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## The use of principles and techniques derived from meditation for the design and creation of co-participatory musical systems

Hannah E. Clemen  
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**The Use of Principles and Techniques Derived  
from Meditation for the Design and Creation of  
Co-Participatory Musical Systems.**

by

**Hannah Elizabeth Clemen**

A Dissertation Presented to the  
**GRADUATE SCHOOL**  
**EDITH COWAN UNIVERSITY**  
**2 BRADFORD ST, MOUNT LAWLEY**  
**WESTERN AUSTRALIA**

In Partial Fulfillment of the  
Requirements for the Degree

**MASTER OF ARTS**

**(Creative Arts)**

June 2005

## **Abstract.**

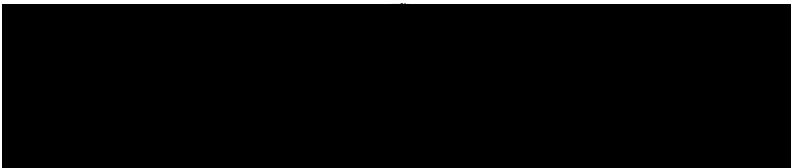
For this thesis, a detailed study was undertaken to determine whether techniques derived from traditional meditation systems can be applied to “co-participatory” music systems in order to enhance their accessibility, interactivity, and experiential impact. In order to adequately address this subject, a number of investigative steps have been taken. First, a workable list of definitions for what meditation actually *is* was made by comparing the practices and philosophies of a number of traditional meditation forms. The conclusions derived from this stage of the discussion served to create a definitive “blueprint” for meditation and served as a theoretical foundation for the rest of the dissertation. The second stage was to see how these definitions manifest in the meditation forms of the modern world. This approach provided insight into how changed cultural perspectives exert a major influence on the effectiveness and/or appropriateness of certain traditional techniques. In addition to modern meditation practices, the definitions from chapter two were also examined from the perspective of modern science, another important aspect of modern culture. The observations from this chapter served as the basis for chapter four, in which the experiential, symbolic and conventional features of Western Art Music were examined. This was to provide some points of reference with which to consider the possibility of using meditation techniques to enhance the “musical experience”. In chapter five, an examination was made of a number of composers and artists and their relevant works who have devised methods by which some of the more “restrictive” aspects of Western Art Music can be overcome or bypassed, so as to gain access to the full potential of that “musical experience”. This stage of the discussion provided a practical framework with which to discuss the background, design and realization of my own works connected to this research, collectively called the *Wheel of Life* project. One of the main aims of this creative project has been to subvert many of the “anachronistic” conventions of Western Art Music, particularly conventions such as performer/audience separation and overly rigid or ambiguous musical structures. By doing this, it is hoped that musical systems can be created that allow the participant to engage in a much more personally meaningful and actively creative experience.

## **Declaration.**

I, Hannah Elizabeth Clemen, hereby certify that this thesis does not, to the best of my knowledge and belief:

- (i) incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education;
- (ii) contain any material previously published or written by another person except where due reference is made in the text; or
- (iii) contain any defamatory material.

Signed,

A large black rectangular box redacting the signature of Hannah Elizabeth Clemen.

Hannah Elizabeth Clemen

24-06-2005

## **Acknowledgments.**

Without the assistance, guidance and inspiration of the following people, this research and creative project could not have been realized.

First and foremost I would like to thank for my family for their continuous support and encouragement. I also extend my sincerest gratitude to my supervisors Lindsay Vickery and Maggi Phillips for all of their wisdom and guidance over this research period.

I would also like to thank Pauline Oliveros, Rob Muir, Bryce Moore, Tos Mahoney, Sarah Douglas, Chris Murdock, Derek Kreckler, Gayle Young, Tilly Kooyman, Helen Lynes, Melanie Robinson and Alan Lamb for all of their help and inspiration.

For the exhibition at the Spectrum Project Space I would like to thank Norton Flavel, James Vernau, Nela Trifkovic and Martin Moon, for their energy and generous assistance. Thanks to Tanya Visosevic for her filming of the exhibition. For the exhibition at Westspace gallery, many thanks to Nat Bates, Bruce Mowson, James Cecil and Michael Graeve for their support and assistance.

For the *Listen and Learn* project, I would like to thank all of the participants over the 18-month period for their enthusiasm, insight and sensitivity. Special thanks goes to Jonathan Mustard for his generous help with filming during the final workshop in May 2004.

Thanks to Cycling '74 ([www.cycling74.com](http://www.cycling74.com)) for giving permission to include their copyrighted documentation from the Max/MSP software package in the accompanying data CD ROM.

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### ***INTRASPECTRAL.***

Track 4. Demonstration of *IntraSpectral* (recording made during the Australasian Computer Music Conference (July 2003). Anne Norman, Shakuhachi.

## **Video DVD (can be viewed using any DVD player).**

### **SPECTRUM EXHIBITION.**

Video Clip 1. Video of the three rooms of the exhibition at Spectrum Gallery (May, 2004) (the audio in the first section is a reproduction of what is heard when engaging with the *Beneath, Becoming* interface).

### **FINAL LISTEN AND LEARN WORKSHOP.**

Video Clip 2. Video of the morning session of the final workshop conducted in the Perth Hills (May, 2004).

Video Clip 3. Video of the afternoon session of the final workshop conducted in the Perth Hills (May, 2004).

## **Data CD ROM.**

**INFORMATION AND README FILES (requires only simple text viewing software – simply double click to open).**

“Readme1.txt”. Copy of these Contents pages.

“Max/MSP Documentation” (folder). Information on Max/MSP and how it functions (copyright documents reproduced with permission from Cycling ’74 ([www.cycling74.com](http://www.cycling74.com))).

## **PROJECT IMAGES (Jpeg Format).**

Figures 1-14 found in chapter six, pages 129-137, in the written dissertation have been reproduced for viewing on this CD ROM. They can be located within the folder entitled “Project Images”.

**\*Note: Figures 1-6 and 8-14, photography and diagrams by Hannah Clemen. Figure 7, photography by Mark Derbyshire (courtesy of Westspace Gallery and Liquid Architecture 5, Melbourne, July 2004).**

## **MAX/MSP PATCHES (requires specific software and hardware.**

**Please see below for specifications).**

### ***BENEATH, BECOMING.***

“BBPatch.pat”. Max/MSP patch of *Beneath, Becoming*.

“BBSimulation.pat”. This Max/MSP patch is an “automated version” of *Beneath, Becoming* so that the system can be viewed “in action”.

### ***INTRASEPCTRAL.***

“ISPatch1.pat”. Max/MSP patch of *IntraSpectral*, as exhibited at Spectrum Gallery (May, 2004).

“ISPatch2.pat”. Max/MSP patch of *IntraSpectral*, with extra features (yet to be tested or exhibited).

## **Computer Specifications for running Max/MSP Patches:**

Apple Macintosh G4 or higher. Requires OS10.3, 800MHz CPU, 256MB RAM or greater.

Requires Max/MSP 4.3 and Pluggo 3 or later.



**Additional files required to run Max/MSP Patches (included on CD ROM and ready for installation):**

FFTease OSX 2, “fiddle~” 1.2 (MSP object). Audio Samples found in the “BBSamples” folder. Please ensure that the “File Preferences” settings include this folder.

**\*\*\* PLEASE NOTE: The Max/MSP Patches can be viewed without Pluggo or the additional files and software. Any OSX version of Max/MSP will successfully open the patches. However, for the patches to run, these additional data and software files are required. The overall structure of each patch and the general function of each subpatch can be viewed as a printed document in Appendix II of the dissertation.**

**\*\*\* Information on Max/MSP and how it functions can be found in the “Max/MSP Documentation” folder on the accompanying data CD ROM (copyright documents reproduced with permission from Cycling ’74) or from [www.cycling74.com](http://www.cycling74.com).**

# Chapter 1. Introduction.

This dissertation and creative project is the culmination of three years of research in which I have investigated new creative possibilities in musical systems and sound-based interactive installations. The discussion presented within covers a broad range of topics, which has been necessary due to the sensitive nature of the subject matter, and the need for a thorough investigation of the many factors involved.

In this Introduction, a brief explanation of the background to and motivations for this research project will be given so as to provide an initial context for the rest of the dissertation. Further discussion into the creative projects themselves is presented in chapter six.

## 1.1 PROJECT ORIGINS AND MOTIVATIONS.

The basic intent that led to my initiation of this project originated while I was finishing my Bachelor of Composition degree at UWA in 2000. By the time I graduated from UWA, my creative focus as a composer had largely turned towards electronic music and psychoacoustics, and I had become very interested in the potential for sound as a tool for healing and expanded/altered consciousness. During this period I created several works either for CD or CD and acoustic instruments that explored different aspects of this kind of creative approach.

This kind of work can induce a feeling of complete immersion and a sense of physical “disembodiment”, thus allowing both the composer and listener to explore a much deeper, internalized level of musical communication. However, I soon began to consider the possibility of designing musical systems that actually “map” a person’s physical and mental state over time, thus creating a soundscape appropriate to those states. The possibility of this kind of approach further fuelled my interest in music as a “guide” to more expansive, “altered” states of mind.

I became interested in interactive music technology, in particular biofeedback equipment and non-tactile controllers, as possible tools for this kind of creative endeavour. By applying this kind of “participatory” approach, I was able to address some of the shortcomings I had experienced when working with soundscape composition and written music.

The first issue that emerged was the repetitive nature of recorded music; a CD will always play the same thing, there is no indeterminacy. Although periodicity is useful in

defining a structure, it does not cater to the specific needs of the individual. Structure is certainly important, but so is flexibility.

The second issue was with regard to the passive role that so many people assume when engaging with music – another symptom of the age of recordings (music in modern times tends to imply towards something you *listen to*, rather than something you *do*). This leads on to the third issue, the essentially *physical* nature of musical expression and reception. Although we listen with our ears, sound is also sensed by other parts of the body. However, listening to music (especially electronic music) has for many become a cerebral, disembodied observation rather than a multi-sensory experience.

Because of my desire to harness both the “mental” and “physical” aspects of creative expression, I decided not to restrict the project to entirely “technology-based” media. By simultaneously using high-tech (interactive installations) and low-tech (group-based improvisation) applications, I was able to explore a much broader range of experiential contexts.

In order to provide some kind of “theoretical” framework in which to expand upon these ideas, I considered a number of fields of knowledge from which to draw the information, including cultural criticism, psychology and religious studies. In the end, I decided to focus my research on the practice of meditation, since it has been so meticulously documented from many different cultural perspectives over many centuries, and because it seems to still hold a great deal of relevance for people in the modern world.

With this particular focus and intent, I engaged in the creative and theoretical research that culminated in this dissertation and these creative projects.

## **1.2 THESIS LAYOUT.**

**Chapter two** is an investigation into some of the major schools of traditional meditation. This chapter is primarily a factual summary of information gathered throughout the research period, and serves to provide a solid foundation on which to build the subsequent discussion. In this chapter, a number of defining “universalities” are isolated through their presence in a number of different traditions. These “universal” features become the “meditation blueprint” for the discussion in chapter two.

**Chapter three** is similar in style and format to chapter two, however this time dealing with schools of meditation that have emerged in the last hundred years. This chapter

provides a modern perspective to the techniques and philosophies outlined in chapter two, and how this perspective has changed those techniques and philosophies. In addition to modern meditation forms, this chapter discusses how meditation has come to be viewed by the modern scientific community. As science is such an important aspect of modern “Western” culture, modern peoples’ perspectives on meditation are very much influenced by it.

**Chapter four** investigates some of the fundamental principles of “Western Art Music”, and how the conventions of this aesthetic viewpoint have shaped the way in which music is viewed today. In order to understand how the “musical experience” can be enhanced, these conventions need to be understood and put in their proper cultural context. If meditation-derived techniques are to be used in musical setting, the information in this chapter provides useful insight into why and how.

**Chapter five** continues the discussion in chapter four, this time presenting the work of a number of current-day composers and artists who have explored ways of subverting the fundamental conventions of Western Art Music. All of these artists share similar motivations, in that they are all interested in creating audio/visual environments that are more engaging than purely “musical” or “visual” art works. Thus they have all designed works that are immersive, multi-sensory and participatory, and have all utilized techniques and concepts derived from meditation. This chapter also provides further background information for chapter six.

**Chapter six** is an exegesis on the actual creative projects accompanying the theoretical research, and is accompanied by an audio CD, video DVD and data CD ROM on which there are numerous footage excerpts, audio files and Max/MSP patches. Unfortunately, this documentation can never be a substitute to actually experiencing the projects “in the flesh”, however it does provide an adequate representation of the projects’ more important elements (please note, the Max/MSP patches can only be viewed on Apple Macintosh computers: see the contents pages or “Readme.txt” on the CD ROM for further information). This chapter also includes fourteen images from the creative projects, which are referred to throughout the chapter and can be found on pages 129-137.

**Chapter seven** provides a conclusion to the entire dissertation, offering comments regarding the findings of the background research and future possibilities following the realization of the projects outlined in chapter six.

**Appendix.** This section is a reproduction of a research paper I wrote as part of the proceedings for the Australasian Computer Music Conference 2003, and serves to elaborate on some of the issues discussed in Chapter six.

## **Chapter 2. The Essential Characteristics of Meditation: Theories, Traditions and Human Experiences.**

Before any system of knowledge can be utilized in a way that is both effective and beneficial to the people using that system, it needs to be sufficiently understood. This is especially so when elements from that system are removed from their original historical or cultural context and reapplied elsewhere.

When researching a subject such as meditation, there are many factors that require special consideration. Here are some examples that I have personally noted while preparing my resources for this dissertation:

1. Meditation techniques are and have been used by many different cultures for thousands of years, resulting in a wide array of practices. This diversity needs to be understood in order to be objective and non-biased towards a particular tradition.
2. Meditation is generally a practice whose primary tools are based on experiences that are not confined to “intellectually acquired” knowledge (that is, knowledge as commonly understood from a modern “Western” perspective). A person may be required to undergo years of training in order to become proficient in utilizing these experiences for the purposes of that meditation system. When researching such a subject using scientific or academic methods, it must be understood that some concepts may come across as “abstract” or “ambiguous”, since the researcher may not have the contextual understanding to fully grasp the concepts being explained.
3. Traditionally, all meditation systems have been used as part of a broader religious practice. The researcher must take care not to allow their own personal beliefs or religious background to affect their objectivity and impartiality beyond a reasonable level.
4. Despite the recent interest among researchers in the “psychophysiology of meditation”, one must remain conscious that each meditation system has evolved within a certain cultural and religious environment. Removing a technique from this environment can potentially alter, reduce or nullify its physiological and/or psychological effects. For the same reason, techniques that do retain their “traditional” affects under experimental conditions should not be considered “superior” to those that do not.

## 2.1 BACKGROUND INFORMATION.

Meditation is a word that has been used to describe a very wide range of practices employed within many different cultural traditions. In recent times, the popularity of meditation among people in the industrialized world has given more people the opportunity to enjoy its benefits. However, the reinterpretation of meditation techniques and principles to suit peoples' changing needs has also led to a certain amount of confusion as to its actual definition. By examining some of the many publications on meditation, one is presented with many different definitions for the practice:

... traditionally meditation has been practised to achieve a direct experiential knowledge of an absolute such as God, Being, Oneness, Buddha nature (sic.) – each of these labels being a product of a religious or personal belief system and representing the essence of existence (West, in West (ed.), 1987, p. 5).

Meditation is a psychotherapeutic practice that is designed to improve the quality of life, and which is undertaken with that intent. But though the practice can be undertaken without any explicit understanding of how it works psychologically, it is nevertheless rare for meditation to be taught in a theoretical vacuum. More usually it is presented within a system of ritual, belief, or interpretation which meditators are expected to study alongside their practice (Claxton, in West (ed.), 1987, p. 23).

Meditation is the process of turning consciousness upon itself to develop attentional control of the processes and contents of consciousness (Pekala, in West (ed.), 1987, p. 59).

Despite the variety of different explanations, there are some common threads within this small collection of quotations. They all indicate that meditation involves the refining and strengthening of certain mental process for the purpose of greater understanding, focus, or insight. These “mental training” activities can be used to create a sense of religious unity, as a form of physical or psychological therapy, or as a means of understanding the nature of consciousness and the “self”. However, different schools of meditation can seem to employ very different practices and have different emphases. Some involve chanting, ritual or physical disciplines, while others place more importance on asceticism, specific religious beliefs or moral codes. Should these practices be considered as separate cultural entities, evolving out of different traditions,

or is there some common thread of human psychological and physiological experience that connects them?

In order to pursue the subject of this thesis, it is important to have a clearly laid out framework for determining what meditation might actually be. Because of the diversity of old and new methods, as well as the fact that meditation is ultimately an *experiential* subject, it is impossible to refer to any one “authoritative text” to glean all the required information. Instead, a careful study needs to be made of a number of important traditions, how they relate and differ, and how they translate to (or have been translated by) people in the modern world. Only then can comparisons be made in an attempt to see if there are perhaps some underlying “universal” concepts that are common to different traditions.

### **2.1.1 Established Definitions of Meditation.**

#### **Traditional Theoretical Foundations.**

One of the difficulties in finding a reliable “general” definition for meditation lies in the terminology itself; does the word refer to mental exercises only or can it also include physical and moral disciplines? Is meditation a single practice, designed to operate within a larger system for a specific purpose, or can it be an entire system in itself?

Let us first consider the actual term “meditation” as it has been used in different cultures. Traditional definitions are quite varied, and can have different levels of importance depending on the focus of that tradition. In the tradition of Raja Yoga laid out by Patanjali in the 2<sup>nd</sup> Century BC, “meditation” (*dhyāna*) is only one of three specifically mental disciplines (the others being “concentration” (*dhāraṇā*) and “contemplation” (*samādhi* (Wood, 1975, p.58)), that themselves form only three parts of the eight-part system of Yoga practice (Iyengar, 1981 p. 6). Within Christianity, the term “meditation” is used to describe “... one of the lower reaches of prayer”, with The Oxford Dictionary for the Christian Church defining meditation as “... mental prayer in its discursive form. It is the type of mental prayer appropriate for beginners and as such accounted its lowest stage” (Parry, in Hanson (ed.), 1973, p. 42). In many Buddhist traditions, different kinds of meditation are woven into a highly developed and complex set of mental practices that can only be embarked upon after a long period of mental and physical purification. Many of these exercises are often mistaken as meditation itself, when in fact they are more like “training exercises” in preparation for meditation (in an interesting example, Kapleau (cited by Naranjo (Naranjo and



Ornstein, p. 7)) explains that the famous Japanese Zen practice of *Za-Zen* is not actually considered as meditation).

There are also other practices that involve various kinds of self mind-control that might be assigned different philosophical and practical frameworks than more familiar “meditation” forms. These include so-called “ecstatic” trance practices present in Sufism and various Shamanic traditions, in which the mind is used as a vehicle to transport a person to another “place”, or to communicate with “supernatural beings”.

### **Modern Adaptations and Scientific Research.**

In the last century, many “Eastern” religious and health practices have come to the attention of the “Western” world. Practices ranging from Zen meditation to Yoga and Qi Gong are becoming well known for their psychological and physiological benefits, and as a result have been met with growing interest and enthusiasm among people with mental or physical pathologies, corporate bodies looking for new methods for training their staff and ordinary people searching for drug-free methods of relaxation, stress-relief, or even the kind of intoxicating “highs” normally associated with drug-use. “New” systems of meditation have also emerged that have either been based on (at times questionable) scientific and medical research or adapted from traditional forms, such as Transcendental Meditation. There has also been a renewed interest in some of the more mystical practices within European religious traditions, such as the Jewish Kabbalah and Christian Mysticism (e.g. Hesychasm and esoteric Catholicism).

