

From Timbre to Space: Differences in Approach and Treatment of Source Material in Electro-acoustic Composition.

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Contents of portfolio:

- Commentary on pieces (including resource list).
- DVD containing multi-channel audio files for *Ghost Detective* and *Missing*, and photos illustrating speaker setup.
- Audio CD containing stereo pieces:

Track 1: *Bass Drum*

Track 2: *Java Gong*

Track 3: *Gong Gedé*

Research Aims:

The focus of my research has been to assess how the nature and characteristics of source material can affect how it is treated, with creative exploration of concepts such as “spectro-morphology”¹, “soundscape composition”², creating a diverse sound world from a single short sample, and the balance of processed and unprocessed audio in a composition. The variety of processing techniques I have used include effects to alter the timbral characteristics of the source material, such as the distorting and filtering of samples, and time stretching and multi-channel presentation to add a another dimension to the audio.

The choice of source material has a direct impact on how it can be treated. For example, it is possible, as I have shown with *Java Gong*, *Bass Drum* and *Gong Gedé*, to create coherently structured, spectrally and texturally diverse compositions from a single, short sample for each piece. In the case of a large amount of initial recordings, using The World Soundscape Project’s *Soundscape Vancouver*³ as an example, the composer must decide the extent to which (if at all) the audio is processed. Composers such as Hildegard Westerkamp present soundscapes in their natural, unprocessed state in order to battle with issues such as “the study of the inter-relationship between sound, nature, and society”⁴. My compositional approach differs in that for *Ghost Detective*, *Java Gong*, *Gong Gedé* and *Bass Drum*, I used my source material as merely a starting point on

¹ Denis Smalley: *Spectro-morphology and Structuring Processes*, ‘The Language of Electroacoustic Music’, p61.

² Using Hildegard Westerkamp’s definition of a soundscape composition: ‘Organised Sound’, *Linking Soundscape Composition and Acoustic Ecology*, 7/1

³ Barry Truax, 1996.

⁴ Hildegard Westerkamp: ‘Organised Sound’, *Linking Soundscape Composition and Acoustic Ecology* 7/1

which to build a sound world that complements the source audio, reflecting and elaborating – in the aesthetic outcome – on its sonic characteristics and context whilst illustrating the different possible levels of balance between processed and unprocessed audio. The one exception, however, and the only electroacoustic work I have ever composed without using any significant processing or effects, is *Missing*. I will explain why there is no processing in this work later.

How the choice of source audio affects the choice of processing and aesthetic outcome of a work was another significant question I sought to address. In the case of my three stereo works, this question related to differences between a piece which has as its source material a non-pitched sample (*Bass Drum* and *Java Gong*), and one with pitch associations such as the deepest gong of the Gamelan family, a ‘Gong Gedé’. With the two multi-channel works, *Ghost Detective* and *Missing*, it was more a question of how the context of the source audio affected the processing and the intended aesthetic.

The balance between the unprocessed and processed audio in an electroacoustic composition is a key decision to be made by the composer. The possibilities can be represented as a continuum from a presentation of unprocessed field recordings such as Hildegard Westerkamp’s *Talking Rain* (1997) to a piece in which the source audio is masked behind a highly processed sound world; Natasha Barrett’s *Migration* is an example. With this portfolio of compositions, I sought to investigate these diverse approaches to source material and aesthetic possibilities, and to organise my compositional findings within the structured framework of this continuum (see figure 1).

