the time between each Electric Spring is reduced and leads up to the Flareshot. This gesture invokes the spirit of something being lit. The motion of the Flare-shots as well as the Electric Springs that led up to them leave the listener with a reference of an ignited fuse that blurs into the launch of the Flare-shots. All this motion accumulates and layers until we hear 'click' (1'21) and a powerful crescendo sweep launches whatever was triggered at the end of the burning fuse. The power with which the next section arrives with is nothing short of cannon artillery.

Section E (1'26-1'44) holds a wealth of symbolism and avenues for the imagination. First, as mentioned above, the allusion to the cannon is an identifiable token to any who have walked the streets of the old Québec City. The cannon of course embody the past, but may also be perceived as a tool of destruction. This section can also be perceived as a Jackhammer that has come to breakup the smooth street that had just been laid out by the previous *trame*. Thus, inflicting the notion of construction work and instantaneously we are transported toward the future, in modern day Québec City with the ongoing sounds of construction common to any big city in the world. This effect is in part created by the

loud sounds existing within a narrow aural panorama and using similar sounding objects in either channel of the mix. The time paradox between modern day and historic Québec is one that is also a reality of the present day city and can be viewed from yet one more angle within this section. If we can think of this pounding sensation to be a jackhammer, we could just as well imagine it to be the constant clamor of the spoon man, a street performer, busking on the corner of a busy street as he plays the traditional spoons against a leather covering over his leg, clapping the backs of two spoons against each other relentlessly with a cupped hand.

At the end of section E (1'45), a quick sweep from left to right of a pitched object slides us toward the next section. Here, keeping within the context of the ride that takes us through the piece, we are given a moment to catch our breath, so to speak. This feels like a moment to gather our thoughts, lying between two intense sections of intense up close action as far as the proximity of objects is concerned. The volume over the Choir *trame* gradually increases, reaching a peak and then decreasing at more or less the same rate before ramping up again to continue the figure two more times. The timing of these dynamic swells remind us of taking in breathes at a slightly slowed down pace as one might do when actively thinking about breathing. The overall reduction in volume and activity paired with the core of the sound brought back to the center also promotes the personification of this section. The sounds feel like an extension of the listener's body. So, we start to see another dialogue presenting itself as contrast between exterior elements and interior elements. The exterior here refers to nature or inanimate objects of the city and the latter to abstract objects that symbolize personal internalized thoughts.

To recap for a moment, there has been direct reference to rails, and the piece has already passed back and forth from moments of dense object verticality, aggressive panning and intense volume to central pan, moderate volume, low-density object sections several times. We have just had a moment to capture our thoughts, and it seems fitting to use the analogy of being on a rollercoaster and after a big drop or series of loops there is that brief moment of calm before the next series of twists and turns. Sure enough, at the beginning of section G (2'15) a Rollercoaster object sweeps from right to left and because the Choir *trame* is not removed from the mix (remaining in the center) we get the illusion of the rails moving beneath us; the ride continues.

Fig. 2.5.2. Panning and Dynamics (2'30-5'00)



At the beginning of section G between 2'14 and approximately 3'14 the Electric Spring object fades in rather quickly with a strong presence in volume. What is interesting here, besides the fact that the Choir object remains in the dialogue, is that the Electric Spring objects continue to pan from left to right but on this occasion, deliberately taking much more time to complete the journey from one side to the other, spending considerable time across the center of the image. In earlier sections, the objects were merely jumping from one side to the other, or being panned much too quickly for any time in the center to be observed. Instead here, we have the feeling of the exterior elements passing through the internal mass. This type of blending between two structures on opposite sides of the dialogue has been apparent in all angles of the analysis thus far. Eventually, the attention is transferred to the grand crescendo gesture that develops at the end of section G (from 3'14 to 3'41). Although there are individual objects that reside more on either side of the audio image, the gesture holds a centered focus, owning to the Horn object's high frequencies again bringing attention upwards, and the objects on either side carefully balanced as to never pull attention too much away from the center. The resulting effect, lead by the Horn object gradually becoming very intense, is comparable to a deer in the headlights, with the role of the deer played by the listener. The sound now focused in the center image directs and draws the attention of the listener. We become absorbed in the moment and can only brace for what is about to come.