Because of the wide range of meditation styles available, the potential meditator is able to choose a technique that is particularly suited to his or her own particular needs or interests. However, such freedom of choice can potentially lead to ambiguity in intention, and subsequently, potential misinterpretation, misunderstanding or misuse of the original principles of that meditation system. Some meditation techniques (in a similar way to certain psychoactive drugs) are potentially dangerous to the meditator if used incorrectly and thus were originally “secret” practices, handed down directly from teacher to student.<sup>1</sup>

For modern psychologists, neuroscientists and cognitive scientists, meditation has become a useful means by which human behavior and perception can be studied, with

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<sup>1</sup> Many sources refer to the psychological dangers of unguided, or misguided, meditation practice, either in traditional (eg. Buddhist mindfulness (*vippassana*) meditation (Burns, 1966, pp. 41-42) or single-point concentration (Goleman, 1977, p. 13)), or modern contexts (eg. as an aid in psychological treatment (Carrington, in West (ed.), 1987, pp. 162 & 171-172)). For the practice of many meditation systems, it is essential to seek the guidance of a qualified teacher.

such research sparking much debate about the efficacy of various meditation techniques. Science and technology have also played central roles in the development of some modern forms of meditation such as auditory biofeedback and techniques used in clinical psychology, while also being used as a means by which the value of a certain technique can be “proved” or “disproved”.

This chapter of the thesis is primarily concerned with establishing a workable framework for meditation using traditional practices as a foundation. Recent scientific research into the psychological and physiological effects of meditation will be discussed at greater length in the next chapter. Similarly, a more detailed discussion on more specific forms of modern “Western” meditation will also take place in chapter three, as the concepts and background of these meditation forms are closely linked with the findings of modern scientific research.

### **2.1.2 Creating an Investigative Framework.**

#### **A Framework for Meditation.**

The primary aim of the following sections in this chapter is to hopefully reveal some basic elements of technique and experience that can be considered universal to many (if not all) meditation practices. In order to do this, there are a number of steps that need to be taken, as well as a number of choices as to the investigative method.

Because of the length and scope of this dissertation, only those meditation traditions that have attracted the most recent attention and thus provide the most available resources have been chosen. These traditions will only be discussed in general terms<sup>2</sup>, and only in the context of their actual meditation practices. Any discussion of metaphysics and history will only be made if clarifying a point within the discussion. The more specific use of sound or music in meditation has not been chosen as a topic for specific discussion in this dissertation, as to do so would be to restrict the discussion to those traditions that make specific use of these practices. This chapter is more concerned with isolating general patterns across some of the general schools of meditation rather than deals with the more specific practices of certain traditions.

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<sup>2</sup> For example, the individual practices used in different schools of Mahayana Buddhism will not be investigated here. This is unfortunate, but the aim in this discussion is to find general characteristics, not to make a complete survey of each rich and complex tradition. In later chapters, certain techniques such as those found in Zen will be referred to where necessary. In this chapter, Tibetan Lamaist Buddhism has been used as an illustrative example of Mahayana (and Vajrayana) in practice. However, the four sects in Tibetan Buddhism will not be discussed here. Although there are distinctions between their practices, they are not dramatic enough to be of major consequence in this discussion.

## **Yoga and Buddhism as a Theoretical Foundation.**

The study and comparison of Buddhist and Yogic meditation yields some very useful information about some of the “essential” features of meditation. Both Yoga and Buddhism place a great deal of emphasis on meditation, and both have been responsible to a large extent for the surge of interest in meditation in Europe and the USA in the last several decades. Some modern systems of meditation such as Transcendental Meditation have been based, partly or entirely, on methods derived from these systems.<sup>3</sup>

Although only one of many yogic systems, the Patanjali system is considered the most thorough and complete outline of yoga available, with many of its details being well documented and accessible to the layperson. Although a younger tradition than Buddhism, the ancient Vedic and Upanishadic beliefs on which Patanjali Yoga was built have also had a strong influence on Buddhism, both in its conception and its development. In addition, certain Yogic systems have become intertwined with Buddhism to form some very interesting “hybrid” practices, such as Tantric Buddhism. In a similar way, Tantric Yoga, though a separate system to that established by Patanjali, is still based upon many of the latter’s principles.

Having isolated some of the key features of Patanjali Yoga, a study of some of the practices in Buddhist traditions will be made, allowing us to make some comparisons with Patanjali’s system and hopefully to isolate some commonalities. The section on Buddhism is somewhat longer than that on Patanjali Yoga, as it is necessary to address some of the aspects of Theravada, Mahayana and Vajrayana Buddhism, and how Yoga and Hindu beliefs have influence the latter two.

## **Comparison with Other Traditions.**

Having isolated some of the key features present in both Yogic and Buddhist meditation, a comparison can be made with some other traditions that make use of meditation or other altered mental states. These include esoteric Christian, Jewish and Muslim practices, as well as more ancient animistic traditions. By looking at the

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<sup>3</sup> The founder of TM, Maharishi Mahesh, developed his technique based on the yogic teachings of his master, Brahmananda Saraswati (Russell, 1976, p. 10). In order to effectively spread this form of meditation to the West, Maharishi deliberately avoided the use of overtly religious symbolism or terminology (Goleman, pp. 68-69). However, the basis of TM is still firmly rooted in Vedic spirituality, with some traditional rites such as the *puja* still being used by the organization (Carrington, p. 150).

similarities and differences of these methods with those of Buddhism and Yoga, some more “universal” conclusions about meditation can begin to be drawn.

## 2.2 INVESTIGATION.

### 2.2.1 Meditation in Patanjali Yoga.

#### History and General Theories in Yoga.

During the first few centuries BC, there emerged in India several schools of mystical Hindu philosophy and practice that used different approaches to draw out the essence of the older Vedic teachings, each offering their own way to salvation and emancipation of the soul. Some schools stressed philosophy, logic or intellectual contemplation, whereas others placed more emphasis on ritual or action.

*Yoga* (Sanskrit root word *yuj* – to yoke or to join (Iyengar, p. 4)) was one of these schools, with its ultimate aim being the union of the human soul and the Divine. Its original practices are attributed to Patanjali in the 2<sup>nd</sup> century BC text, the *Yoga Sutras*. Rather than invent an entirely new philosophical theory, Patanjali sought a more “practical” way of moulding the mind than the more “intellectual” approach of the *Upanishads*. The *Upanishads* originally came about as a reaction against the rigid behaviour codes of the Vedas, placing greater importance on intellectual contemplation than following certain rules to gain favour from the gods (Ch’en, 1968, p. 4). These writings refined the Vedic pantheon of gods into one ultimate and all-encompassing cosmic consciousness – *Brahma*, and all the aspects of man into an inner psychic essence – *atman*. It was believed that when a person attained realisation of the fundamental unity between *Brahma* and *atman*, he would become enlightened (ibid., p. 6) and be released from the endless cycle of birth and death<sup>4</sup>. Patanjali based his teachings on those of *Samkhya*, another school of Hindu philosophy to emerge during this period, which bases all of creation on twenty-five physical and energetic essential elements (*tattvas*). However, unlike *Samkhya*, Yoga also assumes the existence of God as “The Creator” (*Īśvara*)<sup>5</sup>.

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<sup>4</sup> This religious system was well established in the western parts of India, but had less influence in the east. In eastern India there lived many spiritual teachers with their own views and beliefs, and an even larger number of wandering ascetics (*samanas*), searching for salvation.

<sup>5</sup> In Hindu spirituality, there are three primary names to represent the three main aspects of the Godhead: Brahma (creation), Vishnu (preservation) and Shiva (dissolution-restoration) (Yogananda, 2001, p. 341). In addition to these three, the name *Īśvara* refers to “... the Lord in His aspect of Cosmic Ruler; from the root *is*, to rule. The Hindu scriptures contain a thousand names for God, each one carrying a different shade of philosophical meaning (ibid., p. 12).

The system of Yoga laid down by Patanjali, *Astanga Yoga*, consists of eight stages or “limbs” (*Angas*) that are practiced sequentially, building upon each other like steps towards a final goal. There are other yogic systems that use a different order or number of practices, depending on that school’s particular emphasis.<sup>6</sup>

THE EIGHT “LIMBS” OF YOGA	
<p><b>Yoga of Action</b> <i>(karma)</i></p>	<p>Yama (negative ethical code) Niyama (positive ethical code) Āsanas (postures) Prāṇāyāma (breathing exercises)</p>
<p><b>Yoga of Knowledge</b> <i>(jñāna)</i></p>	<p>Pratyāhāra (withdrawal of the senses) Dhāraṇā (meditation)</p>
<p><b>Yoga of Devotion and Love</b> <i>(bhakti)</i></p>	<p>Dhyāna (contemplation) Samādhi (isolation)</p>

### The Yoga of Action.

The first four stages are known as the “Yoga of Action” (*karma*), and are considered by many as essential before the next four “internal” stages can be attempted. *Yama* is called the “negative” ethical code because it deals with removing destructive habits or thoughts<sup>7</sup>. The second stage, *Niyama*, is a set of observances for self-purification, including internal and external purity (external purity concerns personal hygiene, clothing, personal surroundings, and diet), contentment, austerity, study of the holy scriptures, and “... the surrender to the Lord [*Īśvara*] and abiding entirely in His will” (Iyengar, p. 7).<sup>8</sup> The next stage, *Āsana*, consist of a series of physical postures designed to attain and maintain physical health and vitality, extinguish physical and mental dualities, and attain a deeper understanding of the interplay of energy and matter in the

<sup>6</sup> Taimni (1972, pp. 205-206) suggests that the term *Aṅgas* implies a potentially non-sequential ordering, and that a student of Yoga can consider these “limbs” as independent to a certain degree.

<sup>7</sup> *Yama* “... may be called abstentions or negative ethical code, corresponding to the “thou shalt not’s” of any practical religion. The yogin is asked to refrain from causing injury towards other living thing, falsehood, theft, [sexual] incontinence, and acceptance of gifts. This first part of *Yama*, abstaining from injuring others, is considered the most important and a proper fulfilment of it will, it is said, automatically take care of the rest” (Behanan, 1964, p. 119).

<sup>8</sup> *Yama* and *Niyama* are considered essential first steps for clearing away distracting thoughts, habits and environmental factors, and setting up a solid motivational framework for the next stages of Yoga practice. However, there are practitioners who “skip” these stages, focussing instead of the acquisition of “psychic powers”. Most practitioners of this type are essentially egotistical but harmless charlatans, but certain yogis (known as the “Brothers of the Shadow” Taimni (pp. 206-207)), have been greatly feared for their highly developed psychic powers, and cruel, unscrupulous actions and motivations.

universe. These forces consist of *Puruṣa* (the active force in the universe that initiates activity and vitality) and *Prakṛti* (the physical and psychic phenomena in the universe). *Prakṛti* consists of five gross and five subtle elements that merge with its qualities to form the “cosmic intellect (*mahat*)” (Iyengar, p. 7). This cosmic intellect is reflected in the individual through his/her own ego (*ahamkara*), intellect (*Buddhi*) and mind (*manas*) to form individual consciousness (*chitta*). All of these, plus the five organs of perception and five senses of action within the human body, make up the 25 elements spoken of in the *sāṃkhya* teachings (on which yoga is based). *Prāṇāyāma* follows on from *Āsana* by intensifying the student’s focus onto the breath, a manifestation of *Prana*, the vibrating, active energies in the universe (similar to *Puruṣa*).<sup>9</sup>

As *Prāṇāyāma* is perfected, the focus turns toward the more “mental” practices of the “Yoga of Knowledge” (*jñāna*), which is comprised of *Pratyāhāra* and *Dhāraṇā*, and the “Yoga of Devotion and Love” (*bhakti*) that is comprised of *Dhyāna* and *Samādhi*. These are the “meditation” practices of Yoga, in that they deal specifically with training the mind and consciousness through exercises in concentration. Patanjali states that the Yoga of Action should be used as an essential “preparation” for these higher practices, by stilling the mind and body, and overcoming distractions that would impede later exercises in concentration (Goleman 1977, p. 76).

### **The Yoga of Knowledge.**

The 5<sup>th</sup> stage of Yoga, *Pratyāhāra*, involves training in sense-withdrawal, in which the student learns to filter out “unnecessary” sensory stimuli, and only respond to impulses that have “spiritual value”. These “higher sensations” manifest as vibrations that originate at the base of the spine, and slowly climb upwards towards the head (Behanan, 1964, pp. 215-217).<sup>10</sup> In order to control the perception of stimulus, the connections between the sense organs and the mind need to be suppressed or filtered. We do this naturally to a certain extent, for example a ticking clock will always be sending sound waves to our ears, but rarely will we “perceive” it (Taimni, p. 269). If

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<sup>9</sup> To quote B.K.S. Iyengar on the practice of *Āsana* and *Prāṇāyāma*: “The practice of āsanās removes the obstructions which impede the flow of prāṇa, and the practice of prāṇāyāma regulates that flow of prana throughout the body. It also regulates all of the sādhanā’s thoughts, desires and actions, gives poise and the tremendous will-power needed to become a master of oneself”. (p. 14). Iyengar also points out that the asana should be mastered before pranayama is begun, so as not to distract and unbalance the perfection of the āsanās. “One soon realised that when āsanās are well performed, prāṇāyāmic breathing automatically sets in” (p. 10).

<sup>10</sup> The cultivation of this energy flow is very important in some Tantric Yoga schools such as Kundalini Yoga. To quote Goleman: “Kundalini, says Tantric physiology, is a huge reserve of spiritual energy locate at the base of the spine. When aroused, kundalini travels up the spine through six centers, or “charkas”, reaching the seventh at the top of the head” (p. 80).

we were to be consciously aware of every piece of sensory stimulus bombarding our sense-organs, our minds would be completely overwhelmed. In *Pratyāhāra*, this filtering mechanism is refined to such an extent that eventually these constantly changing impressions no longer reach the mind, allowing the practitioner's focus to rest on chosen objects only. It is only when his state of mind is achieved can the student exercise the singular concentration necessary for the next stage of Yoga, *Dhāraṇa*.

In *Dhāraṇa*, concentration is further refined until it becomes a single, unmoving point, rather than a field of focus. As the focus sharpens, memories of the past and anticipations of the future also dissolve. *Dhāraṇa* is mastered in a number of stages. The first stage requires the student to simply observe his/her own thoughts without trying to intervene, becoming a dispassionate observer of his/her own mind. Over many months of practice, these thoughts gradually diminish in number, until they can be apprehended individually. The second stage requires the student to observe the thoughts not as a stream, but as individual units with distinct beginnings and ends. In the third stage, the focus is turned to the *space between* the thoughts. This gap "... is free from fluctuations [of thought] and consequently it is to the yogins a good handle, as it were, for the prolongation of the vacuous state and the suppression of the rising thought... All the studied introspective efforts of yoga, therefore, are only attempts to bring the mind to a thoughtless state which is then prolonged" (Taimni, p. 219). This kind of mental stillness can also be cultivated through prolonged focus on a single point, either a visual image, a sound, or a point on the body, which must not be considered for its qualities or features or utilize the intellect, but be a point on which the mind can rest. Over time one should become able to exercise this kind of concentration naturally, without "effort". "[O]nce the habit is developed, effort is replaced by spontaneity and, instead of having the attention hold the object, the object holds the attention (Behanan, p. 221).

### **The Yoga of Devotion and Love.**

The final two stages of *Aṣṭāṅga Yoga* represent the highest achievements in single-mindedness and transcendence. *Dhyāna* is in many ways similar to *Dhāraṇa*, but is much more refined and prolonged. As well as being able to hold the point of focus for much longer periods, the yogin is able to use more and more subtle "objects" of concentration. Rather than focusing on an image, sound, or point on the body, he is able to penetrate the duality of perception and "... loses his individual identity in the object of meditation" (Iyengar, p. 11). The "object" itself loses its separateness with

God, becoming instead a manifestation of Divine Love with which the yogin now merges his/her being.

The final stage is *Samādhi*, in which the final barrier – the mind – between the meditator’s complete union with the object (now having assumed the form of Divine Love) is overcome. Within *Samādhi* there are again a number of stages. The first allows the mind to co-exist with the concept and the name of the object. The second removes the name and the concept, leaving the object purely as “itself”. In the third stage, the object loses its gross state, “... its place is taken by the subtle constituents of matter (*tanmatras*)” (Behanan, p. 223). The fourth stage frees these constituents from the perception-based associations of time, space, and cause-effect. The final stage of *Samādhi* surpasses consciousness (*citta* – the mind-manifestation of *Prakṛti*) completely, freeing the energetic essence of the universe (*Puruṣa*). A state of being that is beyond perception and consciousness may seem frightening; a nihilistic state of no time, space or movement. However, in the philosophy of Yoga, it is in this state that “pure” or “universal” consciousness can reveal itself, free from the duality and separateness created by sensory or intellectual perception.

### **Summary of Patanjali Yoga.**

Based on the discussion above, I have isolated the following key features of Patanjali Yoga:

1. The ultimate goal in Patanjali Yoga, as expressed in the Vedas and the *Upanishads*, is the union between man and God (*Brahma* or *Īśvara*).
2. Emphasis is placed on the sequential nature of the stages of practice (eg. the Yoga of Knowledge cannot be pursued without first practicing the Yoga of Action).
3. Importance is placed on self-purification, first through actions and deeds, then in the physical body, and lastly within the mind.
4. Physical disciplines are used to maintain health, to act as mental focus-points (eg. the breath), and to represent more symbolic, universal relationships.
5. Intense concentration exercises are used to train the mind towards stillness and refined perception.
6. In order to achieve total concentration, a single object is used as a focal point.



7. It is the act of concentration, not the meditation object, which is of primary importance.
8. Part of the concentration process involves sensory discrimination. All distractions are to be filtered out of one's consciousness (including pleasant and supposedly empowering sensations), leaving only those sensations that are of "spiritual value".
9. Mental processes become meditation objects, first as a broad stream of thoughts, then as individual thoughts, and finally as the spaces between the thoughts.
10. Over time, intense and prolonged concentration should require no effort.
11. With dedicated practice, the meditation focuses on more subtle aspects of the object, culminating in the union between the object and the consciousness of the meditator.

## **2.2.2 Meditation in Buddhism.**

### **History and General Theories in Buddhism.**

Buddhism was founded in India approximately 300 years before Patanjali wrote his original *Yoga Sutras*. The dominant religion at the time was the ancient ritualistic Vedic tradition, embellished with the esoteric knowledge of the *Upanishads*, and was maintained by the *Brahmans*, or intellectual caste.

Siddhartha was born c. 563 BC to an Indian king who ruled over the Sakya province of northeast India (now within Nepal). He spent his youth sheltered in privilege and luxury, but left his household at age 29 to become a wandering ascetic in search of spiritual fulfillment, rejecting his caste distinction, unconvinced by both the rigid ritualism of the Vedas and the intellectualism of the *Upanishads*. After six years of severe but ultimately unfruitful ascetic instruction and practice, Siddhartha instead resolved to concentrate on the inner processes of his own mind. During an evening of intense inward focus, he ascended through a number of heightened states of consciousness, and through attaining the highest state of *nirvana* (enlightenment, or literally, "extinction") became the Buddha, or "... the one who has attained bodhi or enlightenment" (Ch'en, 1968). For the rest of his life, the Buddha traveled and preached what he had discovered. He acquired many students and established a monastic order which became the foundation of the Buddhist religion

In his first sermon, the *Daharmacakrapravartana* (“Discourse Setting in Motion the Wheel of Truth”) (Sangharakshita, 1967, p.16), the Buddha preached what have become the three fundamental principles of Buddhism; the Middle Way, the Four Noble Truths, and the Eightfold Path.

The Middle Way is the philosophy of both inward and outward moderation, through which an individual can be emancipated by desires and subsequent suffering:

[The Buddha] steered a course that avoided the extremes of austerities and self-torture on the one hand and the pursuit of sensual pleasures on the other. Another set of extremes that the Buddha avoided consisted of nihilism, everything is not, and materialism, everything is; instead he stressed that everything is a becoming (Ch'en, p. 31).