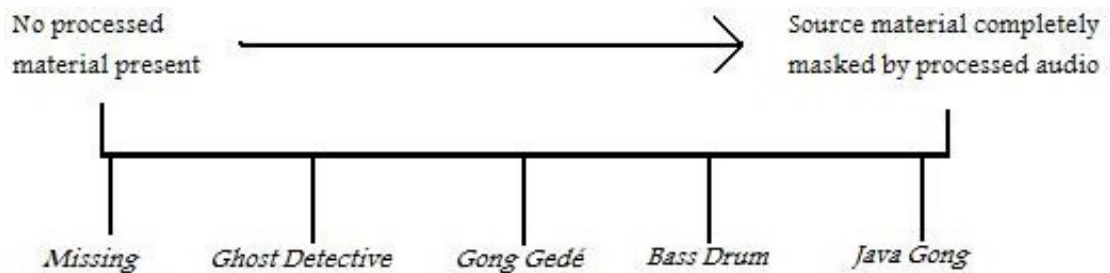


Fig. 1: The clean/processed audio balance continuum

On one end lies *Missing*, in which I present the source material in its completely unprocessed state in order to highlight the gravity and seriousness of the subject of missing people. Because it contains some of the ‘clean’ source audio spatially separated from the processed material, *Ghost Detective* would be next along in the spectrum, with *Gong Gedé* and *Bass Drum* following. *Java Gong* illustrates the other end of the continuum, because the source material does not appear unprocessed throughout the piece.

I had initially set out to investigate extremes in source audio length, with two or three pieces focusing on different approaches to a single sample of only a few seconds long per piece, and a similar number of works assessing the compositional possibilities of starting with extremely long audio files or a large collection of smaller samples. However, the realisation that the concept of audio quantity is limited to the boundaries of time and potentially subject to endless scrutiny (time being a concept with no absolute highest or lowest value) led the focus of my research to be less on the quantity of source material and more on how the sonic characteristics of source audio affect how it can be treated.

Another of my research questions was to investigate whether one small

sample of audio could be the only source material for an electro-acoustic work. This concept manifested itself in my three stereo works *Bass Drum* (2008/2009), *Java Gong* (2008/2009) and *Gong Gedé* (2009). Many electro-acoustic composers, such as Richard Chartier, Taylor Deupree and their fellow artists on *12K* and *LINE*, including Solo Andata and Lawrence English, deal with minimalist techniques and aesthetics, and it could be argued that my use of a very minimal amount of source material and sparse sound structures includes me in this school of composition. However, for *Bass Drum* and *Java Gong* I sought to partly restrict my minimalist approach by focusing less on a minimalist aesthetic (using sparse or minimal textures) and more on a minimalist technique (using a minimal amount of source material). I do not intend to get too involved in defining minimalism in the same way that Timothy A Johnson does in his article ‘Minimalism: Aesthetic, Style or Technique?’, but it is useful to use terms such as minimal and minimalist in describing certain techniques and aesthetic approaches I have chosen to incorporate in *Bass Drum*, *Java Gong* and *Gong Gedé*. It can be argued that because in these three pieces I have used a minimal amount of source material – a single hit of a bass drum, non-pitched gong and pitched gong respectively – to create varied and detailed sound worlds, I have used a minimalist technique. This is supported by the first part of Glenn Watkins’ description of minimalism as “a general reduction of materials and emphasis on repetitive schemes and stasis”⁵. Johnson elaborates by saying that as a result of Watkins’ description, “the term could be employed on a broader basis to describe certain features that compositions include, even if they incorporate

⁵ Glenn Watkins, *Soundings: Music in the Twentieth Century* (New York: Schirmer, 1988; London: Collier Macmillan, 1988), 572-80; also quoted in Johnson, ‘Minimalism: Aesthetic, Style or Technique?’, *The Musical Quarterly*, Vol. 78, No. 4 (Winter, 1994), 750.

other compositional aspects as well”⁶. To apply this to my work, the “general reduction of materials” that Watkins talks about is my choice of single samples for the source material, and one of the “other compositional aspects” that Johnson mentions is the fact that I have developed the source audio into a diverse sound world in each piece.

Taylor Deupree uses the term ‘minimalism’ very freely with regards to his own musical aesthetic, in writings such as his artist profile on the *12K* website: “I like minimalism because I love the purity of objects, design and form . . . I appreciate a sparse aesthetic”⁷. Here, he is defining minimalism as an aesthetic and he does not mention a particular focus on using a minimal amount of source material, showing no concern for minimalism as a technique as I would describe it.

Johnson describes how in a minimalist aesthetic “the activity of listening... is downscaled substantially, and very slight changes in rhythm, texture, or harmony become the main events in a piece”⁸. Within the context of electro-acoustic music, particularly “spectro-morphological”⁹ compositions, the concepts of rhythm and harmony can be replaced with Smalley’s “attack - effluvium” and “pitch - effluvium” continua¹⁰, while the concept of texture is transferable between the Western Classical Music tradition and spectro-morphology. I will go into detail about how my compositional approach is akin to “spectro-morphology” and the extent to which I have used a minimalist aesthetic and technique in my analysis of each work in the portfolio.