The big crescendo peaks at the near threshold of the dynamic spectrum. All the sounds of the preceding section come to a halt (barring a brief reverberation tail), making way for a new color and texture to the aural image. The sound of birds by a riverbank is instantly recognizable but before long there is a surreal accumulation of sounds and we find that we are again being enveloped by a crescendo. It is interesting that a similar crescendo gesture appears in sequence but kept interesting by achieving a similar effect through an alternate technique. In the previous crescendo the effect is chiefly achieved by an increase in volume, whereas in the case of the birds, it is the pure accumulation of mass that attains a similar amplitude curve under the steady hand of the masterful composer. On the other hand, to the listener who is content to become absorbed by the direction of the piece, this section may feel like waves of distorted realities strung together not unlike a dreamlike sequence. The disorientation caused by the rapid succession of alternating realities is especially apparent in the brief segment at the end of section H between 4'01 and 4'08. The Bird accumulation comes to a halt as we hear a sound that emulates a broken glass scattering into countless little pieces. As a deep pitched hum swells, the railway bell fades in, a warped Rollercoaster emerges briefly and a final wave of water complete this rapid succession that echoes a cinematic montage that uses quick cuts of sparsely related elements to indicate a dream or flashback type of narrative.

In the first half of section I, between 4'10 and approximately 5'20, there is a continuous reverb tail resembling the Horn object, which is sustained in a way that transcends the natural laws of physics. It at once carries colors of the Horn object but the Horn object itself seems absent and this is purely a sustained reverberation held in such a way that it forms an object of its own. This referential quality of the Horn blended with the surreal quality of the sustained reverb becomes the conductive thread that serves as the guide though this section. The omnipresent reverb widens the depth of the aural image that is otherwise focused-in toward the center. Other smaller objects take turns hovering around this center, switching between the near left or near right. These near pans recall the headspace gestures from before and instill a pensive state once again. These small objects have awkward textures and attack envelopes. They could possibly be reversed audio reconstructions of their original sources, setting the stage for a recapitulative scene in the composition. We hear brief and background references to the Bell object as well as the Bird object amongst others. A notion of the past moves in like a dense fog seeping into the city, in the dark before dawn has broken the horizon. All the while being nudged forward by a slow and gradual increase in the general dynamic of the section. By 5'15 we hear two successive Flare-Shot objects followed by a muffled Switch object. This propels the crescendo gesture to the front stage as it quickly begins to swell in mass density and
amplitude. The Switch object which sounds more like a the second hand ticking on a clock, in this new morphological materialization of the object, brings along with it a connotation of time. This reference to time, following the Flare-Shots that zoom across the aural panorama, echoes a leap through time from the past toward the present. Here the volume ramps up and a Rollercoaster object sends us to the next section where the reverb tail has finally disappeared from the mix.

Fig. 2.5.3. Panning and Dynamics (5'00-6'00)



In sections J, K and L (5'21-5'53) we pass through two segments of rapid hard-panned and alternating objects (sect. J and L) with a balanced central section (K) between the two. The first of the two aggressive sections is a little more spread out than the second as far as the space between each quick pan gesture. It then leads into the following section with an explosive C note gesture as we have seen earlier, and a similar glass breaking sound also follows it. Now, essentially at the mid point of the composition we hear small but quick pans of objects around the central Choir object and a slight crescendo that pushes toward the second aggressive section. The Flare-shots fire, and we expect the chaos to ensue but there is a deliberate extra moment where we find ourselves deceived by this gesture that we have come to recognize. The composer uses this to keep the excitement in the development and takes advantage of this to keep the surprises and transitions fresh. Just that one extra moment elapses but before waiting too long and risk losing the power of the surprise anti-event, he finally brings in the second chaotic section. Here, the very quickly moving Rollercoaster objects at the same time can feel like another time warp as well as another bumpy section of the ride with quick twists and turns, eventually concluding with a high pitched Horn harmonic. A quick ramp in the volume at the attack of this formed object, followed by the widening shape created at the end by an echoinglike short reverberation create an effect similar to a sword being pulled from its sheath. It prepares us for the last scene of the composition.

Almost as an after thought to the previous section, just as the long final *trame* begins, there are Rollercoaster objects that are swiped once more from channel to channel but at a less intense volume. These are followed by Flare-shots that also run across the aural panorama but do not appear to launch anything as they normally do. Instead, they seem to announce the end of the chaotic sections.