The Four Noble Truths provide an outline for understanding, and ultimately transcending, normal human existence:

1. Both physical (eg. pain, illness) and psychological (eg. envy, guilt, anxiety and depression) suffering (*dukkha*) is endemic in normal human existence.
2. This suffering arises because we cling to “permanence”, which is fact an illusion (*maya*) perpetuated by our ignorance (*avidya*) of the truth of impermanence (*anicca*). Clinging to *maya* leads to an eternal cycle of grasping and suffering, birth and death, known as *samsara*.
3. The concept of “self” is also *maya*, and the vicious circle of *samsara* can be transcended by the attainment of “enlightenment” (*nirvana* – a state of total clarity and realization in which the true nature of the universe reveals itself and suffering ceases).
4. The way to enlightenment is laid out in the Eightfold Path.

The Eightfold Path consists of behavioral and lifestyle patterns conducive to self-cultivation, as well as appropriate attitudes and actions which prepare a person for the final stages of “right awareness” and “right meditation”, leading ultimately to full awakening and Buddhahood.

Buddhism is a psychological rather than devotional belief system in which understanding the mind is of fundamental importance. “Buddhism is probably the least understood of all the major religions. Indeed, from an occidental viewpoint, we might well question whether it warrants the title of religion. In the West we are accustomed to

thinking of theology in terms of God, revelation, obedience, punishment, and redemption. [...] If the basis of Christianity is God, the basis of Buddhism is mind” (Burns, 1966, pp. 1-2).

### **The Major Schools of Buddhism.**

Since the time of the Buddha, there have evolved many variations of his teachings. Buddhism is a very adaptable religion that has spread throughout Asia, often fusing with the local indigenous religions to create new schools. Buddhist philosophy and scholarship has also developed over the centuries, resulting in a vast literature written in a number of languages, with different texts being central to different schools. In very broad terms, Buddhism can be divided into three schools, each with their particular goals and methods, and hence, meditation methods. These are Theravada, Mahayana, and Vajrayana.

### **Theravada Buddhism (The Doctrine of the Elders).**

Theravada was introduced to Ceylon by King Asoka in the 3<sup>rd</sup> century BC and became the dominant Buddhist tradition of Southeast Asian countries including Ceylon, Burma, Thailand, Cambodia and Vietnam. The rules and practices of Theravada are clearly defined by a small number of ancient texts all written in the ancient literary language of Pali. They consist of the three-part Pali Canon or *Tipitaka* or “Three Baskets” (1<sup>st</sup> Century BC<sup>11</sup>), the dialogue-based *Questions of Milinda* (2<sup>nd</sup> Century AD), and the *Visuddhimagga* or “The Path of Purification”<sup>12</sup> (5<sup>th</sup> Century AD). This final text holds the key information to Theravada meditation (and is a fundamental text in all Buddhist schools), giving a detailed description of the stages of meditation and their associated psychological and physiological phenomena, what Goleman calls “... a traditional recipe book for meditation...” (p. 2)

There are three stages, or more accurately, “paths”, in Theravada practice:

**1. “Virtue” (*Sila*).** *Sila* outlines the codes of behavior (words, thoughts and deeds) for monks, nuns and laymen, and is meant to prepare the disciple for concentration and meditation by freeing him/her of self-doubt and distractions. These virtues are thought

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<sup>11</sup> The Pali Canon was first committed to writing in the 1<sup>st</sup> Century BC but is said to be based on a much older oral tradition.

<sup>12</sup> The *Visuddhimagga* is derived from the third part of the Pali Canon, the *Abhidhamma* (“The Higher Subtleties of the Dhamma”), which discusses the nature of phenomena and consciousness (Ch’en, p. 223). It is considered “... the fullest exposition of the three-fold discipline, moral conduct, concentration, and intuitive wisdom. The work thus serves as the best and most authoritative summary of Theravada Buddhism” (ibid., p. 227).

to evolve naturally to a certain extent as the person begins to align himself with the Dharma.

**2. “Concentration” (*Samādhi*).** This is to some extent cultivated through *sila*,<sup>13</sup> but is more concerned with refining the powers of mental focus.

[Concentrating] is the centering (*ādhāna*) of consciousness and consciousness-concomitants evenly (*samañ*) and rightly (*sammā*) on a single object; placing, is what is meant. [85] So it is the state in virtue of which consciousness and its concomitants remain evenly and rightly on a single object, undistracted and unscattered, that should be understood as concentrating. (Buddhaghosa (Bhikkhu Ñāṇamoli (trans.)), 1991, p. 85)

40 meditation subjects in seven categories – including such things as bloated corpses, coloured wheels, the breath, attributes of the Buddha and loving-kindness – are listed as suitable for the cultivation of *samādhi*. A meditation subject is chosen according to the meditator’s own needs and temperament<sup>14</sup> (Goleman, p. 9).

The Path of Concentration contains nine levels of proficiency (beginning with “access state” consciousness, followed by the eight “full absorption” states called *jhana*), through which the meditator begins to experience moments, then lengthier periods, of total immersion in the subject and release from distractions such as bodily sensations, wandering thoughts and outside sounds. Profound feelings of bliss<sup>15</sup> emerge and later recede, leaving behind only equanimity and one-pointedness. Eventually, the mental image of the subject is refined into increasingly more subtle aspects, and one-pointedness is able to be maintained while the mind simultaneously expands outward towards a state of “neither perception nor non-perception”.

The practice of *samādhi* is an important tool in Buddhist meditation, but is not considered as a path to enlightenment. Adepts consider these exercises more as

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<sup>13</sup> By reducing both outward and inward distractions, the meditator is in a much better position to undertake the practice of concentration on the more “subtle” subjects outlined in the *Visuddhimagga*. In addition, by abiding by the practice of *sila* and training the mind to be disciplined, the meditator has already developed the practice of “concentration” to a certain extent.

<sup>14</sup> For example, a lustful person might be instructed to meditation on a decaying corpse, a hateful person on loving-kindness.

<sup>15</sup> Realistic visions and auditory hallucinations can also arise at this level. Such experiences can potentially lure the meditator in a false sense of spiritual achievement, or terrify him/her into madness. With the help of the teacher, the meditator learns to consider these experiences to be merely mental phenomena to be overcome just like any other distraction. “If you meet the Buddha, slay him” (Traditional Zen quotation, cited in Goleman, p. 13).

“concentration games” (Goleman, p. 21) designed to focus the mind. Enlightenment itself comes with the practice of *vipassana* (insight).<sup>16</sup>

**3. “Insight” (*Vipassana*).** Insight is also cultivated to some extent by the initial practice of *sila*, in the form of *satipatthana* (mindfulness). The Path of Insight can be undertaken either from this point or from the “access” state of jhanic concentration. In order to control one’s own desires, thoughts and habits, one needs to learn how to simply notice them without acting on or being distracted by them (this includes “fighting” them). It can be further refined into “bare insight” which enables the meditator to maintain this state without reacting or clinging to any thought. Thus, meditation “subjects” (e.g. mental states (thoughts, feelings), physical states (pain, body sensations and actions), or mind objects (mental classifications of stimuli)) are not used as object for “concentration”, but as indicators of the meditator’s level of non-subjective awareness. As awareness becomes more impartial, the meditator slowly begins to witness the true nature of mind, stripped of its usual masks, allowing him or her to directly experience a number of Buddhist truisms:

1. Non-self – through the understanding of the absence of the “I” in our supposedly “subjective” experiences.
2. Impermanence – by observing the constant stream of thoughts.
3. Isolation of actual “thought moments” (at this stage, the meditator may experience blissful feelings or have visions).<sup>17</sup>
4. Consciousness only of the “disappearances” of these thought moments. The meditator must face his fear of the bare truth of impermanence, before he can release himself and allow his ego to “die”.
5. *Nirvana* – the true nature of things can be observed with total insight. With this insight, the enlightened one is freed from suffering and the endless cycle of birth, life and death.

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<sup>16</sup> The actual practice of *samādhi*, however, is highly sophisticated. Most meditators, especially in the Western world, do not progress beyond the “access state” level.

<sup>17</sup> Because of the profound and blissful nature of the experiences at this stage of insight practice, it is either referred to a “pseudonirvana”, or in the *Visuddhimagga*, “Knowledge of Arising and Passing Away: The Ten Corruptions of Insight” (Goleman, p. 28).

Beyond *nirvana* is another state, *nirodh*, or total cessation of consciousness. This state is only achievable by combining jhanic concentration with insight practice, and is as a result, unique and indescribable.<sup>18</sup>

### **Mahayana Buddhism (The Greater Vehicle).**

The term Mahayana was first brought forth in the 1<sup>st</sup> century AD during a council of representatives from different Buddhist schools of the time. A new system was devised that had a wide enough conceptual scope so as to include most of the existing Buddhist schools, and to give lay persons more access to Buddhist teachings and the opportunity of attaining enlightenment, rather than restricting this privilege to ordained monks.<sup>19</sup> This new way was called Mahayana (The Greater Vehicle), as opposed to Hinayana (The Lesser Vehicle), a name reserved for those (soon to become extinct) schools that rejected this new system.<sup>20</sup>

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<sup>18</sup> There has in fact been some debate among Buddhists as to the difference between *nirodh* and actual death, as the total cessation of perception and conceptualisation would suggest the actual passing away of the meditator (Griffiths, 1986, p. 6).

<sup>19</sup> In early Buddhism, there were clear distinctions between the roles and spiritual potential of ordained monks and laypersons. Emancipation of the soul (*nirvana*) was only considered available to a person who had aspired to the ideal of the *arahant* (sometimes spelled *arahat* or *arahan*), one of the three stages of sainthood described in the *Tipitaka* (Govinda, 1973, p. 40). To live to this ideal required many strict codes of conduct, including ordination as a monk and living by the rules of the *sangha* (the monastic community) in a lifestyle of rigorous discipline and mental training. As a result *nirvana* was not available to ordinary people who had wives, earned money, and lived in the world (Ch'en, p. 98). As a way of making Buddhism a little more appealing to the public (essential to the monks since they relied entirely on the public for material support), and in response to the implications that Buddhism was causing good men to abandon their families in order to become monks, a separate set of religious codes were laid out for laymen, giving them the opportunity to be reincarnated as a deity (the identities of these deities were adapted from existing popular Vedic beliefs), if not to achieve *nirvana* (Ch'en, pp. 100-101).

<sup>20</sup> It is important at this point to note the distinction between Hinayana and Theravada Buddhism. As stated by Govinda (p. 41), the Theravadins were not present at this Council because they had already left the Indian mainland. In addition, despite their emphasis on the *arahan*, Theravadin Buddhists do not reject the *Bodhisattva* ideal, but see both as valid paths. As cited by Nārada Mahā-Thera, a well respected Ceylonese Theravadin leader:

Buddhism is a teaching that appeals equally to those who wish to gain their personal salvation and to those who wish to work both for their personal salvation and for the salvation of others.

There are those amongst us, who understand the vanity of worldly pleasures, and who are so thoroughly convinced of the universality of suffering that they seek the earliest opportunity to escape his cycle of birth and death and obtain their emancipation.

There are some others who not only understand but feel all the sufferings of life; so boundless is their compassion that they renounce their personal salvation and dedicate their lives for the lofty purpose of serving humanity and perfecting themselves. (Cited in Govinda, pp. 41-42)

Because of its conceptual adaptability and accessibility, Mahayana spread quickly to countries like China, Japan and Tibet, though declining in India where it was all but reabsorbed into its Hindu roots.

All Mahayana schools have unique features that reflect to some extent the native religions of the region in which the schools evolved. However, there are also more universal concepts, which have subsequently been utilized by each tradition in its own unique way. Some of these basic general characteristics of Mahayana include:

1. All Buddhist texts are all considered valid, although different schools may emphasize particular teachings. Theravada Buddhists only recognize the Pali texts (*Tipitaka*, *The Questions of Milinda*, and the *Visuddhimagga*).
2. The following of the *bodhisattva* ideal, rather than the *arahant* ideal. The *bodhisattva* concept was originally based on writings in the *Tipitaka*, which emphasized compassion, good deeds and the salvation of others rather than disciplined and solitary practices aimed at individual salvation (the *arahan* ideal).
3. The Buddha is considered an eternal being; a personification of the Dharma. Theravadins maintain the Buddha as a historical, human figure.
4. To the Mahayana Buddhist, Enlightenment is available to all beings (as all beings are said to possess the Buddha-nature) who exhibit faith and devotion to the Buddha, and love and compassion to mankind. The Theravadin believes that Enlightenment is reserved to those who have reached the appropriate level of spiritual evolution (over many lifetimes), and only then through adherence to rigorous mental and physical disciplines.
5. To the Mahayana Buddhist, Enlightenment is available to all beings, as all beings are said to possess the Buddha-nature. The Theravadin reserves the potential for enlightenment only for the chosen few.

Due to the flexibility of Mahayana, further philosophical concepts and practices have developed through combination with Hindu and/or native religions, resulting in a vast number of different traditions, ranging from the austerity of Japanese Zen to the vivid spectacle of Tibetan Lamaism.

The initial popularity of Mahayana in India may have been due to the still dominant influence of Hindu beliefs in the region, as certain features of Mahayana do resemble those of Hinduism. However, the techniques outlined in the section on Theravada are

still visible in many Mahayana traditions, since the Pali Canon is still a valued resource in Mahayana.

### **Summary of Buddhist Meditation as Compared with Patanjali Yoga.**

During the course of this investigation, a number of commonalities have emerged between Patanjali Yoga and Theravada Buddhist meditation. Both traditions place great importance on the cultivation of inner and outer purity, the practice of prolonged mental focus until it becomes an effortless and natural state, and the adherence to certain sequential stages of proficiency and technique for the gradual attainment of the desired mental states. Mahayana Buddhism shares further features with Patanjali Yoga, including the observance of physical disciplines (most obvious in the school of Vajrayana, or Tantric Buddhism), however these similarities can be to a large extent attributed to the influence of certain yogic systems (not necessarily Patanjali Yoga) and Hindu spirituality on younger Buddhist schools.

There are also a number of key differences. For Mahayana schools, many of these differences can be attributed to residual influences from the native religion of a particular school's region, or other cultural sources. However, Theravada Buddhism shares many common roots with Patanjali Yoga, yet there are some fundamental differences between them in both philosophy and practice. For example, they each utilize the body and the human senses in different ways. Yoga places greater emphasis on physical disciplines such as body postures and breath control, whereas the nature of the meditation objects to be visualized in Buddhist meditation seem to be more specific than in yogic practices. For the yogin, complete and continuous one-pointedness is the most important mental tool for allowing him/her to penetrate the illusion of duality between the object and the meditator, *and thus the duality of God and Man*. In Buddhist meditation, enlightenment is ultimately found through perfect and impartial "bare awareness", that is, *allowing the multiplicity of consciousness to simply cease to exist*.

These fundamental methodological differences seem to reflect fundamental philosophical differences between these two traditions. The primary aim of Yoga is *union* with God, whereas the Buddhist seeks *cessation* from the thought-driven illusion of reality. Essentially, the two traditions head toward the same "goal" (that is, going beyond singular, human existence and re-absorption into a greater "Oneness" or "cosmic consciousness") from slightly different conceptual angles. Yoga defines this cosmic consciousness as *Isvara* (God as The Creator), and Buddhism refers to *sunyata*



(the fundamental state of pure “emptiness” and hence pure “potential”), which is accessed in the enlightened state of *nirvava*.

### **2.2.3 Comparison With Other Traditions.**

#### **Meditation in Medieval Christian Mysticism.**

The mid to late Middle Ages was a rich period of development for mystical thought in the Christian world, inspired to a large degree by the ongoing debates between various important teachers at the time, including Bernard of Clairvaux and Richard of Saint Victor (12<sup>th</sup> century), Thomas Gallus and Meister Eckhart (13<sup>th</sup>-14<sup>th</sup> century), through to the great mystics of the 16<sup>th</sup> century, St. Theresa of Avila and St. John of the Cross.

One of the key preoccupations for mystics of this period was the concept of “mystical union” (*unio mystica*) (McGinn, in Idel & McGinn (eds.), 1996, p. 60). The nature and possible extent of this union, the definition and relative importance of “knowledge” and “love” as the two primary tools in its pursuit, and the actual methods for utilizing these tools, were all important subjects of debate at the time. New ideas were developed partly by using literary sources (either the works of other respected mystics and saints, or ancient sources such as the Bible and Classical Greek writings), and partly through first hand visionary experiences.

Prayer is the primary spiritual tool for both laypersons and mystics in all streams of Christianity, although techniques vary greatly from simple “petitions” made by children before bedtime through to highly sophisticated forms of mental discipline employed by devout mystics. As noted earlier in this chapter, the term “meditation” in Christianity is used to describe a somewhat elementary level of prayer, in which a person reflects on a particular theme such as a Biblical scene, or a predetermined concept or image, so as to “... stimulate the will and to condition the emotions” (Parry, p. 43). The four-week “Spiritual Exercises” program devised by St. Ignatius Loyola (16<sup>th</sup> century) is a particularly striking example of how this kind of “guided imagery meditation” can be used to condition, even “brainwash” (Parry, p. 43) the minds of the faithful.

Prayer in the broader sense, however, is a complex and multi-tiered practice. John Brian Parry (pp. 41-53) provides a summary of the general stages of prayer, describing three distinct levels:

**Vocal Prayer:** The individual engages in the four acts of (1.) “Adoration”, (2.) “Thanksgiving”, (3.) “Penitence” (realization of man’s imperfections and God’s perfection), and (4.) “Petition”.

**Mental Prayer:** Three stages of prayer are classified here. First, “meditation” is used to strengthen a person’s virtue and eliminate bad habits.

Following this inner purification, the individual is able to engage in “affective prayer”, in which “knowledge” (as opposed to “logic” or “reason”) and “love” are used to strengthen a person’s understanding of *unio mystica*, in preparation for the “Prayer of Contemplation”, described in more detail below.

Another form of prayer known as the “Jesus Prayer”, thought to originate with the 4<sup>th</sup> Century Desert Fathers sect, is traditionally associated with Eastern Orthodox mystics (most notably the Hesychasts<sup>21</sup>). The simple words “Lord Jesus Christ, Son of God, have mercy on me, a sinner”, are used as a repeated vocal, and later mental, chant, which over time regulates the breath and allows the mind to deepen its concentration on the meaning of the words. Eventually, the prayer is internalized physically, connecting not only with the breath, but also with the heartbeat and the lower abdomen, allowing the monk to carry the prayer constantly.<sup>22</sup> The mind reaches a state of rest or *quies*, a “nowhereness and no-mindness” (Thomas Merton, cited in Goleman, p. 58) in which the monk “... has reached the summit of all virtues, and has become the abode of the Holy Spirit... when the Holy Spirit comes to live in a man, he never ceases to pray, for then the Holy Spirit constantly prays in him...” (Kadloubosky and Palmer, cited in Goleman, p. 58).

**Contemplative Prayer:** Parry categorizes this level in a number of stages, but as a whole describes it as a state of “... extreme intellectual simplicity. Intellectual striving and imaginative pictures have been left behind. [...] The key words are “contemplates

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<sup>21</sup> Hesychasm is a Greek Orthodox monastic order that is thought to have evolved from the practices of the Desert Fathers (Goleman, pp. 56-57). The name is connected partly with the work of the 5<sup>th</sup> century monk and theologian Hesychius of Jerusalem (Goleman, p. 57), and partly with the Greek word *hēsychia* or “divine quietness” that was the spiritual preoccupation for members of the order (Encyclopaedia Britannica, 1982, Vol. V, 1982, p. 19).

<sup>22</sup> The physicality of this stage of the Jesus Prayer has met with some controversy over the centuries. In the late 13<sup>th</sup> Century, St. Nicephorus advised monks to specifically focus on the “middle of the body” during the later stages of the Prayer, an approach that was violently attacked by Barlaam the Calabrian (early 14<sup>th</sup> Century) who referred to the technique as *omphalopsychoi* (“having the soul on the navel”) (ibid.). The practice was strongly defended by the 14<sup>th</sup> Century Greek saint, Gregory Palamas, who suggested that the human body had an important role to play in the mystical experience.

without effort”. Again, prayer at this level results in love” (Parry, in Hanson (ed.), p. 48). The “active will” no longer contemplates the object; there is only the object and the act of contemplation. Going beyond both knowledge and love as they are known to mankind allows “... the old superficial self to be purged away and the gradual emergence of the true, secret self in which the Believer and Christ [are] “one Spirit”” (Merton, cited in West, p. 12).