⁶ Johnson, 1994, 750.

⁷ Taylor Deupree, <http://www.12k.com/deupreeableton.html>.

⁸ Johnson, 1994, 744.

⁹ Denis Smalley: *Spectro-morphology and Structuring Processes*, ‘The Language of Electroacoustic Music’, p61.

I have experimented with the concept of “soundscape composition” in *Ghost Detective*. Hildegard Westerkamp points out in her article *Linking Soundscape Composition and Acoustic Ecology* that “soundscape composition” eludes definition and that “no-one really seems to know what is meant by it, myself included”¹¹. However, later in the article she delineates it as the “artistic, sonic transmission of meanings about place, time, environment and listening perception”¹². I will address the issue of why *Ghost Detective* is a soundscape composition in the research analysis for the piece. If I am to assess the extent to which *Ghost Detective* is a soundscape composition, it is necessary to give an example of an existing recognised soundscape work. The World Soundscape Project’s *Pacific Fanfare* (1996) is such an example, as it documents the city of Vancouver’s changing soundscape through ten ‘soundmarks’ recorded between the early 1970s and the 1990s using digital resonating and time stretching effects. The use of effects such as time stretching allows for the processed sound to sit next to the source material in the mix, and Barry Truax uses this effect to enhance the source material and let it “resonate in our own memories”¹³.

The WSP’s use of multi-channel presentation of soundscape compositions through an eight-speaker, or ‘octophonic’, setup has helped recreate a more precise and enveloping listening environment for the listener, “given the immersive effect it creates”¹⁴.

¹⁰ Denis Smalley, 1986, 67 and 72.

¹¹ Hildegard Westerkamp: *Linking ‘Soundscape Composition and Acoustic Ecology’*, *Organised Sound*, Volume 7, Number 1, 2002. Reprinted on Hildegard Westerkamp’s Simon Fraser University mini-site, <http://www.sfu.ca/~westerka/writings%20page/articles%20pages/linking.html>.

¹² Westerkamp, 2002.

¹³ Barry Truax, www.sfu.ca/~truax/fanfare.html

¹⁴ Truax, *Soundscape Composition*, <http://www.sfu.ca/~truax/scomp.html>

Diversity from Simplicity: *Bass Drum, Java Gong and Gong Gedé.*

Bass Drum:

Using Denis Smalley’s explanation of “spectral typology”¹⁵, the source material for *Bass Drum* can be placed on the ‘noise’ end of the note to noise continuum because “the density of [the bass drum’s] noise spectrum is so compressed that it is impossible to hear any internal pitch structure”¹⁶. Therefore, if the sound of a bass drum hit is categorised as noise, it stands to reason that the application and development of such a sample in a composition involves dealing with the “effluvium” end of Smalley’s “pitch - effluvium continuum”¹⁷ as far as the aesthetic of the piece is concerned. However, in order to provide some aesthetic diversity and aid the structuring of *Bass Drum*, I used the “octave mixer” in a piece of time-stretching software (Paul’s Extreme Sound Stretch) to create some simple pitch-based material to act as a middle section and exaggerate the impact of the noise-based textures of the first and third sections by process of chronological juxtaposition. However, I felt that by having elements of the first section disintegrate into the sparse textures of the middle section it was easier to demonstrate structural cohesion than had the middle section began more abruptly. The brief space between the middle and last sections was aimed to increase the impact of the bass drum’s attack, which starts the final section.

As I have established, the main aesthetic focus of this work is on effluvial textures because of the nature of the source material. I achieved a variety of

¹⁵ Smalley, 1986, p.65

¹⁶ Smalley, 1986, p.67

sound structures using processing such as the distortion and filtering of looped repetitions, interrupted by the unprocessed bass drum sample in the first and last sections. The contrasting middle section contains time stretched and pitch shifted textures created from reversed loops of the source audio. I created a spectrally diverse sound world with extensive use of graphic filtering to highlight different frequency ranges, from the distorted bass drones of the first and third section to the focus on higher and middle frequencies in the middle section.