Fig. 2.5.4. Panning and Dynamics (6'00-8'00)

By the beginning of section M, around the 6'01 mark we begin to become immersed in the *trame* that creates a wide space through reverberation and occupying selective areas of the frequency spectrum. A comfortable gap is always maintained between the high and middle register to help create a sense of vertical space. This applies to the low frequency register as well, always appearing well below the middle so as to widen the gap without getting muddled in the same frequencies. Over the next few seconds this is contrasted by dry (non-reverberated) objects that move from side to side, putting emphasis on the distance and space between themselves and the widening *trame* in the background. By 6'10 the *trame* begins to increase its volume by the addition in layers of harmonics. Objects continue to move sparingly from side to side, spread out with enough distance between each event that they don't disrupt the *trame*, rather they keep the listener aware and actively following the progression of the piece.

Around the 7'20 mark this section really starts to pick up in terms of vertical density as well as the overall volume of all the elements. In this part the crescendo is intense while remaining unrushed as far as attaining any peak or climax. The use of long held distinguishable pitches bring a continuous sense of cadenza. The *trame* achieves its

widest stretch over the frequency spectrum by 7'43. Flare-shots and Rollercoster objects continue to move across back and from channel to channel before they subside completely by the 8'50 mark. Amid the big swell of the *trame* they remind us of fireworks that race across the sky of a festive night, but there is never any explosion. The composition seems intent on leaving the listener waiting for more, listening for more.

Fig. 2.5.5. Panning and Dynamics (8'00-10'36)



At around 9'07 we hear the Horn object begin to emerge and then again at 9'22 and 9'41 we hear a very high-pitched squeaking very much like a breaking train. The high squeak comes back again even at 10'18 without ever really arriving, or to put it in other words, the train never really appears to stop. We can see this as a metaphor to the present day in a state of perpetual arrival. We never really arrive at our destination, instead we are invited to continue making connections to our life and the life around us even after the piece has concluded. This idea ties in perfectly with the very slow and gradual fade out that takes over 30 seconds before completely extinguishing into silence. This type of effect, allows other outside sound sources that may be present in the area where one would be listening to the piece, to interact with the aural image created by the composition. As the volume of the track becomes less audible, the listener is inclined to mix in other audible sounds of the environment, especially after having spent the past ten minutes in a state of active listening.

Bédard's piece demonstrates an execution of form and compositional control that serves to launch the listener into a world that allows for the imagination to roam freely. The very solid structure that makes up the piece incites the quite opposite notion of unbound and open-ended thought.

Conclusion

Bédard's piece *Champs de fouilles* tells an open-ended narrative about a distinct region in the world and the society that inhabits it. The piece is structurally sound and complete, but the narrative invites the listener to question one's surrounding society and culture, essentially provoking a lasting impression and reflection even after its conclusion. Bédard's cinematographic approach to an acousmatic composition proves very efficient and effective in creating a veritable cinema for the ear.

The use of dialogues existing throughout several layers of the composition is an important theme in the piece. At the structural level, a back and forth motion between sound objects of opposing nature (*trames* and iterative impulses) establish the pillars of the sonic world that Bédard invites us to explore. The objects themselves imply the narrative through a mix of referential and non-referential sounds that guide a symbolically driven expose about the duality of Québec City's past and present.

Bédard's balanced distribution of pitched and non-pitched objects allow the composition to progress through a series of storyboard-like frames that essentially transport the listener to different settings and scenarios within the composition. Furthermore, the choice of tonality and harmonic structures establishes a distinctive mood that evokes a sense of curiosity and calculation about the symbolism embedded in the composition.

Finally, the positioning of objects within the aural image successfully creates alternating spatial perceptions of intensity and vastness within the narrative. Bédard's use of dynamics and panning reinforces the dialogues, which take place not only within the structure, but also between the elements and among the harmonic and melodic sections.

Champs de fouilles merits its place among the pieces that are representative of the unique Québec acousmatic experience.



결론

마틴 베다르의 작품 <샹 드 후이>는 퀘벡이라는 제한된 지역과 그 사회에서의 삶에 대한 묘사를 보여 주고 있다. 이 작품은 구조적으로는 전통적인 형식을 취하고 있지만, 음악적인 내용에서는 주변 사회와 문화에 대한 비판적인 시각을 드러내고 있다. 작곡가 베다르가 영화를 제작할 때와 같은 방법으로 작곡한 아쿠스마틱한 접근법은 마치 영화를 청각으로 듣는 효과적인 방법을 이 작품에서 보여주었다.