This kind of union was explored in great detail by many of the great Medieval mystics of Western Christendom, such as Meister Eckhardt, Thomas Gallus, and the anonymous author of the great English work, *The Cloud of Unknowing* (McGinn, in Idel/McGinn (eds.), pp. 66-69). While generally not as literal and physical as that described in the Eastern Hesychast practices (ie. there is still the essential sense of separation between Man and God), there was a wide range of opinions and beliefs on the nature of this union and how the powers of reason (*ratio*) and “knowing” (*intelligentia, intellectus*) function with love to achieve this union.<sup>23</sup>

### **Meditation in Sufism.**

Sufism is a branch of Islamic mysticism that appeared during the lifetime of the Prophet Mohammed (7<sup>th</sup> century AD) in Arabia. Although totally devoted to the teachings of the Koran, Sufis differ from “Orthodox” Muslims in that they believe that inner purity and love are more powerful means of reaching God than observance of rituals and performing “good deeds”. Ultimate realization is considered a gift from God, and not the result of one’s own endeavors. God will grant divine knowledge only to those who please him by totally opening their heart to him (Shushtery, in Archer (ed.), p. 78)<sup>24</sup>.

In order to open oneself to God, one must allow the ego to “die” (*fana-f’illah*, extinction into God). In the initial stages, the student develops devotion to God through devotion and obedience to his teacher (*Pir*), and love of God’s Eternal Beauty through

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<sup>23</sup> Some mystics were persecuted for their stance on *unio mystica*. The Beguine Marguerite Porete (early 14<sup>th</sup> Century) was burnt as a heretic, whereas Eckhardt’s works were condemned posthumously for his ideas regarding a more literal form of union with God, “the union of indistinction” (*unio indistinctionis*) (McGinn, in Idel and McGinn, 1996, pp. 73-74).

<sup>24</sup> To most Muslim mystics, man is inherently separated from God. For them, the ultimate realization lies in understanding “God’s Uniqueness” (Baldick, 1992, p.2), and thus sharing a special relationship with Him. Sufis modify this theory somewhat, believing that God is the one reality, and Creation (including Man) is that one reality reflected and diversified, but only as a shadow of God’s Oneness. The diversity and “differences” in creation are considered an illusion, and the only way a man can reach beyond his own imperfections to realize God’s oneness is to train his mind to dwell only on God, and to strive to reflect God’s supreme beauty in every aspect of his own being. To a Sufi, the purest way of doing this is through love. (Shushtery, in Archer (ed.), pp. 65-67)

love and appreciation of beauty in the physical world (often expressed through poetry and music). The teacher, in time, teaches the student how to refine his developing relationship with God through meditation on subtler aspects of beauty and love. Little is written about these teachings, as they are secretly handed down from teacher to student in a manner tailored specifically for the student. There are, however, some more widely known techniques that can be studied without having to be an initiate.

The main Sufi meditation practice is *zikr*, meaning either “remembrance” (Goleman, p. 61) or “repetition” (Naranjo uses the variant *dhikir* to describe both meanings (in Naranjo and Ornstein, 1971, p. 47)). The *Pir* gives a word, name or phrase to the student for him to focus on, first by oral repetition, then mentally.

When a Sufi meditates on his *zikr*, it is its meaning that is most important. Thus, the *zikr* “*La ilaha illa’lla*” (“There is no god but God”) strengthens one’s love, and thus one’s connection, with God.

A *zikr* can take the form of a story or joke, functioning in much the same way as the riddles (*koan*) of Zen Buddhism – “illogical” on the surface, but with multiple layers of subtle meaning that are uncovered through meditation. This kind of *zikr* is used to encourage students to think in more than one way, and to think “illogically”, which is essential if one is to grasp certain kinds of knowledge (Naranjo, pp. 45-46). Different people will often draw different meanings out of a single *zikr*, depending on what they “need to learn”.

As a Sufi is able to maintain his focus on the *zikr* (or rather, its essence) for longer periods, his connection with God is strengthened and his understanding of God’s beauty is refined. Eventually, the state of *fana* is attained (or rather, granted to him by God (Goleman, p. 62)), in which his understanding can be maintained without effort. Beyond *fana* lies the highest state of *baqa*, in which *fana* becomes a constant mind state that the Sufi carries all the time, allowing him to live God’s love in everyday life.

Some Sufi schools (such as the Mevlevi School or “Whirling Dervishes”) use ecstatic trance states – induced through recitation, listening to or playing music, or dancing – as another expression of love and surrender to God. Although dramatic and effective, these states are not considered as ends in themselves, but rather as another tool in the quest towards God. In the words of a Mevlevi Sheikh: “And the meaning of the dance? Merely to relax in a safe way the tensions which have built us through certain inner experiences. Otherwise, you see, people become emotionally aroused” (Isfandiari, in Archer (ed.), 1980, p. 56).

## **Comparison Between the Meditation Techniques of Sufism and Christianity.**

Here we shall consider some of the more general points brought to light in this discussion in a similar examination as that made between Patanjali Yoga and Buddhism. Islam and Christianity (with Judaism), share many mythological features, such as the Old Testament, the life of Jesus (although to the Muslim, Jesus was a great prophet, not the Christ) (Baldick, 1992, p. 2), and the fundamental belief in “One God” as the creator and ruler of the universe.

Both Sufis and Christian mystics must also be devout followers of their respective religions, however the moral conventions and outward expression of purity that are laid out in their religious texts are much more strictly adhered to by the latter than the former. In a way somewhat reminiscent of the Buddhist practices of *sila* and the early stages of *samadhi*, outward virtue is used to strengthen a person’s personal faith, to reduce outward distractions, and to refine powers of concentration. Although somewhat different in style and impact, there are similarities between the imagery of Christian “meditation” and the 40 Theravadin meditation objects. To a Sufi novice, purification is achieved through unquestioning obedience and love towards one’s teacher (*Pir*), which is thought to be the first step towards developing a motivation driven entirely by God’s Love. For the Sufi, an individual’s spiritual evolution is not determined by his/her own will, but by the will of God. The individual can only hope to please God, who will choose whether or not to grant them purification.

Many religious traditions make use of allegorical stories as a way of communicating their fundamental messages. Christian “meditations”, such as the mental reconstruction of Biblical scenes or Loyola’s “Spiritual Exercises”, give many excellent examples of how the imagination can be a powerful tool for mental conditioning. As the mind dwells more deeply on the meaning behind the story, scene or idea, more esoteric meanings can also begin to emerge. This is especially evident in the Sufi jokes, riddles and “nonsensical” stories that not only communicate important moral and philosophical messages for the mind to contemplate on, but are also often designed to confound the logical mind and offer the listener a window through which more “subtle” knowledge may be accessed.<sup>25</sup>

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<sup>25</sup> The following is a famous example of such a story (in this case the protagonist is Nasrudin, a popular “wise fool” character in many of these stories), recounted by Naranjo:

On one occasion a neighbor found [Nasrudin] down on his knees looking for something.

“What have you lost, Mulla?”

The repeated prayer-chant is another technique in both Islam and Christianity that has multiple layers of use and meaning. Like allegorical stories, chants are used both by the layperson and the mystic, serving to strengthen one's faith and moral conviction through the powerful symbolic meanings, while also being a means by which trance states can be induced and subtle understanding accessed. "Lord Jesus Christ, Son of God, have mercy on me, a sinner" and "*La ilaha illa 'lla*" ("There is no god but God"), are examples of how a phrase can be used for both purposes. In both the Jesus Prayer and the abovementioned *zikr*, the process of absorption is both a physical as well as mental process, involving breath control and meditation on body parts. This Hesychast practice is unusual among Christian mystical traditions, which for the most part seem to be much more "mentally" oriented, with few references to physical disciplines beyond celibacy and dietary regimes. Physical disciplines are more common in Sufi practices, including breath control exercises, physical postures, vibration of body parts using sound, and dancing.

In a similar way to Buddhism and Patanjali Yoga, differences in practice and belief between these Christian and Islamic mystical schools can often be attributed to the cultural influences unique to certain times and places. However, in the writings of both Sufis and Christians mystics, we see two overriding themes appear again and again, which seem to form the core of their beliefs and motivations:

The ultimate spiritual goal is expressed through the union of the soul with God. This may be represented in different ways depending on the emphasis of particular branches of these two systems, such as the difference between literal, substantial union (there being only "One"; the separation is a product of man's illusion), and relative union (in which God's existence as God is ultimately separate and unknowable to a person in his/her fundamental existence as "man").

Love is the key to attaining this union with God, being an expression of God's perfection reflected in man. Although Islamic and Christian texts both hold to the fundamental separation between man and God, man's ability to gain access to and express God's Love is an indication of a deeper connection (man having been created

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"My key," said Nasrudin.

After a few minutes of searching, the other man said, "Where did you drop it?"

"At home."

"Then why, for heaven's sake, are you looking here?"

"There is more light here" (p. 45).

in God's image), even if total and literal union is impossible. "God is unknowable, but may be thought through some concrete comparison" (Shushtery, in Archer (ed.), p. 65).

### **2.3 SOME GENERAL FEATURES OF TRADITIONAL MEDITATION SYSTEMS.**

Despite the many cultural, historical and geographical differences between the mystical traditions of these four great religions, there have emerged a significant number of commonalities in their respective "meditation" practices. During the course of this discussion, these commonalities have emerged in such a way that can be divided into two broad groups: practical features (i.e. the actual techniques and disciplines used in various traditions) and philosophical features (i.e. the fundamental belief systems underlying the traditions, and the ultimate goals being sought).

#### **Shared or similar "practical" features:**

1. Progressive, multi-layered approach. The "basic" stages may be accessible to the public, whilst progressively advanced stages are more closely guarded secret practices.
2. Simultaneous process of single point concentration and expansive or altered awareness.
3. Some kind of repetitive language-based tool for encouraging an altered state of mind.
4. Exercises of body awareness.
5. Abandonment normal thought patterns such as sense of self, reason, and linear time.

#### **Shared or similar philosophical features:**

1. All play a fundamental role within intensive (usually monastic) and esoteric religious traditions.
2. All systems require a primary stage of inner and/or outer "purification" and "initiation" into a collective of like-minded people.
3. The goal of understanding the nature of, and ultimately "union" or "absorption" with the normally unknowable "true essence".
4. Concept of normal corporeal reality being an "illusion", a veil of mind obscuring the "true essence".

In some cases, there is some variation between traditions. For instance, point “4” in the first group: body awareness. There is a great deal of difference between the highly developed practices described in Patanjali Yoga, and the austere physical denial expressed in many Christian traditions (the Hesychast practice being, as previously mentioned, an exception). Another example is point “3” in the second group: understanding and union with the “true essence”. Although present in all of these traditions, this ultimate goal is expressed and conceptualized in different ways. In Theravada Buddhism, the nature of this “true essence” does not seem to be an overt preoccupation, presumably because it cannot be “contemplated” at all. Focus is placed instead on the mind; by understanding the mind, a person can be freed from it. To many Christian mystics, God is considered to be ultimately unknowable, and man can only aspire to understand him to a certain capacity. In Sufism, divine realization is not a “human” achievement, but can only be granted by God.

Although there is a certain amount of variation, the features listed above can be clearly seen to a greater or lesser extent in all of the four traditions. A full exploration of the how-and-why of these variations would require an extensive and dedicated line of research that would be outside the bounds of this thesis. However, it is important to remember that these various practices did not evolve “by accident”, but formed due to the specific beliefs and ideals of the culture in which they were being used. It is clear that certain techniques are given emphasis by a particular tradition if they evoke a state of mind and are compatible with the mystical philosophy of that tradition (e.g. mindfulness in Buddhism, single-pointedness in Patanjali Yoga, and supreme love in Sufism or Hesychasm). In order to further pursue the subject of this thesis (that is, the possible application of meditation technique in music), it needs to be determined whether these “fundamental principles” of meditation are truly “universal” to the human experience (and are therefore transferable into another cultural/historical context), or whether they are purely the products of centuries of cultural interchange between mystical traditions. This second option would suggest that the power of the techniques have lain ultimately in their potent symbolism, and any reapplication of the technique in a new context would render them ineffective.

The only way to answer this question is to see how they function outside of these mystical traditions, specifically, in the modern secular world of science, art and music.



## **Chapter 3. The Recontextualization of the “Meditation Experience” in Modern Culture.**

In the previous chapter, four “practical” features and three “philosophical” features were identified as appearing to some degree in all four of the major meditation systems investigated (Buddhism, Patanjali Yoga, Christian mysticism and Sufism). It was also found that variations between practices in different traditions were reflected in variations in the philosophical structures surrounding those traditions and cultures.

In this chapter, the end objective is to determine whether the four “practical” features can be effectively transferred to a modern “Western” setting, given the likelihood that the “philosophical” features will alter due to the new cultural context. In order to consider this possibility, care must be taken to determine whether their use will be effective or appropriate given the new circumstances, as the practical and philosophical aspects of the traditions discussed thus far are often strongly bonded together through their specific cultural foundations.

In order to determine if any of the four practical elements can be used, a number of investigative steps need to be taken. Firstly, a selection of meditation systems that have emerged in the “Western” world over the past century will be examined to determine how many, if any, of the points isolated in chapter two can be detected, and to see whether a technique can be simply “transplanted”, or whether it needs to be adapted so as to bond to a new philosophical and cultural foundation. Following this analysis will be a discussion on some of the issues raised as a result of recent scientific research into the “meditation experience”, in that modern science is a primary guiding force in modern culture.

The conclusions reached at the end of this section will determine the approach to be taken in chapter four on the possible application of meditation techniques and principles to the “musical experience”.

### **3.1 MODERN OR ADAPTED MEDITATION SYSTEMS.**

As new or adapted meditation methods have emerged to suit the expectations of modern people, so too have their points of conceptual focus. Originally, meditation functioned as part of a system of religious practices, whereas many people now use meditation for other purposes, such as relief from such problems as chronic pain, depression, substance addiction and stress, or to enhance motivation, memory recall or

IQ. In the words of Daniel Goleman: "...meditation has been for millennia the path for the person who seeks to go beyond the limiting goals of the everyday world. Ironically, meditation is now touted as the best way to fulfill those everyday goals and live out worldly visions" (p. xxiii). However, despite the development of forms of meditation to serve a modern secularized culture, some people have turned to meditation specifically *because* of the spiritual foundations of these systems. Such an attraction may be fuelled by a person's desire to reinforce (or find an alternative to) their own religious roots, to seek answers about the nature of existence, or because of a fascination with the idea of developing their "psychic power".

Before we consider the nature of meditation in the modern world as compared to the fundamental principles isolated in the previous chapter, a selection of other more recently developed techniques should be discussed, if briefly, in order to gain a more diverse perspective on the range of styles and approaches. Each method has been selected as an example of a particular approach.

The first system to be discussed is Transcendental Meditation, which can be considered as a modern adaptation of single traditional form, whereas other modern forms may draw their elements from a number of sources, including science and cosmology as well as various meditation traditions. An example of this second approach is Gurdjieff's Fourth Way, which is a "hybrid" system that draws upon practices and concepts from a number of sources. The third and final system is the use of biofeedback technology, which is said to induce the same psycho-physiological responses as traditional meditation methods, but through the use of technology rather than esoteric mental exercises.

While by no means a complete list, the selection of meditation forms discussed below does provide a reasonable overview of the main stylistic trends and approaches developed in the Western world within the last century. In the following investigation, attention will be paid to the way (if at all) these systems make use of the features outlined in the conclusion to chapter two, allowing us to determine how well these "traditional" techniques and philosophies function in a modern context.

### **3.1.1 Transcendental Meditation.**

#### **Origins of Transcendental Meditation.**

In 1959, the Indian yogi Maharishi Mahesh arrived in the United States to begin teaching a technique he called "Transcendental Meditation". He had learned the technique as a disciple of the prominent Indian mystic Brahmananda Saraswati, who

had supposedly instructed the Maharishi to make the techniques more widely known (Russell, 1976, p. 24). The Maharishi began his teaching in India, where he founded the Spiritual Regeneration Movement in Madras in 1958, and a year later began teaching in the United States. The techniques proved to be very popular, and within two years the Maharishi had established a teacher-training program to cater for the growing number of people wanting to learn. Transcendental Meditation is now practiced by as many as two million people worldwide (information retrieved from the official TM website [www.tm.org](http://www.tm.org), 2004).

### **The Philosophy of Transcendental Meditation.**

Transcendental Meditation, often referred to as “TM”, is the practical application of the Maharishi’s broader philosophical framework, the Science of Creative Intelligence, or “SCI”, in which many of the more esoteric aspects of “Eastern” philosophy are re-packaged using modern scientific terminology so that they can be more easily understood and accepted by people in the “West”. Although “enlightenment” is the ultimate goal in TM, it is described in purely scientific, non-religious terms:

The benefit of this meeting of the ancient and modern sciences of physiology is that enlightenment is now being taken out of the realm of mysticism and uncertainty and is shown to be a specific reality that is verifiable, universally available, and of immense practical value.

The state of enlightenment represents the ultimate development of what we ordinarily consider to be the most valuable qualities of human life. It is something real, natural, and tangible and develops systematically in a continuous and progressive manner – on the basis of neurophysiological refinement, or purification.

This process of refinement [and resulting enlightenment] is completely natural for it utilizes the existing mechanics of human physiology (Wallace, 1975, p. 3).

The practice of TM teaches a person to achieve a state of mental stillness which is said to reduce stress levels and over time have profound physiological and psychological benefits. The fundamental practice involves the use of a *mantra* (a symbolic pattern of syllables), which is given to each student on the condition that he or she is not to divulge his/her own mantra to anyone else). The mantras themselves are not meant to have any specific meaning, although the syllables are derived from the names of Hindu

deities, and are assigned to students according to a number of factors, most notably age (Goleman, p. 70). The mantra is not used as a point of focus or a meditation object, as it might be in traditional Hindu or Buddhist practices, but instead serves as "... a vehicle on which the attention rests and which leads it down to the subtler levels of thinking" (Russell, p. 50). The mantra is meant to be "nonsensical" and not evoke any specific meaning for the user. However, references can also be found that suggest that particular syllables are imbued with certain "energies" (ibid., p. 47), and the care with which specific mantras are chosen for, and kept secret by, each person does evoke a sense of "... mystique about the specialness of each person's mantra" (Goleman, p. 70).

### **The Practices of TM.**

In practice, a person assumes a comfortable sitting or lying position and meditates on their mantra for 20 minutes twice daily, in a manner that has been referred to in such terms as "passive concentration" (West, in West (ed.), p. 18), in which concentration and mindfulness are employed simultaneously. Even at the most basic levels, there is no "effort" required to successfully practice TM. The only essential factor to ensure the technique's success is for it to be practiced *exactly* as taught (the same technique is taught to everybody). The meditator simply allows the mind to "rest" on the mantra; if thoughts wander, they are drawn gently back to the mantra without force or effort. Over time, mental processes and the development of thoughts can be observed at a progressively refined level, until finally the point of mental conception, or, as described by Russell, "... a state of zero mental activity, a state of non-vibrating consciousness..." (p. 34) is accessed. Known as the "Fourth State" or "transcendental consciousness", this mental state is distinct from waking, dreaming and deep sleep in that it is characterized by total alertness yet the total absence of thought (thought having been reduced to its fundamental field of "pure creative intelligence"). "What has effectively happened in transcendental consciousness is that the object of experience and the subject of experience have become the same" (ibid., p. 95). This state allows access the true nature of self, and the source of all creation.

Beyond the Fourth State is the Fifth State or "Cosmic consciousness", in which transcendental consciousness is maintained constantly, allowing the person to draw upon the field of creative intelligence whether awake, dreaming or in deep sleep. Advanced levels of TM offer access to more powerful states of consciousness, enhanced psychic abilities and Self-realization (however the specifics of these advanced techniques are not revealed to the general public).