The balance between processed and unprocessed material in *Bass Drum* is heavily weighted towards processed textures. This is partly because the source sample is very short, resulting in sonic and textural diversity occurring only when more focus is given to processed sounds. The reason the source audio appears in its unprocessed state at all is that the sharp attack of the sample is ideal to initiate and truncate the distorted and filtered textures in the first and third sections, ameliorating the intended rhythmic and precise nature of these sections. Returning to Denis Smalley's analysis of spectro-morphology, the bass drum sample can be described using the "closed attack-decay" morphological archetype¹⁸. This is to some extent reflected in the aesthetic outcome of the piece, with the sharp changes in texture of the first and third sections representing the emphasis on the attack of the sample's morphology.

Java Gong:

Using Smalley's "morphological archetypes"¹⁹, the sample used in this piece can be described as "open attack-decay". This is because "the ear is drawn away

¹⁷ Smalley, 1986, p.67

¹⁸ Smalley, 1986, p.69

from the formative influence of the attack into the continuing behaviour of the sound on its way to termination”²⁰. In terms of “spectral typology”²¹, the strike of a Java Gong illustrates its characteristics as a “nodal spectrum”²² and therefore lies towards the “noise” end of Smalley’s note to noise continuum. However, despite its lack of immediately coherent pitch components, once amplified and put through processing such as time stretching it is possible to hear some degree of harmonic and inharmonic²³ pitch structure, resulting in it being placed somewhere in the middle rather than the “noise” end of the spectrum. One of the consequences of the presence of a certain amount of harmonic and inharmonic components, evident after processing, was more possibilities being available to create pitch-based textures than in *Bass Drum*, whose source material had more effluvial characteristics and no internal pitch structure.

The morphological and spectral characteristics of the source material affected my choice of processing and aesthetic intention partly by encouraging a ‘two pronged’ approach with regard to the spectral qualities of the sound structures I used. The inclusion of distortion and delay was intended to elucidate the nodal characteristics and exaggerate them to create effluvial textures. Time stretching, on the other hand, was an effect I used to highlight the pitch-based characteristics of the source material. I combined these effects with processing that is evident in all four pieces in which I use timbral effects, such as the looping and time compression of a sample. This concept of using effects to

¹⁹ Smalley, 1986, p.69

²⁰ Smalley, 1986, p.69

²¹ Smalley, 1986, p.65

²² Smalley, 1986, p.67

²³ Smalley describes inharmonic spectra as “the behaviour of, for example, many metallic sounds whose spectral components are generally unrelated to the harmonic series... simple inharmonic spectra may be interpreted as close relations of harmonic spectra; more complex examples may include harmonic and inharmonic intervals alongside nodal densities which defy definition.” He goes on to say that “inharmonic spectra are ambiguously multi-dimensional.”

create pitch out of noise based textures and vice versa is one that I have experimented with in this piece as well as *Bass Drum* and to a certain extent in *Gong Gedé*.

In terms of the balance between processed and unprocessed audio in *Java Gong*, the emphasis is most definitely on the processed material. The least amount of processing is when the momentum of the piece is broken by two occurrences of the source sample with graphic filtering and reverb added. There is no point throughout this piece where the source material is heard unprocessed, which is one of the factors that separates it from the other pieces in the portfolio. This shows one of the source material treatment possibilities: it is sometimes effective to omit the unprocessed audio from the composition, abstracting it and severing preconceived associations and meaning of the source material.