이 작품의 중요한 주제는 작곡된 여러 개의 층이나 구간이 대화형식으로 사용되어 나타나는 것이다. 베다르의 작품에서는 움직이는 소리의 이미지가 상반되는 유형의 사운드 오브젝트 사이에서 음고를 형성하게 하여 점차적으로 음으로 인식을 바뀌게 하며, 사운드 오브젝트를 통해 퀘벡시의 과거와 현재의 이중성이 상징적으로 표현되도록 하였다.

베다르의 음고가 있는 오브젝트와 음고가 없는 오브젝트의 균형적인 분배는 연속되는 줄거리를 가진 음악적 시나리오를 전달해줄 뿐만 아니라, 선율과 화성의 구조는 상징성을 가진 독특한 음악적인 분위기를 만들어 내고 있다.

청각적인 이미지에서의 위치 조절은 광대한 공간 인식을 만들어 냈으며, 강약과 패닝등 기술적인 접근은 오브젝트 간의 화성적인 영역과 선율적인 영역의 긴밀한 연계를 강조하는데 사용되고 있다.

마틴 베다르의 작품 <샹 드 후이>는 독특한 퀘벡 아쿠스마틱 테이프 음악의 대표적인 작품 중 하나이며, 본 논문은 이 작품을 한국에 처음 소개하고 분석하는데 그 의의를 찾고자 한다.

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국문요지

본 논문은 마틴 베다르의 아쿠스마틱 테이프 작품 <샹 드 후이>에 대한 분석과 청각에 의해 재구성된 악보로 구성되어 있다. 본 분석에서는 작품의 '청각에 의해 재구성된 악보'를 직접 제작하여 창조하였다. 본 논문에서는 분성의 범위와 관점을 구조의 분석, 주파수의 분석, 공간의 견해에 대한 분석 이렇게 3 부분으로 구분하여 살펴보았다.

본 분석에서는 이 작품의 구조가 뚜렷한 형식이 존재함을 알 수 있었고, 서로 서로 비슷한 사운드 오브젝트를 분류하고, 다른 사운드 오브젝트 그룹을 병렬로 분류하여 구조를 다시 섹션으로 나누어 접근하였다. 이 작품에는 다수의 음고를 가진 사운드 오브젝트의 화성적인 역할과 선율적인 역할을 분석하였다. 본 논문에서는 음악분석 방법에 의해 화성적인 분석과 선율적인 분석으로 연구하였다.

본 분석 연구는 사용된 사운드 오브젝트 선택의 결과로부터 만들어진 서술적 제시에 관한 주제적 논의를 보여주고 있는데, 작품의 청각적 이미지와 청각적 장면에서의 위치를 조정하는 음악적 다이내믹과 패닝 제스춰들의 배치에 관하여 설명하고 있다. 아쿠스마틱 작품을 위하여 영화영상 제작 과정을 응용한 베다르의 접근은 청각의 즐거움을 위한 한편의 영화 같은 경험을 성공적으로 만들고 있다.









Declaration of Ethical Conduct in Research			
I, as a graduate student of Hanyang University, hereby declare that I have abided by the following Code of Research Ethics while writing this dissertation thesis, during my degree program.			
"First, I have strived to be honest in my conduct, to produce valid and reliable research conforming with the guidance of my thesis supervisor, and I affirm that my thesis contains honest, fair and reasonable conclusions based on my own careful research under the guidance of my thesis supervisor.			
Second, I have not committed any acts that may discredit or damage the credibility of my research. These include, but are not limited to : falsification, distortion of research findings or plagiarism.			
Third, I need to go through with Coppykiller Program(Internet- based Plagiarism-prevention service) before submitting a thesis."			
	JUNE	02, 2015	
Degree :	Master		
Department :	DEPARTMENT OF MUSIC		
Thesis Supervisor :	Richard Dudas		Carl Guil
Name :	Gentile Carlo		(Signature)





Appendix

Listening Score for Champs de fouilles - Martin Bédard

The Listening Score for <Champs de fouilles – Martin Bédard> found in the appendix of this thesis was created for the purpose of this thesis in 2015 by the author Carlo Gentile.





