Much of the appeal of TM is that there is no need to renounce worldly interests. In fact, TM is said to *enhance* a person's ability to cope with his/her worldly life. Concepts such as enlightenment and Self-realization are explained in terms of *enhancing* a person's sense of individual self and ego (although the "self" becomes redefined in terms of creative intelligence rather than sense-perceptions only) (Russell, p. 16), rather than dissolving it as illusion or *maya*. In addition, the practice of TM is said to not interfere with a person's existing religious or philosophical beliefs (information retrieved from the official TM website [www.tm.org](http://www.tm.org), 2004).

Publications by TM advocates and websites maintained by the Maharishi's organizations claim that TM is a totally unique while simultaneously universal practice that utilizes the natural (but usually dormant) abilities of the brain to facilitate the equally natural state of enlightenment, and that it contains the potential for the further evolution of human consciousness, social reform, and world peace.<sup>1</sup>

### **TM and Scientific Research.**

The advocates of TM and SCI (including the Maharishi himself) rely heavily on "scientific evidence" to validate these practices, and offer many examples of experimental studies that have confirmed the overwhelmingly positive effects of TM (many of the results from these studies are available from the official TM website noted above, or in Keith Wallace's 1974 publication Neurophysiology of Enlightenment: Scientific Research on Transcendental Meditation). However, another body of research shows that TM may result in different psychological/physiological responses than those proclaimed by the TM affiliated studies. A summary of much of this research is available in Holmes (1987, pp. 81-103), in which increased heart-rate (p. 86), respiration (p. 88) and somatic arousal (p. 96) were all observed in TM practitioners when this form of meditation was compared with simple rest states.

This disparity between the results of different studies does raise a question mark regarding the reliability of this scientific research, how it is conducted, and how the results are presented. It also suggests that TM (either the practice itself or as it is taught presently) may not actually be suitable for everyone because of differences in

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<sup>1</sup> To these ends, the organization has also founded a political party in the United States (the Natural Law Party) based on the Maharishi's socio-political visions, and a university (the Maharishi University of Management, formerly the Maharishi International University) dedicated to the research of Science of Creative Intelligence ([www.tm.org](http://www.tm.org), 2004).

psychological profiles (Delamonte, 1987, p. 123), despite previous claims to the contrary.

### **3.1.2 The Fourth Way.**

#### **Origins of the Fourth Way.**

“The Fourth Way” is a system of philosophy and practice developed by the Russian born G.I. Gurdjieff (1877-1948) after many years of personal spiritual exploration throughout the Middle East and Central Asia (Goleman, p. 96). During his travels he acquired a number of companions who later became his students, and ultimately, future teachers of the Fourth Way system (most notably P.D. Ouspensky and A.R. Orage).

The philosophy of the Fourth Way is complex, with many interweaving concepts regarding human psychology, different levels of consciousness, and the nature of the “Universe”. The main premise of the Fourth Way is that the vast majority of humans are “asleep”, and go about their lives in an unconscious, automatic state. The primary aim of the Fourth Way is to “awaken”, and realize the full potential of human consciousness.

#### **The Philosophy of the Fourth Way.**

The Fourth Way is thus named because of the nature of the path. Action and thought is said to take place within three main “centers” of attention; the mechanical, in which actions are purely automatic and physical, the emotional, in which attention is held through interest and excitement, and the intellectual, in which attention is directed using will and effort (Ouspensky, 1977, pp. 55-56). The Fourth Way supposedly combines all of these centers in a unique and powerful way. As a means of explanation, Gurdjieff compares the Fourth Way with three well-known spiritual “archetypes” (cited in Ouspensky, pp. 44-47).<sup>2</sup> The first is that of the *fakir*, who does not philosophize, but develops a practice (often originating with the imitation of his teacher) of extreme physical discipline and suffering (mechanical center). The second way is that of the *monk*, whose actions are based on religious fervor, faith and love of God, and obedience to the teacher (emotional center). The third is the way of the *yogi*, who uses the power of his mind to harness the intellectual center. These methods are said to be restricted to the confines of their respective centers, and cannot develop any further, whereas the Fourth Way develops all of the centers simultaneously so that they may be

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<sup>2</sup> Gurdjieff describes his use of the term *fakir* (and to some extent *monk* and *yogi*) as archetypal definitions, and not literal descriptions of the actual practices and beliefs of actual Sufi, Buddhist and Hindu mystics.

used together, in harmony (Webb, 1980, p. 235). This development takes place not in social seclusion under vows of renunciation, but in the world, through interpersonal relationships, life situations and material possessions. For these reasons, the Fourth Way is sometimes referred to as the “way of the sly man” (Goleman, p. 96) (Ouspensky, p. 50) (Webb, p. 145).

In order to undertake the Fourth Way path, a person must become aware of the nature of and reasons for their actions and thoughts through the simultaneous development of “knowledge” (understanding concepts in a way that is simultaneously detailed and inter-relational) and “being” (self-observation of the fragmented multiplicity of one’s personality, and cultivation of the true “observing I”<sup>3</sup>). Through the primary processes of “self-observation” and “self-remembering”, a person can begin to reconnect with this essence from which emerges the “one true I” or “observing I” (Goleman, p. 98).

### **Fourth Way Practices.**

The Fourth Way does not consist of a rigid set of practices and principles as many other mystical systems do; new generations of teachers and sub-schools have developed their own particular brand of the Fourth Way based on Gurdjieff’s original teachings (ibid., p. 97). Gurdjieff’s original system consisted of a large number of different practices, designed to exercise each of the three centers and facilitate communication between them. The details of many of his practices are not revealed by practitioners, but a number of better-known disciplines include:

1. Self-observation and contemplation; observing one’s own thoughts and actions in relation to the Fourth Way theories, observing the dynamics of interpersonal relationships, and acting in accordance with “Work I’s” (parts of the personality that aid self-development, as opposed to the “false I’s” that hinder it).
2. Physical Disciplines; James Webb describes a number of physical disciplines including various “dances” based on those of Mevlevi Sufism and other Eastern traditions, music and chanting using Gurdjieff’s microtonal musical systems and ancient religious texts (pp. 239-240).

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<sup>3</sup> Mental processes such as “imagination” and “identification” are considered as the illusory manifestations of the “many I’s”, different internal characters that arise, and with which we identify, in turn depending on the situation. These many I’s are acquired through life experiences and are said to number in the thousands, collectively forming a person’s “personality”. Buried within this web of identification is a person’s “essence”, which appears as an empty vessel at birth and is filled over time with personality (this essence is also considered to be the source from which the “true I” emerges). More information on this philosophy can be acquired from the Fourth Way website (2004).

3. Mental Exercises; esoteric text memorization, learning complex codes, engaging in counter-intuitive mathematical problems, and meditation on given subjects (ibid.). An example of the latter is described by Ornstein, who recounts an exercise in which Gurdjieff instructed his students to "... meditat[e] on a series of dots on a piece of paper" (1971, p. 158).

The complexity and intensity of these practices supposedly strengthens the cooperation, capacity and energy distribution between the three centers, and the observation of personality and the "many I's" reiterates the importance of everyday experiences and societal relationships as tools for the development of consciousness.<sup>4</sup>

Many of these exercises were designed to challenge all three centers at once, requiring intense concentration, physical coordination and expression. Gurdjieff's student James Young likened these exercises to "... the children's game in which you try to pat the top of your head at the same time as rubbing the stomach with a circular motion" (Webb, p. 239). Young describes the value of these exercises purely in terms of the effort being expended, however others have believed that they also contained a deeper symbolic significance, and "... in some way they aligned the pupil with the harmonies of the universe" (ibid., p. 240).

Despite varying opinions regarding the symbolism of Gurdjieff's physical, mental and creative exercises, they all reinforced the central objectives of "self-observation" and "self-remembering".

The diversified approach of the Fourth Way has allowed it to evolve in accordance with the needs of the individual, changes in society and new cultural settings.<sup>5</sup> Because The Fourth Way is not as centralized an organization as some other mediation systems (such as the TM movement), students must take care when choosing a school. This lack

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<sup>4</sup> An interesting example of this kind of "worldly" teaching is given by Ornstein:

[A student of Gurdjieff] felt that she was a "slave" to her habit of cigarette smoking. Gurdjieff, who stressed that men were often slaves of their habits, instructed her to give up smoking. On returning to him a year later, she told Gurdjieff triumphantly that she had given up smoking and was no longer a slave to her cigarette habit. Gurdjieff smiled and immediately offered her a very expensive Turkish cigarette, indicating that it was not in her behaviour but the fact that she had been a slave to her cigarette habit that was important (pp. 201-202).

<sup>5</sup> Because of the Fourth Way's somewhat "open form", a number of "false schools" have emerged in recent years that use elements from Fourth Way teachings in a way that either misrepresents or misuses them, and have to some extent tainted the reputation of the Fourth Way as a whole. To combat this, Fourth Way advocates have established a list of "false schools" and "degenerate practices" on their website to inform potential students of possible pitfalls. They also recommend that prospective students should seek out schools whose teachers have been trained "officially" (that is, their teaching lineage can be traced back to Gurdjieff and his original principal followers).



of centralization may seem an inefficient means of carrying on a tradition when compared to an organization like that of the Maharishi, but Gurdjieff himself stressed that a person has to “want” to do the Work: “And, first of all, it has to *be found*. This is the first test. It is not as well known as the other three ways. There are many people who have never heard of the fourth way (sic.) and there are others who deny its existence or possibility” (Gurdjieff, cited in Ouspensky, p. 48). Gurdjieff warned that the Fourth way is *not for everybody* (“not suited to mass tastes”) (Goleman, p. 96), as opposed to TM, which is meant to be for *everybody*.

The other difficulty in discussing the Fourth Way is that its practice depends on the understanding of a complex and mentally challenging system of philosophy. However, its primary emphasis on “self-observation” and the nature of the many exercises has very much identified it as a “mindfulness” style of meditation (Goleman, p.99).

### **3.1.3 Modern Biofeedback Equipment.**

#### **The Theory and Practice of Biofeedback Meditation.**

New technology has emerged in the past century that has enabled a more “quantitative” assessment of the dynamics of human physiology and brain function. Devices designed to monitor heart-rate, electrical skin resistance, body temperature and brain activity have not only given scientists new tools to study otherwise “subjective” human experiences such as meditation, it has also resulted in new ways of devising methods for inducing those experiences.

One such method involves the direct use of monitoring equipment with some kind of attached feedback device, such as a visual display or tone generator, allowing a person to identify changes in their physiology by observing representative changes in the feedback apparatus. Using these indicators as a guide, a person is able to, over time, begin to control the normally “automatic” physiological features that are being monitored (Ornstein, p. 226). This method is known as “biofeedback” and has generated a great deal of interest among researchers of mentally-induced psycho-physical states such as meditation.

The “physiology of meditation” has become a popular subject of investigation among scientists, as it has allowed them to compare meditation with other states such as hypnosis, rest and arousal. As a result of early studies on Zen masters and Indian yogis (Fenwick, 1987, pp. 105-108), and subsequent writings of TM-affiliated scientists such as Herbert Benson (1984) and Keith Wallace (1974), a number of “automatic” physiological responses have been associated with meditation, most notably electrical

brainwave activity, which is monitored using an electroencephalograph or EEG, and electrical skin resistance, which is monitored using an electromyograph or EMG.

There are two principal theories regarding brain function that have been of particular interest to practitioners of biofeedback meditation; the “split brain theory” and the control of brain wave frequencies. Deep meditation has been associated with high a proportion of “alpha” brain wave activity (8-12 Hz) (Ornstein, p. 167) and a balanced state of activity between the right and left brain hemispheres (Cade and Coxhead, 1979, p. 21); both of these parameters can be controlled using biofeedback equipment. Studies have also suggested that high electrical skin resistance (ESR or EMG) readings give a reliable indication of reduced levels of arousal (Cade and Coxhead, p. 19), a parameter that is also easily controllable using biofeedback technology.

### **Advantages and Disadvantages of Biofeedback Meditation.**

Biofeedback is an interesting and different way of inducing meditative states, in that it focuses entirely on controlling physiological responses; any changes in psychology and consciousness emerge as a result of the physiological changes. This kind of “objective” approach may be more appealing to people who require a greater feeling of personal “control” than they would if engaging in more “esoteric” practices (Carrington, 1987, p. 156). Of course, this sort of physiological approach is not new; the observation of bodily functions is important in yoga, Sufism, and other traditional systems, and many traditional “mental” exercises are in fact “brain entrainment” techniques. However, the precise and objective nature of modern techniques using biofeedback equipment allows this process to be “streamlined”, resulting in a more rapid onset of psychological benefits. Indeed, the famous yogi Swami Rama suggested that “... when he returned to India, he would shorten the training of novice monks by starting them off with biofeedback instruments. Many years could be saved that way, he observed” (Cade and Coxhead, p. 20).

Despite the dramatic and rapid effects of biofeedback, there are limits to its use. According to Russell, by using biofeedback techniques a person can only control a small number of parameters at a time, whereas in “true” meditation (in this case Russell is referring to TM), many simultaneous changes in the body take place as a matter of course (p. 60). In any case, biofeedback has shed many new insights into some of the neuro-physiological processes that take place during meditation, and consequently some of the intimate links between body and mind.

## **Considering Modern Forms of Meditation in the Light of the Concepts Discussed in Chapter Two.**

In a similar fashion to the methods discussed in chapter two, these modern meditation forms display a number of common features. Some of these features correspond with those isolated earlier, while others do not or may have been adapted.

Many of the “practical” features from chapter two also apply to these modern forms, either directly, or through cultural recontextualization. TM, the Fourth Way and biofeedback meditation also consist of a number of layers of proficiency, of which the more advanced techniques are restricted to those suitably qualified through duration of practice and depth of understanding. All three also engage in exercises involving single-point concentration and/or expansive awareness, as well as some interesting variations of the two, such as the TM concept of “passive concentration”.

The more detailed points such as language-based tools and exercises in bodily awareness vary to a greater extent. In TM the fundamental tool is the mantra, however the words themselves are “nonsensical”, and although the actual sounds are thought to be imbued with certain “energies”, the mantra itself is never uttered aloud. TM is in itself not a physical technique, but changes in physiology (specifically stress responses) are a major preoccupation for practitioners. The Fourth Way makes use of language (either as verbalizations, tones of voice, or in thought) as a tool in exercises for observation, understanding and self-transformation. These exercises can either be formalized and ritualistic, or take place during a person’s observation of their own day-to-day interactions and experiences. Unlike TM, Fourth Way practices also include a number of physical disciplines. The use of biofeedback equipment is an entirely physical method, and does not involve the direct use of language, but instead relies on representative images or sounds.

Like the traditional meditation practices discussed in chapter two, these three modern systems are all designed to break through “superficial” levels of thought and gain access to purer, more malleable, and hence more powerful states of consciousness. Notions surrounding “normal” day-to-day existence are challenged when a deeper understanding as to the nature of the motivations behind this existence is gained. However, an important difference between these modern forms and their traditional counterparts lies in the belief that the key to this “higher awareness” is accessible through gaining understanding in and engaging with the physical world of day-to-day life, rather than renouncing the physical world so as to gain greater understanding in and engage with a more subtle, intangible reality.

The philosophies of these modern systems do not suggest that corporeal reality is an illusion, rather that it is distorted by dysfunctional human psychology. By understanding one's own psychology, a person can interact with the world in a more meaningful and effective way. Neither is the "self" considered to be an illusory notion. Rather, it is seen as something misunderstood, neglected and fragmented.<sup>6</sup> The aim of all of these methods is not so much the *dissolution of the self* and *unification with the greater whole*, but *understanding the true nature of the self* and *the unification of its fragmented aspects*. Rather than becoming unified with God and thus being freed from the world, these theories point towards unification with the self and thus engaging with the world in a more meaningful way.

The final point to be raised regarding these modern forms of meditation is that they all base their theories and practices on scientific/psychological concepts. Although methods such as TM and The Fourth Way are derived from older, religiously based practices, and do as a result use some "spiritual" terminology (such as Gurdjieff's "ray of creation" (Ouspensky, p. 82) and TM's "Cosmic consciousness" (Russell, p. 105), this spirituality is redefined using modern scientific and psychological concepts.

## **3.2 MEDITATION AND SCIENCE.**

### **3.2.1 Fields of Research.**

#### **Psychology and Psychotherapy.**

Meditation first came to the attention of modern science in the early 20<sup>th</sup> Century, when psychoanalysts such as C.J. Jung began exploring alternate mental states as part of his research into human consciousness. Jung was particularly interested in the appearance and function of subconscious symbols in dreams, fantasy, art and mythology. He viewed the existence of these symbols in different cultures and historical periods as evidence of what he called "archetypes" or "primordial symbols"; basic unconscious imprints that he considered to be the psychological manifestation of instinctive trends (Jung, 1974, pp. 67-69). These archetypes, Jung explains, are the basis of the "collective unconscious": "... a part of the psyche which can be negatively distinguished from a personal unconscious by the fact that it does not, like the latter, owe its existence to personal experience and consequently is not a personal acquisition" (Jung, 1980, p. 42).

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<sup>6</sup> For example, TM theories refer to the mental "signal to noise ratio" (Russell, p. 33), The Fourth Way refers to the "many I's" and "false personalities", and biofeedback gives examples of "asymmetrical" brainwaves that are in disharmony (Cade and Coxhead, p. 160).

Although much of Jung's research was more concerned with the symbolic elements (e.g. mandalas and other sacred images) of meditation rather than the actual techniques (Smith, 1987, p. 136), his pioneering work has led to a strong body of research into the psychology of meditation. Over the years, psychologists and cognitive scientists have found meditation a rich and interesting field of research, whether their studies are in the interest of pure research, or have more clinical ends in sight. A number of current-day psychologists have created new meditation forms to be used as a part of their clinical practices, such as Patricia Carrington's CSM ("Clinically Standardized Meditation") technique (Carrington, pp. 150-151), Herbert Benson's ROM ("Respiratory One Method") (ibid.), or the more physiologically based "Progressive Relaxation" method, developed by Edmund Jacobson (Bernstein and Borkovec, 1975).

Although the application of meditation techniques in clinical settings can lead to a number of problems relating to the need for skill acquisition, patient openness or misinformed skills training (Smith, pp.136-149), these methods have been shown to provide an alternative to more "invasive" methods such as hypnosis (Carrington, p. 156).

### **Physiology, Cognitive Science and Neuroscience.**

Meditation has also drawn much attention from physiologists and neuroscientists, and since the advent of practical forms of electroencephalography and other forms of physiological monitoring, there have been a growing number of studies made on the effects of meditation on human cognition and the physical body. One of the most influential, but still in many ways elusive and ambiguous, fields of physiological research is electroencephalography (EEG research).

Although the electrical activity of the brain was discovered in 1875 (Cade and Coxhead, p. 21), it was not until the 1950s that any serious research into the nature of electrical brain activity was conducted. During this time, certain global brain wave frequency patterns began to be associated with particular mental states. Of particular interest were the "alpha" frequencies, which became associated with states of relaxation and synchronicity between the brain hemispheres (ibid.).

EEG technology offered, for the first time, a window into the workings of human consciousness. Early studies into meditation by scientists such as Bagchi and Wenger (1957) were difficult to implement, due to the cumbersome nature of the equipment and the inaccessibility of meditation masters at the time (Fenwick, p. 106). However, the

results of these initial experiments yielded results that led to a massive body of subsequent research by countless scientists over the last several decades.

More recent studies have used relatively plentiful Transcendental Meditation practitioners as subjects (Warrenburg, Pagano, Hlastala, 1980, pp. 73-93) (Fenwick, Donaldson, Gillis, Bushman, Fenton, Perry, Tilsley, Serafinowicz, 1977 pp. 101-119), or simply devised their own “meditation exercises” for the purposes of the experiment (often based on the TM technique) (Seer and Raeburn, 1980, pp. 59-71). As was discussed in section 3.1.3, more sophisticated technology and a wider variety of physiological monitoring methods have allowed scientists in more recent years to design ever more detailed and complex experimental models so as to further understand the physiological foundations of these human experiences.