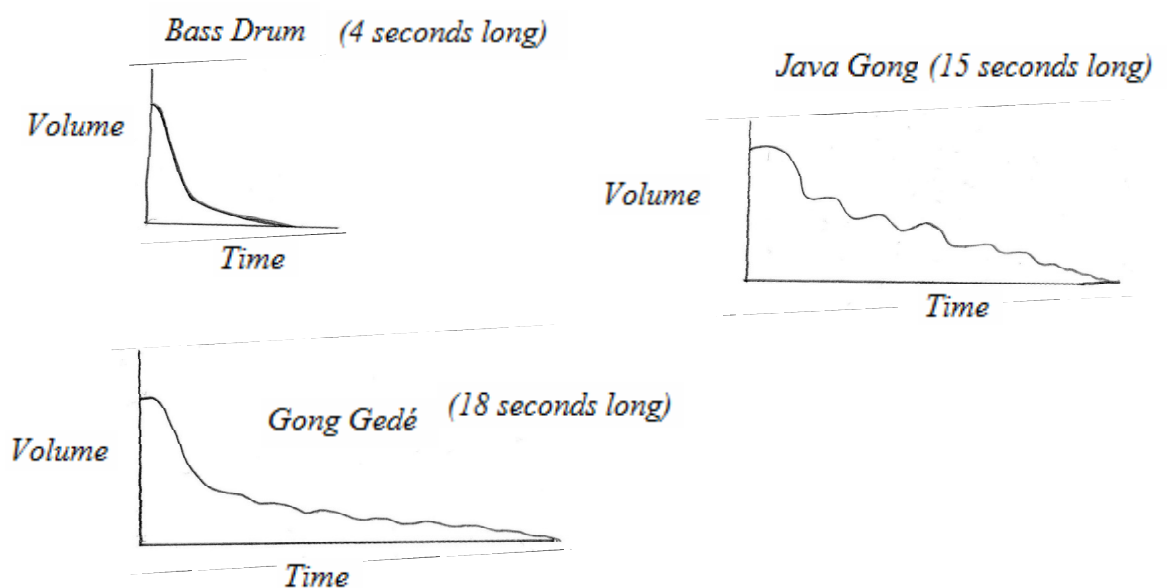
Structurally, this piece differs greatly from *Bass Drum* in that the different sections merge more fluidly into each other, with textures being introduced gradually and any even slightly abrupt changes being softened by the morphological characteristics of the source material. Comparing the Java Gong with a Bass Drum, the former has less emphasis on the attack and more on the continuation of the decay than the Bass Drum, whose 'thump'-like attack is followed by a rapid decay. The morphological characteristics of the Java Gong therefore lend themselves to the analysis of the decay through the creation of textures and more fluid structural changes than the abruptness of the Bass Drum.

Gong Gedé:

The main reason why I chose a strike of a pitched gong as the source material for this work is the huge variety of harmonics that this particular gong, the deepest in

pitch of the Gamelan family, can produce. The sample that I used as the source material for this piece can be described as an open attack-decay morphological archetype²⁴, and has similar morphological properties to the sample in *Java Gong*. However, the Gong Gedé produces a more sustained sound than the Java Gong, giving more focus to the sonic characteristics of the decay. The expansive, smooth textures and structural changes can be attributed to the morphological characteristics of the source material, in a way similar to *Java Gong*. However, because the attack element of this pitched gong sample is even softer than that of the Java Gong, there is a corresponding increase in focus on the development of the spectral elements of the decay in this piece.

Figure 2: Approximate morphological characteristics of source material.



During the recording process I had to make a decision about the attack type I wanted and therefore what type of mallet to use and where on the gong to strike. After collating approximately fifty samples using three different mallets

²⁴ Smalley, 1986, p.69

and a variety of points of contact, I decided to use three samples at different volumes to create a balance of clear attack but one that did not intrude on the decay, and a decay that had a sufficient spectral balance. One of the key elements of the sample that affected the aesthetic outcome and processing used was the diversity of harmonics in the decay. Having this variety of harmonics in the source material resulted in only simple processing - filtering, time stretching and reversing - being required to create such a diverse sound world.

Gong Gedé demonstrates my interest in a minimalist aesthetic and a keenness to promote focused listening, which is similar to Taylor Deupree's appreciation of a "sparse aesthetic"²⁵. The fact that the first sound of this piece, a faint swell of a reversed and filtered gong sample, is preceded by approximately ten seconds of silence, sets out the intended aesthetic. This is reinforced by a distant loop of high frequency harmonics, gradually increasing in volume, which is intended to draw the ear in and introduce it to the focused listening technique that is required for this piece of music.

Multi-channel Works:

Ghost Detective:

For *Ghost Detective*, I chose as my source material a recording - lasting approximately one hour and 15 minutes - of a tourist attraction in York called “The Ghost Detective”, which is a guided tour interspersed with stories of the paranormal relating to different parts of the city. During the recording process I decided to capture not only the stories and musings of the tour guide, but also the reaction of the group that was following him, and all the ambient sounds that were encountered, such as car noises and the hustle and bustle of the general public on a busy Saturday evening.