### **Research Methods and Experimental Models.**

Based on the body of research studied for this dissertation, there have emerged three primary questions about meditation that have been tackled by the scientific community with a greater or lesser degree of success:

1. What are the key features that actually define the “meditation experience”?
2. How is the “meditation experience” achieved?
3. Why do people meditate?

In the past, religion was the supreme authority for understanding life and defeating death, and meditation was an important practical tool for personally realizing religious concepts that lay beyond intellectual boundaries. In the modern world, science has assumed that position of authority, with experimentation being a similarly important tool for understanding broader concepts and systems.<sup>7</sup> Because of the essentially qualitative nature of meditation, attempts at its definition, explanation and understanding by quantitative means can be highly problematic.

### **3.2.2 Understanding the “Meditation Experience”.**

#### **Scientific Definitions for Meditation.**

There are a number of ways in which meditation has been defined by the scientific community. The first theory suggests that meditation is a unique physical state with

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<sup>7</sup> Both meditation and modern empirical research are essentially “sciences”, in that they both engage in objective observation of and experimentation a system. However, the “science of meditation” recognizes the essentially qualitative nature of its subject matter, whereas “science on meditation” is more concerned with quantitative measuring.

predictable psychological consequences, and as such it is universally accessible (e.g. Wallace, Benson). The second contends that there is no evidence to suggest that meditation is any different or more beneficial than any other form of “rest” (e.g. Holmes). The third explores the possibility that meditation is a practice whose effects and benefits depend largely on a person’s specific psychology, their cultural background, and the technique they choose to practice (e.g. Carrington).

Studies and experiments have been conducted that can provide evidence proving or disproving any of these theories, which suggests either that scientific investigation is not as impartial and objective a tool as generally thought, or that meditation is more complex a system of experiences than previously thought, and one that encompasses all of the above theories without being restricted to any of them. Some aspects of the “meditation experience” can be reproduced quite reliably in an experimental setting, however the more complex and long-term psychological effects are harder to reproduce with reliable uniformity. Some experts have attributed this unpredictability to inadequate experimental designs and procedures, in which many important factors, such as expectancy<sup>8</sup> (both on the part of the subject and the researcher), a subject’s personal psychology, and the circumstances under which the data is gathered are often overlooked (West, pp. 18-22).

### **Defining the “Meditation Experience”.**

Because of these inconsistencies, it can only be concluded that meditation is a complex combination of physiological, psychological and cultural influences. In order for its effects to be further reaching than mere physiological responses, the experiences themselves need to be given a symbolic significance so that the practitioner is able to identify them within a philosophical context. An example can be drawn from a study made by L. Bernardi, P. Sleight, G. Bandinelli, S. Cencetti, L. Fattorini, J. Wdowczyk-Szulc and A. Lagi, in which it was found that performing the Catholic Ave Maria rosary and reciting yoga mantras both induce a respiratory rate of approximately ten seconds (six breaths per minute), which corresponds to the ideal respiratory rate for maintaining healthy blood pressure and heart rate:

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<sup>8</sup> Some studies have even suggested that the effectiveness of meditation might lie not so much in the techniques employed, but in the conceptual framework in which it is presented, implying that it might not be the actual experience that has the desired effect, but the expectancy of the meditator (Shapiro, 1987, p. 175).

We serendipitously discovered that reciting the Ave Maria prayer and yoga mantras enhances and synchronises inherent cardiovascular rhythms because it slows respiration to almost exactly six respirations per minute, which is essentially the same thing as that of endogenous circulatory rhythms. [...] We believe that the rosary may have partly evolved because it synchronized with the inherent cardiovascular (Mayer) rhythms, and thus gave a feeling of wellbeing, and perhaps an increased responsiveness to the religious message. (Bernardi, et. al., 2001).

Here we have a practice that has a clear and beneficial physiological effect, however, in order for the activity to be anything more than a pleasant and interesting relaxation exercise, there needs to be some “meaning” with which to integrate the experience. The physiological response sets up the potential for a meaningful experience, but it is the symbolic significance that manifests it.

Essentially, meaningful human experiences cannot take place in a conceptual vacuum. Therefore, in order for any meditation exercise to be applied in a new context, all of the above factors need to be taken into account.

Similar comments can be made about other qualitative aspects of human culture that have been subjected to attempts at definition using quantitative measures, such as language, art and music. The following chapter continues this line of discussion into the realm of the “musical experience”, and examines how it, like the “meditation experience”, is dependent on many factors beyond the quantitative theories that have tried to define it.



## Chapter 4. Defining the Western Art Music “Experience”.

Like meditation, music is a powerful and complex combination of experiences containing many layers of influence. It has been used as a practical tool in many cultural institutions, including science, mathematics, philosophy and religion, and as a means of communicating abstract concepts and deep emotions. Yet, as a product of culture, music is bound by the specific philosophical and scientific boundaries of the culture in which it is created. Thus, music as we perceive it exists within the confines of certain theoretical laws of musical definition.

One of the primary contentions of this dissertation is that the “musical experience” can be made more intimate and powerful if it is offered in a context that loosens some of the cultural preconceptions that can restrict its full potential.

In order to do this, some of the conventions that define music *as music* need to be identified, so that it can be determined whether they help or hinder the realization of the full potential of the “musical experience”. Because of the scope of this dissertation and the creative emphasis of its accompanying projects, this investigation will focus specifically on Western Art Music. There will be a brief outline of the history and evolution of musical science and how those theories have been applied to construct a commonly recognizable musical “language” through the use of specific philosophical and aesthetic conventions.

Finally, the traditional scientific, conceptual and symbolic conventions of Western Art Music will be viewed in relation to the actual “musical experience” as it exists in today’s cultural context, and whether the redefinition of some of those conventions by recent composers have yielded some useful creative alternatives. Some of these alternatives will then be considered to exemplify the creative diversity of today’s Art Music practice, while also indicating the possible residual presence of some of the more resilient traditional ritualistic and symbolic elements. These insights will provide some further background into the possibility (and realistic potential) for applying some elements of meditation into a musical setting.

## 4.1 THE TRADITIONAL AESTHETICS AND CULTURE OF WESTERN ART MUSIC.

One of the fascinating things about music is that it is simultaneously an art and a science. Because sound is simultaneously a tangible force (able to affect physical bodies) and an intangible force (able to affect thought and emotion), it has always been viewed as a possible window into the greater uniting whole of the “Universe”. In all of the great civilizations, musical science has played an important role not only in the development of mathematical and physical theories, but also as a means of understanding other, more human phenomena such as thought, emotion, perception and social dynamics (which are supposedly subject to the same mathematical laws as those other, “external” forces). For example, music was used in ancient China for divination and the maintenance of social and governmental equilibrium (Daniélou 1943 (rev. 1995), p. 9). Although there are some points of convergence, there are a number of notable differences in the musical sciences of different traditions, resulting in different tuning systems and concepts of musical “harmony” in the classical musics of India, China and Europe.

### 4.1.1 Scientific Theories Regarding the Nature of Musical Sound.

#### **Ancient Theoretical Foundations.**

Many of the conventions within Western Art Music can be traced back to the aesthetic and philosophical notions of certain ancient Greek philosophers, most notably Pythagoras, Plato, Aristotle and Ptolemy. Central to Plato’s theories was his concept that certain attributes such as “Beauty” and “Truth” were in fact constant and unchanging “absolutes” that, although not observable by themselves, are reflected in certain things in the physical world, and explored to varying degrees by products of culture such as art, mathematics and science. “[The theory of these “Absolutes” is] a **standard** with which to judge individual objects as being more or less beautiful. Because they are the patterns or ideal models to which we compare individual actions in order to determine how beautiful, just, or whatever, they are, [Plato] also refers to them as ‘**Forms**’ or ‘**ideas**’” (Dye, 1995).

Music has demonstrated this idea very effectively, since sound is a more abstract medium than language or visual imagery, and encompasses both mathematical and scientific laws as well as more subjective experiences such as emotion. The doctrine of *ethos*, developed by Plato and carried further by Aristotle, stated that music was not only a reflection of universal laws, but that it was an active influential force capable of

inducing states of mind and changing a person's temperament (Grout and Palisca, 1988, pp. 7-8).

The mathematical laws on which Western Art Music is based were laid by Pythagoras in the 6<sup>th</sup> Century BC, who supposedly used a plucked string to deduce that musical intervals depended on certain ratios of proportion (Grout and Palisca, p. 10). Pythagoras found that pure, simple ratios resulted in "ideal" intervals, and these ideal proportions were seen as a reflection of natural laws found throughout the universe.<sup>1</sup> Whether a sound was "musical" or not was determined by the degree to which it abided by these "natural" laws of harmony and proportion.<sup>2</sup> Pythagoras' investigations and resulting theories were inspired by his particularly rigid belief that the phenomenal universe could be reduced to pure mathematics, and that understanding the nature of mathematics would yield the secrets of Creation (Grout and Palisca, p. 6). However, Pythagoras' theory on musical proportion contained a number of "errors" (most notably the "Pythagorean comma"<sup>3</sup>) that have occupied theorists and musicians ever since.

### **The Rise of Modern Musical Theory over "Number Mysticism".**

At its foundation, Pythagoras' system of mathematical mysticism implied the existence of a kind of Divine Geometry that offered a "window into the mind of God", a concept that inspired musical theorists throughout the Middle Ages. The symbolism of certain number combinations and how their presence in certain systems (such as musical intervals) could reflect a similar "cosmic" harmony occupied the minds of many musical theorists up until the 16<sup>th</sup> century, such as Gioseffo Zarlino (1517-1590). In the later 16<sup>th</sup> century, this reduction of musical intervals into pure mathematics was challenged by theorists such as Giovanni Bendetti (1530-1590) and Vincenzo Galilei (c. 1520-1591), who began a trend that continued into the 17<sup>th</sup> century with individuals such as Marin Mersenne (1588-1648), who conducted controlled experiments in order to explore sound as a physical force functioning in a mechanistic universe. Although

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<sup>1</sup> It was Plato who coined the term "Music of the Spheres", and the later theorist Ptolemy (who was also a leading astronomer of the time) saw the same mathematical ratios in the movement of stars and planets as those found in music (Grout and Palisca, p. 6).

<sup>2</sup> During the Middle Ages, the "dissonant" interval of the tritone was avoided, being considered to be "*diabolus in musica*" ("the devil in music") (Cohen, 1984, p. 227).

<sup>3</sup> The "Pythagorean comma" is a tuning error that arises as the Pythagorean ratios are extended beyond a single octave. For a detailed explanation of the mathematics of this phenomenon, please refer to Cohen (pp. 37-39).

this concept was by no means new<sup>4</sup>, it was for the first time viewed as the physical realization of intervallic ratios, rather than as a conceptual analogy. In general science, the most important figure of this 17<sup>th</sup> century “Scientific Revolution” was Isaac Newton, who successfully united a number of previously opposing scientific approaches with his theories of Forces (Encyclopaedia Britannica, Vol. VII, 1982, p. 306). In musical science, this new line of enquiry paved the way in the 17<sup>th</sup> and 18<sup>th</sup> centuries for the science of acoustics, in which the concept of overtones and the harmonic series enabled composer/theorists such as Rameau (1683-1764) to investigate the nature of consonance and dissonance as they applied to functional harmony.

Although Rameau’s writings form the basis of many current-day concepts of functional harmony, certain un-resolvable problems inherent in Benedetti’s “coincidence theory” (on which 17<sup>th</sup> century musical science was based) meant that there was still no definitive explanation for certain auditory phenomena, such as the relative tuning of different intervals and the perception of difference tones.

The 19<sup>th</sup> century gave rise to a number of different approaches to musical sound and acoustics. New connections were made between human perception and the structure of the ear through the research done by scientists such as Boerhaave and Corti. Another important approach during this century was taken by Fourier, who proposed that sounds are composed of complexes of simple tones that act upon each other to create timbre. A third, purely mathematical theory was proposed by Leibniz and Euler, who suggested that the perception of consonance was due to “... psychological considerations in the human preference for order over disorder, for unity in variety, and so on” (Cohen, p. 237).<sup>5</sup> It was not until the later 19<sup>th</sup> century that these different fields of research were united by Hermann von Helmholtz’s in his seminal book On the Sensations of Tone as a Physiological Basis for the Theory of Music (originally published in 1863).

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<sup>4</sup> In ancient Greece, there existed two theories; one considered sound as a proliferation of particles from the sound source to the listener, the other used the analogy of ripples on water to describe how a sounding body would influence the air in wave patterns (ibid., p. 77).

<sup>5</sup> In a recent study by Australian physicist and abstract painter Richard P. Taylor, the paintings of Jackson Pollock have shown to possess structures and proportions corresponding to nearly ideal representations of Chaos Theory and fractal mathematics, two scientific fields that did not emerge until more than ten years after the great painter’s death. Upon further investigation, Taylor found that people tend to respond most favourably (i.e. derive the most aesthetic pleasure) to visual images (be they natural, mathematical or man made) that contain a certain degree of chaotic and fractal complexity. It seemed that throughout his “drip painting” period, Pollock had been experimenting with different degrees of fractal complexity in attempt to find this ideal “chaotic balance” (Taylor, 2002, pp. 84-89).

Of course, exploring the nature of consonance and dissonance in relation to mathematics, waves of force, harmonics and human physiology does not entirely resolve one of the original problems brought forth by ancient theorists such as Pythagoras, which is: how does the existence and perception of consonance/dissonance equate to the actual “musical experience”, in that it can evoke highly powerful emotions and other states of mind?

### **Recent Developments in Musical Science and Acoustics.**

In the last century, new technology has offered greater understanding not only into the physical nature of sound itself (e.g. the oscilloscope) and room acoustics, but also into the ways in which sound is processed by the brain. This new perspective has allowed scientists to begin to consider how the intimate connections between the physics of sound, human physiology and psychology all contribute to the experience. In addition, new understanding into the nature of music and musical theories of other traditions and how they correspond to Western Art Music concepts suggest that how we judge and experience music, even in how we perceive sound, is to a large extent due to cultural influences. The music educator and psychoacoustics theorist Robert Walker, in his book Musical Beliefs: Psychoacoustic, Mythical, and Educational Perspectives (1990), cites many experiments indicating that the perception of consonance is not “hard-wired” into our brain or ear structure, but is learned.<sup>6</sup> Walker suggests that a person’s mythological, historical and linguistic heritage to a large extent determines not only how we perceive, but also *what* we perceive (p. xii), in that a person will tend to notice the particular features of a system that “corroborate” their already present conception of reality.

#### **4.1.2 Music as an Expressive Symbolic Language.**

##### **Experience as Distinct from Theory.**

As stated in chapter three regarding the “meditation experience”, the “musical experience’ cannot take place in a conceptual vacuum, and cannot be explained simply by studying the nature of acoustics or the processing of sound by the ear. The nature of pitch discernment is altered dramatically depending on the musical context. Although

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<sup>6</sup> For example, in an experiment by Bundy, Columbo and Singer in 1982, it was found that the ability to perceive the missing fundamental in a harmonic spectrum does not develop until an infant is 7 or 8 months old. Until quite recently, this ability was seen as a physiological response to the natural characteristics and physical laws of sound, but it seems instead to be as much learned as instinctively perceived: “Bundy and his colleagues (1982) conclude that the mature forms of pitch perception we associate with adults are not present in infants; they develop with experience” (Walker, p. 50).

some music theorists such as Rameau were also very notable composers, and there are some examples of theorists working directly with musicians or instrument builders,<sup>7</sup> many theories into the mathematics of musical sound have not been particularly concerned with actual musical practice. The foundations of Western musical theory are, of course, derived from ancient Greek musical theory, not ancient Greek musical practice (Grout and Palisca, p. 6).

However, composers have been asking the same fundamental question as the theorists, that is: what are the qualities in music that can actually evoke mental imagery and subjective experiences?

Many musical representations of non-musical subjects can be attributed to the imitation of a particular sound, or onomatopoeia, such as the roll of thunder in Beethoven's (1770-1827) Symphony No. 6, or Clément Janequin's (1485-1560) depictions of the sounds a battle in his work *La Guerre*. More abstract musical symbolism can also be employed in which recurring chord progressions or melodic fragments can be used to represent such non-musical things as people, places or objects, such as the *idée fixe* in Berlioz's *Symphonie Fantastique* (1830) or the symbolic musical motives used by Wagner in his epic opera-cycle *Der Ring des Nibelungen* (completed in 1876).

However, the kind of musical symbolism of greatest interest to this discussion is that which depicts and evokes the more "intangible" aspects of human experience, such as abstract thought and emotion. This kind of symbolism can span the length of an entire piece, can be encapsulated in a self-contained musical gesture, or serve to change the "mood" of other musical symbols. How, then, do these chosen musical symbols "evoke" their subjects, and how can their "moods" be altered by using different timbral and harmonic textures?

### **Changing Creative and Stylistic Explorations.**

The philosophical and aesthetic writings of Pythagoras, Plato and Aristotle have also been strongly felt in this field of musical endeavour, made known to later generations through the translations of Roman theorists like Ptolemy, through to St. Augustine (354-430) and Boethius (480-524) during the early years of the Roman Catholic Church. St. Augustine was well aware of the affective power of music, and similarly its potential for diverting attention *away* from God. He recommended a musical system

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<sup>7</sup> The 17<sup>th</sup> century theorist Isaac Beeckman supposedly learned about the phenomenon of dissonant beats from a contemporary organist, and Mersenne often was in contact with instrument builders (Cohen, p. 248).

that avoided those aspects that would incite worldly passions (e.g. dissonances, complex rhythms), so that its power would be better employed to inspire people towards more “virtuous” aspirations: “... that so by the delights of the ear the weaker minds may be stimulated to a devotional frame” (St. Augustine, cited in Grout and Palisca, p. 36).

This essentially Church-dominated aesthetic was challenged during the Late Renaissance when the romantic ideal of Classical Greek culture became fashionable, in particular the Platonic concept of *ethos* and the desire to reunite poetry and music.<sup>8</sup> Because of the now established aesthetic in which consonance represented order and stability, musical dissonance could be used as a way of expressing emotional tension and release, and the use of harmony that supported a melody, instead of the pure polyphony used by High Renaissance composers such as Palestrina, was used to evoke a sense of forward moving drama. The intimate link between poetry and music rose to prominence through the pen of Italian madrigal composers such as Francesco de Layolle (c.1492-1540), Cipriano de Rore (1516-65) and Orlando di Lasso (1532-94), later linking with other performative arts to create the earliest (surviving) opera, Monteverdi’s *L’Orfeo: Favola in Musica* (1607). These new creative endeavors, spurred on by new practices such as functional harmony and tonality, marked the dawn of the Baroque era in the early 17<sup>th</sup> century.

The connection between language and music similarly influenced instrumental music, with the introduction of the concept of *rhetoric* into musical structure. This idea of using melody, harmonic progressions and structure to construct fully self-sustaining wordless “oratories” gave rise to forms such as the fugue and sonata form, the mainstays of the “absolute music” of the 18<sup>th</sup> century.

Later on, with the sociopolitical unrest of the mid-to-late 18<sup>th</sup> century came further changes in the attitudes towards musical aesthetics and expression. Of particular note was the Parisian “opera war” of the 1750s in which the then established conventions of French opera were opposed by the philosopher Rousseau and his supporters, who considered both the style and the subject matter stifling, elitist and old-fashioned. They suggested that the simpler textures and more down-to-earth subject matter exemplified

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<sup>8</sup> There was of course no way to imitate Ancient Greek music as there were no surviving scores or instruments, and thus virtually no knowledge of actual musical practice. 17<sup>th</sup> century musicians and composers instead constructed a romantic impression of the music and other performing arts of this earlier time based on surviving texts and images that depicted, described or theorized about musical practice.

by the Italian *opera buffa* style were more expressive, and more accurately represented the natural emotions of Plato's *ethos* (Walker, pp. 123-124).

Throughout the 19<sup>th</sup> century, many composers and philosophers regarded the Platonic notions expressed in music as a window into the soul (ibid., p. 134). Arthur Schopenhauer was a strong believer in Plato's theories, and viewed music as the most powerful of the arts because it did not merely imitate the Platonic "Ideas" (the "Absolute Forms"), but bypassed them and thus reflected the essence of the *Will*, that is, humanity's universal striving towards unity with those Forms or Ideas:

Therefore music is by no means like the other arts, namely a copy of the ideas, but a copy of the will itself, the objectivity of which are the ideas. For this reason, the effect of music is so very much more powerful and penetrating than is that of the other arts, for these others speak only of the shadow, but music of the essence (Schopenhauer, cited in Storr, 1992, p. 140).

Schopenhauer represented a popular belief at the time to the effect that music was a form of communication more profound and subtle than any other art form, and composers became preoccupied with using music to explore the darker, more hidden aspects of human psychology. As a result, structural and harmonic conventions were not only challenged, but also stretched to their limits in the quest to find the essence of Plato's Forms. As the traditional aesthetic conventions of Western Art Music began to break down, composers began to turn to entirely new expressive systems, such as atonalism, dodecaphonicism (Shoenberg's "12-note" scale) and "noise compositions" (the Italian futurists such as Russolo envisioned music composed of "industrial" sounds generated by machines) (Nyman, 1974, pp. 34-37). The psychoanalytical work of Freud and Jung offered insights into human psychology that fuelled new inquiries into musical aesthetics, while the study of music from other cultures offered alternative timbres, musical structures and tuning systems.

## **4.2 THE WESTERN ART MUSIC EXPERIENCE IN A MODERN CULTURAL CONTEXT.**

In every period throughout history, music has been an important means by which particular social, cultural, scientific and technological preoccupations could be explored and discussed. As stated earlier, music is a product of culture, so its role as well as its definition are to a large extent determined by the requirements of that culture.



Considering the rapid (and ever accelerating) cultural changes over the past century, as well as its increasing diversity, it is interesting that the traditional aesthetics and practices of Western Art Music have retained any meaningful significance at all. After all, Western Art Music is essentially a cultural product of a past era, or is it?

### **Symbolism, Ritual and Musical Meaning.**

There are a number of important symbols and rituals that have been successfully adapted into new musical eras. Some general concepts, such as the ancient Greek, Roman and early Christian writings discussed in the previous section have been used as important aesthetic foundations throughout all of these historical periods. This mix of Pythagorean, Platonic and Augustian/Boethian concepts has provided an extremely rich and malleable basis for exploring different aspects of musical expression, how they relate to the other arts, and how they relates to life and the world at large. Although the existence of a common basic principle does not equate to uniformity of practice, it does suggest a possible reason why some of the aesthetics principles of music from, say, the 16<sup>th</sup> century (or even the 11<sup>th</sup> century) can still be appreciated today without full knowledge of their “technicalities”.

Other reasons why music may have certain “universal” qualities can be related to other cultural foundations that were laid during the Antiquity. In ancient Greece, music was intimately bound with poetry (Grout and Palisca, p. 7), and hence, connected to the sounds, structure and dynamics of language. Many Western European languages share common roots, thus just as a modern person can often guess the meaning of a French, German or English word or grammatical structure because of their common roots, some musical symbols may also be similarly recognizable.<sup>9</sup>

There are many points of connection that allow a common enjoyment and appreciation of music from different ages. However, a musician or listener needs to be aware of how their own specific cultural situation can and will affect the way in which they receive a piece of music. This is particularly evident when listening to the music of other cultures, and can be readily noted in many older ethnomusicological (or then called “comparative musicology”) studies in which inappropriate and misinformed “Western”

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<sup>9</sup> In his book The Language Instinct, American linguist Steven Pinker discusses how certain sounds produced by certain tongue shapes have similar meanings in different cultures. For examples, syllables such as “i” or “ee” tend to suggest “little” things, where as vowels such as “or” or “ar” tend to suggest “large” things (Pinker, 1994, p. 167). Such widespread symbolism in language structures could also have found its way, by means of poetry, to music.

musical value judgment were applied, hence missing both the point and the purpose of the music being observed.

“Romantic associations” to certain periods in history (as was the case in the 17<sup>th</sup> century when composers tried to “recreate” the aesthetics of ancient Greek musical drama) also removes a musical experience from its original context. In recent decades, “early music performance practice” has become a very prolific field of musical activity. However, despite so many efforts to “accurately” recreate the music of former times, many early music scholars are well aware of the extent by which the stylistic fashions of their own age can affect the interpretation of earlier music (particularly as much of the music from the early 1600s and before contains a large number of ambiguities) (Gardiner, 1987, pp. 16-17). Even if the “mechanics” of the music were perfectly reproduced today, the role-plays of performance, the presence or absence of certain instruments, and the expressive dynamics of the music in actual performance would contain a different symbolic significance, and hence result in a different “musical experience”, for a listener of today compared to a listener in the 16<sup>th</sup> century.

As explained by the ethnomusicologist John Blacking, music is ultimately a *participatory activity* which takes place in time and space: “The chief function of music is to involve people in shared experiences within the framework of their cultural experience” (Blacking, 1974, p. 48). Music is an activity that cannot be reduced either to physiological responses to sound or to relics of ancient Greek “Divine mathematics”, but is a complex ritual involving a combination of experiences determined by social, cultural, physiological and psychological factors.

Music is a synthesis of cognitive processes that are present in culture and in the human body: the forms it takes, and the effects it has on people, are generated by the social experiences of human bodies in different cultural environments. Because music is humanly organized sound, it expresses aspects of the experience of individuals in society (Blacking, p. 89).

### **Traditional Musical Conventions and the Modern “Musical Experience”.**

Much of the music of today still relies on important symbolic features of older styles of music. Many of the musical instruments, on-stage role-plays, harmonic theories, and formal structures have remained for centuries. This is by no means a “bad” thing, however it suggests that in order to find truly new creative avenues to explore and enhance the “musical experience”, composers need to address the foundations of what

actually constitutes that experience. This is particularly pertinent in today's "hybrid" culture.

In order for the musical experience to be as penetrating and intimate as possible, a composer can engage in either of the following practices:

1. To create a work that will evoke exactly the same response in every listener (by accessing some kind of "universal principle").
2. To allow the music to be totally malleable and open to any interpretation, without imposing any symbolism of its own.

In the following section, a number of composers who have explored either or both of these principles to enhance, or to seek an alternative means to access, the "communicative power" of their music will be discussed.

#### **4.2.1 Alternative Aesthetics in Modern Art Music: Redefining the "Musical Experience".**

##### **New Musical Sounds.**

The first half of the 20<sup>th</sup> century gave rise to an unprecedented number of new musical innovations with regard to musical structure, aesthetic intent and the actual definition of musical sound. The number of important composers is of course too long to list here, thus the following summary can only provide brief examples of some of the shifts in musical sensibilities in the last hundred years.

By the turn of the 20<sup>th</sup> century, tonality in Western Art Music had all but broken down, having been stretched to its extremes by late 19<sup>th</sup> century composers such as Mahler, Bruckner and Wagner. In the early 1900's, composers such as Schoenberg, Berg and Webern began to experiment with new compositional techniques that offered new alternatives to traditional harmonic aesthetics. Among these were the texturally-based aesthetic called *Klangfarbenmelodie* ("Tone Colour Melody"), "... in which instruments maintaining constant pitches drop in and out of an orchestral texture, creating a melody of tone colours. [...T]he changing colours transport us into a dream world, where the normal dimensions of melody and harmony no longer pertain" (Grout and Palisca, p. 767). Timbre, rather than using functional harmony and melody, was used to determine musical shape.

Between 1908 and 1923, Schoenberg worked with a new harmonic system that did away with all references to standard tonality. In this "Atonal" system, all 12 notes of the chromatic scale are treated with equal weighting, allowing the composer to work

with “pure sound” rather than the dramatic push-and-pull of consonance and dissonance. Although this “... emancipation of the dissonance...” (Schoenberg, cited in Grout and Palisca, p. 850) allowed new compositional freedom, it also meant that listeners had no symbolic signposts with which to gauge their musical responses. In 1923, Schoenberg developed a new system in which musical reference points could be made by comparing different treatments of “tone rows”, sequences of the 12 chromatic notes that form the basis of a piece. Following Schoenberg’s pioneering work in “12-tone music”, other composers began to create rows and sets using rhythms, dynamics and timbres as well as notes. This “total serialism” style is exemplified by the 1950s works by composers such as Milton Babbitt and Pierre Boulez.

Other composers took a different path in attempting to establish alternative methods to the traditional Western Art Music Styles. The American composer Harry Partch sought new methods of expression that would free “serious” music from the bonds of what he saw as anachronistic aesthetic, technical and theoretical conventions:

I am trying to hope that we are not entering an era where the only men of significance in music will be those facile at quoting Bach and Beethoven, Brahms and Tschaikowsky (sic.). It is something of an understatement to call this a conceivable situation, and it is also an understatement to say it would show some similarity to the quoting of Plato and Aristotle, Ptolemy and Boethius, by the scholarly little men of some ten centuries ago. If we are entering such an age it is already dead, and I can think of no epitaph more fitting than this: “They did not like modern music” (Partch, 1949, p. 55).

Partch’s alternative to Western Art Music conventions lay in the rediscovery of the art of monophonic (single voice) music and the development of alternative tuning systems (most notably, his 42-notes-to-the-octave scale) (Cook and Pople (eds.), 2004, pp. 224-225), and his design and construction of novel instruments to play the music of these systems (ibid., pp. 221-222). By creating unfamiliar timbral and tonal constructs, he could also create a new musical symbolic language that was removed from the conventions of Western Art Music theory.

### **Alternative Structures and Hierarchies.**

Another way in which more recent composers have attempted to subvert the conventions of Western Art Music has been by devising new dynamic models. Although composers such as Schoenberg used their serial techniques to create new structures, other composers used new structures to create the musical content. These

structures could be based on either totally human processes, such as improvisation, or totally random processes, such as the rolling of dice. Two composers that represent these different approaches are John Cage (1912-1992) and Cornelius Cardew (1936-1981). They both used their compositional methods not only to create music, but also to communicate their philosophical, social or political ideas.

John Cage made many significant contributions to the theory and practice of new music, but for the purposes of this discussion the focus will be on his exploration of indeterminacy or “chance” music. Through his studies with D.T. Suzuki during the 1950s, Cage developed a keen interest in Zen Buddhism, and began to reflect the philosophies of this system in his music. In order to achieve the musical equivalent of the Buddhist “bare attention” principle, cage believed that the composer should not offer the listener anything that “... might encourage the mind to acts of relation or memory: the musical processes had to be purposeless” (Griffiths, 1981, p. 22). Unlike the composers described above, Cage sought to create a musical language that was totally open. Rather than creating a new set of musical symbols through which the composer constructs a new kind of musical experience for the audience, Cage concerned himself with the creation of “... opportunities for experience” (Griffiths, p. 37).

Silence, the passage of time and the total freedom for sound to be perceived as sound only were some of the fundamental principles that led to the creation famous works such as *4'33"* (1952) and *Variations IV* (1963). The former work involves the performer sitting before, but not playing, the instrument, for a period of four minutes and thirty-three seconds. It is a natural assumption that this work is a study in silence, however, according to Michael Nyman:

*4'33"* is a demonstration of the non-existence of silence, of the permanent presence of sounds around us, of the fact that they are worthy of attention, and that for Cage ‘environmental sounds and noises are more useful aesthetically than the sounds produced by the world’s musical cultures’. *4'33"* is not a negation of music but an affirmation of its omnipresence (Nyman, 1974, p. 22).

*Variations IV* also demonstrates Cage’s desire to free music from the preoccupations of musical aesthetics. This work is indicated to be “... for any number of players, any sounds or combinations of sounds produced by any means, with or without other activities” (cited in Grout and Palisca, p. 876). By removing all composer and/or

performer control, music loses its “artificiality”. “Henceforward sounds (‘for music, like silence, does not exist’) would get closer to introducing us to Life, rather than Art, which is something separate from Life” (Nyman, p. 22).

The English composer Cornelius Cardew took a very different stance toward using musical structure as a means for communicating philosophical ideas. In fact, Cardew criticized Cage and Stockhausen as being “... the leading figures of the bourgeois musical avantgarde (sic.)” (Cardew, 1974, p. 33). Originally a follower of both Cage and Stockhausen, Cardew was later influenced by Communist political ideals, which prompted him to view much of the current musical avant garde simply as traditional social elitism in a new guise. He became interested in music that concentrated on improvisation, and the pooling of creative resources in collectives that “... engaged the most valuable resource of any music – people” (Nyman, p. 97).

From 1963 to 1967, Cardew worked on *Treatise*, a large body of work in which he created forms of notation that bore no resemblance to traditional Western Art Music symbols. This approach created the potential for performers to “... form some sort of non-representational relationship between symbols and materials and treatments...” (ibid., p. 100). Throughout the late 1960s and into 1970s, Cardew became involved with a number of musical collectives that experimented with group improvisation and compositional approaches that emphasized collaborative, group efforts as a means of transferring the “power” of musical creation away from the music itself, or the isolated composer, to the collective. AMM, The Scratch Music Orchestra, the Fluxus Ensemble, and parts of his large-scale work *The Great Learning* (1968-1971) (inspired by ancient Confucian texts) (ibid., p. 104) were all forums for this kind of musical experimentation.

### **New Technology, New Symbolism.**

One of the most significant developments with regard to the delivery and communication of music has been the advent of recorded media and electronic sound. “When recording technologies became socially effective, they brought about ... a shift from the prominence of music production processes (composition and interpretation) to the prominence of listening activities as cultural experience” (Iazzetta 2000, p. 259).

This is understandable, since the vast majority of electronic (and more recently, computer-based) music created in the last fifty years has been realized in the final form of recorded media (e.g. vinyl, tape or digital media). By removing the physical presence of the actual sound source, this kind of music becomes “disembodied”,

allowing it to be presented either as “pure sound” (either to be listened to without any external physical stimulus or representation), or in a new physical context, such as Greek composer Iannis Xenakis’ extraordinary *Diatope* (1978), a work that combined large-scale architecture, light and sound (Matossian, 1986, pp. 222-227).

However, this disembodiment of electronic musical sound has also to a large extent separated it from the physical process of music making, and thus it has developed the stigma of being something novel and alien to actual human experience. In the last few decades, new interactive computer-based music technology has begun to not only allow electronic music to discover its true place as a valuable creative resource in performative music, but to also extend the potential of performance into entirely new areas.

Atau Tanaka is one such composer/performer/instrument designer who is devising new performance models using new technology. I will briefly discuss two of his major contributions – his performances using the BioMuse interface, and his performances with the ensemble Sensorband.

Because of his instrumental specialization, Tanaka aims to communicate to the audience through the way he and his instrument communicate with each other. He describes this combination of the “...physical, tactile or sonic and musical...” as a kind of “feedback” between the performer and his instrument. “It is a confidence in his instrument that helps the musician to create a flowing musical dynamic that is conveyed to the audience” (Tanaka 2000, p. 400).

The BioMuse is a highly expressive instrument, sensing muscle tension in the performers arms via two armbands, and thus is very responsive to physical gesture. Non-essential gestures (e.g. head or leg movements) can also be incorporated into the performance to enhance the level of expressivity, but care must be taken that “... the thin line between musical artistry and vain theatre...” (Tanaka, p. 401) is not crossed.

It is in Atau Tanaka’s performances with the group Sensorband that the potential for this kind of performance are more fully realized. With Edwin van der Heide and Zbigniew Karkowski (who play their own instruments, the ultrasound MIDI-Conductor and an infrared sensor “cage”, respectively), the ensemble performs highly engaging group-improvisations and compositions in a way that would be impossible on traditional instruments.

There is a mass of computer-generated electronic sounds coming from three musicians on stage. The audience must distinguish who is playing what. At some moments it is clear, and there are other moments where it is unclear. We can play with this ambiguity. It is a kind of natural reaction on the part of the audience to try to make a connection between the physical gesture they see and what they hear. However, to do so is difficult, because these sounds are unknown. (Tanaka, cited in Bongers, 1998, p. 18)

Thus a ritual is created by the very “newness” of the media, combined with the communicative relationship between the receptive, actively listening audience and the sensitive, knowledgeable performer.

I think that what we are doing is really without tradition. Or if there is tradition, it would be right at the roots – music as ritual, trance, and pure energy. [...] We want to communicate. Our concerts exploit energy, we want the audience to feel like they have just gotten their batteries reloaded. We want them to feel stronger and like better human beings. (Karkowski, cited in Bongers, p. 23)

### **Beyond the Performance Paradigm.**

Music is a means by which all three elements of the perceived world – time, thought and physicality – can be directly and simultaneously accessed. Time is accessed through the changes in pitch, rhythm and structure; thought is accessed by symbolic associations of certain chord progressions, melodies and timbres; physicality is accessed by the rituals of performance, the visual nature of the instruments, performers or speakers, and by the physical nature of sound waves themselves as they affect the body. None of these elements can exist without the others, and all must exist within some kind of conceptual framework to be recognized as “music”. Over the centuries, these frameworks have changed in response to new cultural forces, and as a result so has the symbolism. Some concepts have survived these cultural changes (and in some cases have also be observed in the music of different cultures) better than others, suggesting they are more “universal”, and perhaps originate with basic physiological responses. However, as we have observed with some of the more “universal” concepts of meditation (by both examining how they appear in different cultures, as well as how they respond to scientific investigation), these elements cannot simply be “transplanted” in an arbitrary manner. Although the basic elements may be “universal”,



the way in which they interact with the more specific symbolic components of a particular cultural context can completely alter their function and effectiveness.

Many of the fundamental elements of the “musical experience” converge with those of the “meditation experience”. Both are explorations of time, thought and physicality, and by understanding them a person can hopefully transcend them and discover/unite with the underlying “Essence” from which they originate (depending on the context, this Essence can be called anything from “God”, to “nirvana”, “pure creative intelligence” or “Absolute Forms”).

Rather than trying to devise a new symbolic framework in which to explore these basic principles, the projects outlined in chapters four and five instead aim at setting up symbolic *potentials* from which participants can construct their own frameworks. In order to do this, a careful balance needs to be achieved between assigning symbolic significance to certain events and responses, and disassociating an experience with any pre-prescribed connection. If the balance is tipped too far in one direction, the work becomes rigidly ritualistic, if it is left totally open, the experience becomes ambiguous and nebulous.

In order to realize the creative aims of the projects discussed in chapter six, it has been necessary to employ media that offer the kind of malleability required for this kind of undertaking. These media chosen are technology-based “interactive” installations, and group-based intuitive improvisation. The following chapter discuss a number of works by other composers and artist who have, to varying degrees, inspired my own projects. The various ways in which they have conceptualized and realized their works will be examined, so as to offer further insight into how, through these creative forms, the intentions of this dissertation could potentially be realized.

## **Chapter 5. The Use of Meditation-Derived Practices as a Creative Alternative to the Conventions of Western Art Music.**

In chapter four, a number of aesthetic and cultural concepts conventions were identified as having survived throughout the centuries to become well established “paradigms” of what we now call Western Art Music. The legacy of Pythagoras’ simple number ratios representing a greater “Cosmic” harmony have formed the foundation (and much of the resulting conflict) of Western art music theory, whereas Plato’s “Ideas” have been an important reference point in the ongoing quest towards realizing the “essence” of musical expression. The romanticized interpretation of Ancient Greek aesthetics during the 17<sup>th</sup> Century have formed the basis of many fundamental aspects of Western Art Music forms, media and creative institutions.

Throughout the last century, these basic concepts have been further transformed through the exploration of new tonalities (e.g. Schoenberg), tuning systems (e.g. Partch) and aesthetic perspectives (e.g. Russolo). As before, musical forms and aesthetics have been a vehicle for political commentary (e.g. Cornelius Cardew), or the communication of philosophical ideas (e.g. John Cage). Recent technological developments and new understanding of and interaction with music of other cultures have allowed composers to explore new structures and timbres previously not considered musical at all.