One of the effects this material had on my choice of processing was to encourage the use of a variety of reverb settings, to reflect the diversity of acoustics which the tour guide utilised on the walk, including narrow alleyways, open streets and courtyards. In order to enhance the mysterious and sombre atmosphere that is created by the content of the final ghost story of the piece, I used a technique of placing filtered, time stretched material alongside the unprocessed source audio.

A key issue to be considered in composing *Ghost Detective* was the balance between the unprocessed source audio and the processed material. I decided to use four of the ‘location specific’ stories (as opposed to the tour guide’s occasional witticisms and musings between locations), separated by sections focusing on the processed textures. The processed sound occurs constantly throughout the piece in order to provide additional sonic context for

the source audio and also to achieve independent aesthetic goals, such as to introduce the source material. For example, approximately two minutes 20 seconds into the piece, the source material (the tour guide saying “It is said to be very, very haunted”) is immediately preceded by a time stretched and reversed version.

In order to allow for both to be heard together without creating an excessively dense sound world, I decided to spatially separate them by presenting the ‘clean’ source material in stereo and flanking it with two speakers playing the processed sound textures.

The ways in which the World Soundscape Project treated source material in *Pacific Fanfare* (1996) have informed some of my compositional approaches in *Ghost Detective*. With this piece, I sought to investigate the aesthetic possibilities of a marriage between processed material and the original, ‘clean’ source audio, while presenting the work through four speakers set up so the stereo ‘clean’ source audio is flanked by a stereo mix of the processed material.

In order to assess the extent to which *Ghost Detective* fits in with the idea of a soundscape composition I will examine it in terms of Hildegard Westerkamp’s definition of a soundscape composition as the “artistic, sonic transmission of meanings about place, time, environment and listening perception”²⁶. In recording the source material I used a stereo microphone to provide the freedom to capture an accurate audio image of the “Ghost Detective” experience rather than a directional single channel microphone that could have been held by the tour guide. This illustrates my intention not only to focus on the verbal content of the tour but also to include the sonic context in which the ghost

²⁶ Westerkamp, 2002.

stories were told.

Missing:

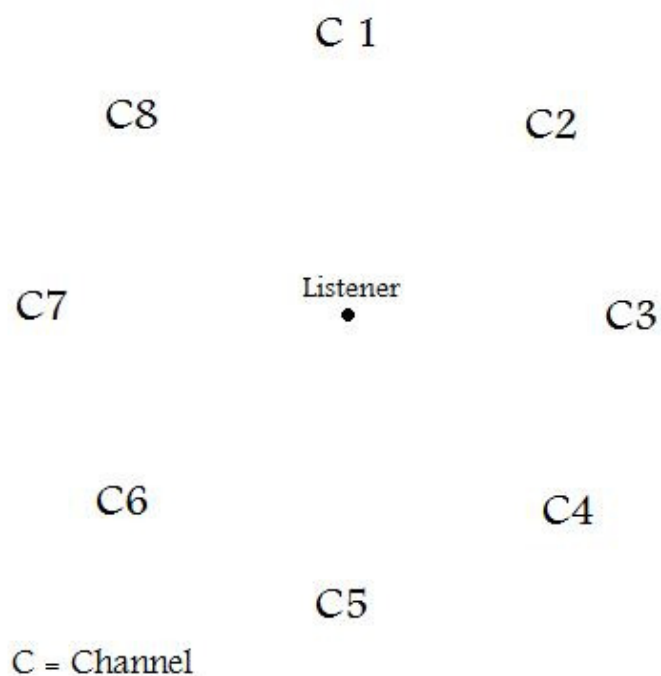
The way in which this piece demonstrates research into treatment of source audio is that it clearly shows that the choice of source material directly affects how it is treated. It is not always necessary to use detailed processing to illustrate the versatility of recorded sound; in fact, in cases such as this, it can be argued that it is detrimental. The fact that the only processing evident in this piece is minor volume adjustments and spatialisation places it on the 'clean' end of the continuum representing the balance between processed and unprocessed audio.

The concept of this piece was to illustrate the vast number of people who are reported missing in the UK by recording spoken descriptions posted on the website belonging to the charity "Missing People". I chose to use a wide variety of voice types, including different accents, vocal ranges, and both male and female voices to represent the diversity of backgrounds that missing people originate from. In order to maintain clarity of the source material for this piece, I chose not to put it through any processing except to present it in a multi-channel sound field. This proved effective in communicating the gravity of the subject because had I used the complex processing and effects that are evident in my other four works, it would have detracted from the solemnity of the issue of missing people. One of my intentions for this piece was to give a voice to each missing person described, and had there been processing and effects present, the clarity of this voice would have decreased.

As I have established, the only processing I used for this piece was to present the material in a multi-channel setup in order to create an environment in

which the listener feels surrounded by a barrage of accounts of missing people. Barry Truax's work with multi-channel presentation using the World Soundscape Project's "octophonic" setup led him to the conclusion that "8 channels of discrete source material creates a convincing soundscape where component sounds can be localized in the manner experienced in acoustic environments"²⁷. With regards to *Missing*, the "acoustic environment" I intended to create was one in which the listener is surrounded by people voicing accounts of missing people. My initial trials with an eight speaker system (see fig. 3) resulted in the conclusion that it would be more effective to use fewer channels so as to increase the sense of density that I had intended to create in this work. I therefore decided to use the same speaker setup as *Ghost Detective*, but with four mono channels rather than two stereo, to maintain some measure of density but still be able to hear the detail in the source audio.

Fig. 3: Discarded 8 channel setup for *Missing*.



²⁷ Truax, *Soundscape Composition*, <http://www.sfu.ca/~truax/scomp.html>

Conclusion:

Through these five pieces, I have investigated and utilised approaches to source material including the evaluation of how the choice of source material affects the processing used and the balance between processed and unprocessed audio in the context of a musical composition. To this end, I have placed the five pieces on a spectrum (fig. 1), providing continuity between the works. *Bass Drum*, *Java Gong*, and *Gong Gedé* demonstrate the possibilities of developing a detailed and coherent sound world out of a single short sample of audio and explore the effectiveness of using the unprocessed source material along side the textures that are the result of processing the sample. *Ghost detective* not only explores this same question of balance, but investigates the meaning of a “soundscape composition” and combines Westerkamp’s idea of communicating meanings about place, time, environment and listening perception, with more abstract use of soundscape source material, using it for its spectral characteristics and ability to contribute to a diverse and unique sound world. *Missing* is to some extent separated from the other pieces in that there is very little processing involved, but it demonstrates that a viable and effective approach to source material is to present it in its clean, unprocessed state in order to communicate the subject matter involved.

Resource List (in order of reference):

- Dennis Smalley: ‘Spectro-morphology and Structuring Processes’, in *The Language of Electroacoustic Music*, ed Simon Emmerson. London: The Macmillan Press Ltd, 1986. 61-93.
- Hildegard Westerkamp: ‘Linking Soundscape Composition and Acoustic Ecology’, *Organised Sound*, Volume 7, Number 1, 2002. Reprinted on Hildegard Westerkamp’s Simon Fraser University mini-site, <http://www.sfu.ca/~westerka/writings%20page/articles%20pages/linking.html> (Accessed between June and October 2009)
- Barry Truax, ‘Soundscape Composition as Global Music: Electroacoustic Music as Soundscape’, *Organised Sound*, 13(2), 103-109, 2008. Reprinted on Truax’s Simon Fraser University mini-site, <http://www.sfu.ca/~truax/OS7.html> (Accessed between June and October 2009)
- Glenn Watkins, ‘Soundings: Music in the Twentieth Century’ (New York: Schirmer, 1988; London: Collier Macmillan, 1988), also quoted in Johnson p. 750 *The Musical Quarterly*, Vol. 78, No. 4 (Winter, 1994)
- Timothy A. Johnson. ‘Minimalism: Aesthetic, Style or Technique?’, *The Musical Quarterly*, Vol. 78, No. 4 (Winter, 1994), pp. 742-773
- Taylor Deupree’s Ableton Artist Profile, <http://www.12k.com/deupreeableton.html> (Accessed between June and October 2009)