However, although recent developments have stretched musical possibilities into unforeseen creative and philosophical realms, there still remain a number of older musical conventions that have either remained, been recontextualized, or are used as a reference point for the listener to comprehend the “new” music being presented to them.

In order to determine whether establishing an entirely new set of “creative priorities” is either feasible or warranted, existing conventions need to be viewed in the proper light. Are they anachronisms that need to be cast off, or are they the essential ingredients that are needed for music to be understood as music?

As was stated in the previous chapter, music is ultimately an action rather than a concept. New theories and conceptual approaches, consisting of new abstract musical symbols, structures, tonalities and tuning systems can and have been created, but ultimately it is within the “ritual” of music making that we can find the essence of

actual “musical experience”. This is understandable, since it is through rituals that human beings are able to imbue their experiences with meaning, as well as form a concept of their place within the world and understand the nature of their relationships. In his book Musicking: The Meanings of Performing and Listening (1998), the ethnomusicologist Christopher Small explains the importance of ritual as an affirmation of different levels of *relatedness*:

Ritual is a form of organized behaviour in which humans use the language of gesture, or paralanguage, to affirm, to explore and to celebrate their ideas of how the relationships of the cosmos (or of part of it), operate, and thus of how they themselves should relate to it and to one another (Small, 1998, p. 95).

Small goes on to isolate the term “myth” as being the concept being expressed by a ritual, and “metaphor” (the articulation of the elements and relationships within a myth) being the method of communication of that concept within a ritual (p. 99). He emphasizes the importance of ritual as an experiential tool for understanding; that the participation in or observation of the ritual process allows the individual to become part of the symbolic representation of relationships, and thus the experience becomes more intimate than if the concepts were just “explained”.

As was discussed in chapter four, the ritual of music-making has been a powerful and enduring means for communicating the metaphors and myths embedded in the musical theories. However, rituals also mirror broader social, philosophical and religious conventions, and when taken out of their original contexts (either through time or cultural appropriation), they can lose their symbolic significance. Many of the conventions of Western Art Music represent cultures that have since changed and no longer exist in their original form. Thus, the rituals have become a largely “empty” emulation of experiences that were once truly intimate and powerful.

This chapter consists of a number of layers of discussion, which will ultimately lead to a creative and aesthetic framework for the creative projects accompanying this dissertation (which are discussed in greater detail in chapter six). A conceptual foundation will be established through the analysis of selected works by a number of current-day composers and new media artists who have used various methods to subvert these aforementioned ritualistic elements of Western Art Music, so as to allow the potential for a more intense and personally meaningful experience to become manifest. For all of them, a primary objective seems to be to create powerful musical

experiences that challenge a person's perception, aesthetic sensibilities and personal ego, and thus expand that person's consciousness.

The first main section of this chapter deals with three important current-day composers who have employed various kinds of group-based music making as an alternative to the traditional hierarchies and aesthetic sensibilities used in traditional Western Art Music: Karlheinz Stockhausen, R. Murray Schafer and Pauline Oliveros. A number of works by these composers will be discussed with regard to how they subvert these paradigms, and what their ultimate motivations for using these kinds of creative approaches are. In the light of the cultural discussion of chapters three and four, it will be determined how the motivations and methods used by these composers might relate to, and be assisted by, the principles of the traditional meditation systems isolated in chapter two. Although Stockhausen, Schafer and Oliveros are by no means the only composers who have worked these ideas, they have been chosen for this discussion because they represent three distinctly different cultural/musical approaches, while at the same time all three explore the concepts of musical ritual, role-play and "intuitive" music-making.

The work of a number of current-day new media artists will also be discussed, to see how these new aesthetic and creative perspectives can be accessed (or perhaps enhanced) using "hi-tech" interactive installation environments.

The observations and conclusions made in both sections of this chapter will be used as a starting-point for discussion into my own creative projects (to be discussed in chapter six).

## **5.1 COLLECTIVE MUSIC MAKING: IMPROVISATION, INTUITION AND ALTERNATIVE ROLE PLAYS.**

### **5.1.1 Explorations by Current Day Composers.**

#### **Karlheinz Stockhausen**

One of the world's most influential composers since the 1950s, Karlheinz Stockhausen has been at the forefront of many recent musical innovations. His musical theories, practices and philosophies have been the subjects of a great deal of discussion over the years, to an extent well beyond the scope of this thesis. In this discussion, we shall examine two series of works that emerged between 1968 and 1970 – *Aus den Sieben Tagen* (1968) and *Für Kommende Zeiten* (1970) – and how they represent a unique and powerful manifestation of Stockhausen's creative vision.

Throughout the 1960s, Stockhausen's essentially Roman Catholic faith was challenged and transformed by his exposure to other religions and philosophies, which he struggled to realize in his music by experimenting with different notation systems and musical structures (Stockhausen, cited in Cott, 1974, p. 26). Musically, he began to review his strictly formalized style of the 1950s (noted partly by his increased interest in the aleatoric music of American composers such as Cage, Brown and Feldman) (MaConie, 1976, p. 135), and began to explore more "transformative" structures, in which certain aspects of either the form or material could be determined by the performers (examples here include *Prozession* (1967) and *Kurtzwellen* (1968)). However, this period of exploration resulted in an inner creative conflict that isolated him from his colleagues and led to what MaConie describes as "...feelings of deep depression" (p. 253). Stockhausen himself described the experience as coming "... very close to death, to suicide, and giving myself up in that sense" (cited in Cott, p. 26). In 1968, Stockhausen came into contact with a book by Sri Aurobindo that was possibly the key inspiration he needed to "... dislodge [him] out of the idea that his creative and expressive potential was limited to physically graspable events and sensations" (MaConie, p. 253).

In May 1968, during a vivid experience lasting seven days and nights, Stockhausen wrote the series of works he called *Aus den Sieben Tagen* ("From the Seven Days"). This series represented a more direct way in which Stockhausen could realize his creative aims to his performers, by accessing what he called "intuitive music".<sup>1</sup> By using almost purely text directions<sup>2</sup>, Stockhausen created works that :

... had a purifying rather than a suggestive function. They put all of us in a special spiritual state in order to make ourselves open, to use what we *are* as musicians in conjunction with all that we have learned in the context of other music. All this is part of a process through which we realize that we are a

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<sup>1</sup> Stockhausen used the term "intuitive music" instead of "improvisation" to describe these works because he wanted to remove any associations with predetermined stylistic or compositional models:

The term intuitive music is one I have purposely introduced. Not only in order to make it clear that I have something specific in mind, but also to rule out other things. For example, music played freely without a score is sometimes called free improvisation, like let's say free jazz, although making free jazz has its own rules: as the word says, it should still sound like jazz, otherwise people would just call it free music. [...] I try to avoid the word improvisation because it always means there are certain rules: of style, of rhythm, of harmony, of melody, of the order of selection, and so on (Stockhausen, 1989, pp. 112-113).

<sup>2</sup> One of these texts, *Unbegrenzt* ("Unlimited"), also contains a simple graphic element consisting of an curved arch shaped that extends beyond the confines of the page.

vessel, and this vessel then just reflects, responds. (Stockhausen, cited in Cott, p. 26)

These works allowed Stockhausen to more fully explore the spirituality that had previously been the source of much creative frustration. As a result of the exposure to other cultures he received during the 1960s, Stockhausen developed a strong belief that "... the religions were all part of the face of a multifaceted universal spirit, of the total spirit", and through the experiences that resulted in *Aus den Sieben Tagen*, he discovered a "suprareligious way" (ibid.). For many years he has been preoccupied with the concept that composers and musician are like a "radio apparatus" (*Radioapparat*) (Peters, 1999, p. 108) for vibrations both within and without the solar system. He believes that these "cosmic rays" affect the human organism down to the minutest detail, and that the optimum creative state was one in which the musician could separate him/herself from the ego and act purely as a medium through which these forces can be channeled.

Each of the fifteen texts of *Aus den Sieben Tagen* are essentially musical meditations, designed to extend and transcend human consciousness beyond the ego and into this state of "channeling".

Actually achieving these states and communicating them in sound poses many difficulties. In the initial stages, Stockhausen worked with a particular group of musicians who were already very familiar with his music. However, some of the instructions proved to be very challenging. One example is in the text for *Verbindung* ("Connection"):

play a vibration in the rhythm of your body

play a vibration in the rhythm of your heart

play a vibration in the rhythm of your breathing

play a vibration in the rhythm of your thinking

play a vibration in the rhythm of your intuition

play a vibration in the rhythm of your enlightenment

play a vibration in the rhythm of the universe

mix these vibrations freely

leave enough silence between them

(Stockhausen, 1970, p. 7).

While Stockhausen and his ensemble were rehearsing this piece, the pianist Kontarsky admitted to having difficulty finding a suitable visualization to allow himself to express the “the rhythm of the universe” (Stockhausen, 1989, pp. 118-119). It was only after Stockhausen offered a number of representative explanations to Kontarsky (who was described by Stockhausen as an “extreme intellectual”) (ibid.) that a suitable visualization could be found. Stockhausen took great care that these works were performed from a state of total intuition, with as little “musical” material as possible (which included avoiding duplicating material from previous performances of these works).

By silencing the “intellectual” mind, Stockhausen believed that subtle vibrations can be heard and transmitted, whether they be massive solar orbits (as in *Verbindung*) or sub-atomic particles (as in *Abwärts*, “Downwards”). Although he had been trying to communicate this in other works during this time (e.g. *Kurzwellen* (1968)), *Aus den Sieben Tagen* was the first work in which he was trying to communicate the musical “process”, rather than the musical “result”.

In 1970, Stockhausen completed a second series of text-based “intuitive music” works entitled *Für Kommende Zeiten* (“For Times to Come”). These works are similar in many ways to those in *Aus den Sieben Tagen*, however two also include musically notated directions (specifically *Ceylon* and *Japan*). This series was written over a period of two years, and are not quite as unified in their approach. MaConie indicates: “By and large these texts display little of the emotional tension so palpable in the earlier sequence. True to form, as his apparent self-confidence returns, so the pathetic tone diminishes, and his thoughts take on a more practical term” (p. 259).

Although Stockhausen returned to more formal musical structures in the 1970s (such as his masterwork *Mantra* in 1970), these two series of “intuitive music” works represent a turning point in Stockhausen’s approach towards structuring and realizing his creative ideas. *Aus den Sieben Tagen* and *Für Kommende Zeiten* were the results not so much of a period of compositional “aberration”, but presented an opportunity for him to take a new perspective from which he could communicate the spirituality underlying his

music, a perspective that gave him new creative confidence and certainly contributed to his compositional approach in later years. ‘The difference between his purism of the 1950’s and that of 1968 is that the composer’s goal is now mental, not physical, and his resources are spiritual and human instead of linguistic and technological’ (MaConie, pp. 253-254).

### **R. Murray Schafer.**

A somewhat different exploration of the experiential and transformative power of music has been made by the Canadian composer, writer and educator, R. Murray Schafer. Throughout his career, Schafer has nurtured a number of important aesthetic and creative concepts regarding the why-and-how of music.

“Theatre of Confluence” was the term Schafer gave in 1966 to his vision for music-theatre, a genre that he had been very interested in since 1964. He wanted to extend the genres of both opera and theatre to create a performative multi-artform that did not organize its elements in a “hierarchical” manner (e.g. in opera, music is usually the “dominant” artform). Schafer began to articulate the need to re-evaluate the conventions of music theatre, but in a way that combined expressivity and judgment. “All art should lead to altered states of consciousness; but it also insists on complex acts of discernment. [...] By all means let us keep an open mind on the new means for producing artistic effects, but let us not lose our brains in the process” (Schafer, 2002, p. 31). Schafer was aware of contemporaneous experimentation with conventions, such as audience interaction, but felt that care should be taken not to allow these sorts of experiments to become gratuitous (and consequently, artistically impotent) novelties. In order to create a harmonized multi-artform, Schafer believed that the artist should first consider sensory elements, and how they can combine to produce a meaningful form of communication.

Schafer’s concerns regarding the senses led him not only to work with alternative performance settings and dynamics, but also to pay further attention to the acoustic environment. Throughout the 1970s, he and a number of other Canadian composers<sup>3</sup> embarked upon the World Soundscape Project, an extensive research initiative designed to further understand the nature of, and possible harmful effects of, the modern industrialized sonic landscape. This field of research, known as “acoustic ecology”, resulted in a number of important recordings and texts, most notably

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<sup>3</sup> These artists included Hildegard Westerkamp, Howard Broomfield, Bruce Davis, Peter Huse and Barry Truax (Schafer, 1994, p. xi).



Schafer's Our Sonic Environment and the Soundscape: the Tuning of the World (originally published in 1977).

Since 1966, Schafer has been working on the *Patria* project, an extensive 12-part cycle of “musical dramas” that has incorporated and further developed both of the major concepts discussed above. This monumental series of works ranges from almost “traditional” performance settings, to highly unconventional works that take place out of doors and/or involve considerable “audience participation”.

Although a number of the *Patria* works contain elements of great relevance to this discussion, the focus here will be on the Epilogue, *And Wolf Shall Inherit the Moon*. This work forms the “final” installment of the epic tale in which the two principal characters, Wolf and Ariadne, are reunited after their initial separation and mutual searching throughout the other eleven works.

*And Wolf Shall Inherit the Moon* (otherwise known as the Wolf Project) takes place over seven days in a remote location in the wilderness of Ontario, Canada. It has been performed annually since 1988 (Schafer, 2002, p. 248), and as such, is a work that is in constant evolution. The musical and ritualistic structure consists of a mixture of “fixed” aspects, and elements that have evolved over the years or result from the direct and spontaneous input of participants.

Over the seven day period, the group of 64 individuals<sup>4</sup> separate into eight different “animal clans” that dwell in camps a number of kilometers apart, and interact with each other through various “forest encounters” and other rituals. Each clan has a particular set of tasks and rituals to perform throughout the week, culminating in the “Great Wheel of Life” ritual in which Wolf and Ariadne are united, and the world is saved from destruction.

There is no separation between creators, performers and audience in the Wolf Project.<sup>5</sup> Although Schafer created the outline and theme of the work, its success and longevity is determined by the commitment and input from all of the participants. Similarly, the

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<sup>4</sup> The actual number of participants has changed through the years. The initial meeting in 1989 consisted of five participants, and has gradually expanded in size since then (Schafer, 2002, pp. 248-249). It now supports nearly the full compliment of 64 adult members (plus a number of children) (Schafer, et. al., 2001, p. 9).

<sup>5</sup> Originally, Schafer and the original Wolf Project group considered the possibility of a viewing audience, but the logistics involved would have made such an undertaking extremely difficult. This idea was abandoned, which turned out to be both the best practical and philosophical decision (Schafer, 2002, p.254).

largely ritualistic content is only partly designed by Schafer: “The spiritual nature of the undertaking has given rise, over the years to a number of rituals that have been incorporated into the project. When a ritual is satisfying to the majority of the membership, it is incorporated; if it ceases to have significance, it is discarded” (Schafer, et. al., 2001, p. 253).

Since his early writings on the Theatre of Confluence, one of Schafer’s primary contentions has been that music (and all art) has lost its potency as a transformative experience, because it has assumed the role of *entertainment* rather than a means of experiencing “Divinity”. Schafer argues that, with the evolution of civilization and self-critical analysis, man has become detached from these experiences, instead creating “art” as a reflection of humanity as separate from nature (i.e. art as a tool for criticism, whether it be social, political, religious or psychological). The joy that is experienced today in artistic expression, says Schafer, contains “... mere suggestions of something, yet never so intense as to lose the patronage of a public which has no intention of getting hurt by art. [...] It is no longer exaltation, no longer a clearing of the path between ourselves and heaven. No longer does it teach us how to fly. It merely tickles what were once wings” (Schafer, p. 85).

Total immersion in a ritualistic, spiritually transformative experience is viewed by many modern people as a “loss of control” or a “psycho-evolutionary regression” back to the animistic traditions of tribal culture and shamanistic religions. However, Schafer sees these experiences as vital for rediscovering the true purpose of art, as well as reestablishing an inner connection with “the Divine”.

In accordance with his vision of re-igniting the “sacred ritual” of music, Schafer has also re-defined the role plays, but not by simply offering a gratuitous “audience participation” opportunity for people whose only commitment was to pay for an admission ticket. In the *Patria* works, the audience is often required to make a special effort, well beyond the confines of established musical conventions, to engage in a spiritual pilgrimage as much as an artistic activity.<sup>6</sup> “The notion of pilgrimage is crucial

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<sup>6</sup> The nature of these efforts vary from work to work. In *Prologue: Princess of the Stars*, the audience is required to drive for a number of hours to a remote wilderness location and climb an embankment to the lakeside for the 5am performance on the lake. *Patria 6: Ra* takes the form of a 12-hour dusk-to-dawn ritual in which the audience are initiates to the cult of the Sun God. In *Patria 9: The Enchanted Forest*, the audience is led through a forest and to some extent determine the fate of the principal characters in the work. *Patria 10: The Spirit Garden* takes place over a number of months, during which time a garden is nurtured from seed to harvest.

in Schafer's work,... you have to make your own way, at some effort, to a special place in order to have the experience" (Gablik, 1991, p. 86).

In the Wolf Project, this commitment extends beyond the work itself. Members are expected to make a long-term commitment to the project, and some have been returning each year since 1989. "Those who have been members for some years know how the project has affected their lives, changed and enriched them, taught them new skills and expanded their horizons as to what art can be and has become" (Schafer, et al., 2001, p. 2).

In order to re-connect with the experiential potential of music, Schafer seeks to re-connect people with aspects of what Suzi Gablik calls the "ecstatic experience" (p. 84), that is, psychologically potent mythical archetypes, sacred ritual, community, and the celebration of the natural world.

### **Pauline Oliveros.**

American composer and performer Pauline Oliveros began experimenting with alternatives to Western Art Music conventions early in her career. Although many of her early works (e.g. *Three Songs for Soprano and Horn* and *Concert Piece for Accordion* (1957)) were scored in a "traditional" manner, her particular interest in the nature of sound, perception and musical improvisation (as well as her collaborations with composers such as Terry Riley, Loren Rush and Stuart Dempster) led her to begin to create works that utilized these features to a greater degree (e.g. *Trio for Flute, Piano and Page Turner* and *Sound Patterns* (1961)). In the early 1960s, Oliveros began to also work with tape and electronic media, and with fellow composers Ramon Sender Barayon and Morton Subotnick co-founded the San Francisco Tape Music Centre (von Gunden, 1983, p. 52). Working with tape and electronic sound allowed her to further explore the potential of her ideas and further influenced her compositional style in other genres.

In 1964, Oliveros abandoned standard notation in her performance-based works in favour of a more theatrical approach (e.g. *Pieces of Eight* (1964), *Aeolian Partitions* (1969)), through which "...she found that her penchant for imagery allowed her to make statements about music that were impossible to say in a totally abstract medium, ... and theater pieces provided the opportunity to use material objects to augment her message" (von Gunden, p. 70).

These "music-theatre" works allowed Oliveros to not only explore sound, perception and improvisation, but also to further her interest in group interaction and symbolic,

ritualistic action. By the mid-1970s, her work in this area had developed into a number of highly evocative “ceremonial” works that involved complex visual/auditory symbolism and cyclic temporal structures. Works such as *Crow Two* (1974) and *Rose Moon* (1974) were not designed to convey a linear narrative, but to evoke an altered state of consciousness in both the performers and the audience (who, in works such as *Rose Moon*, were also free to participate to a certain degree).

Throughout this period, Oliveros’ creative focus underwent a number of significant developments. In the late 1960s and early 1970s, she became acquainted with a number of practitioners in other fields whose influence inspired her to explore other avenues of human consciousness and perception. Most notable at this time was the dancer and T’ai Chi instructor Al Chung Liang Huang, with whom Oliveros began to study Chinese movement meditation in 1968. In her 1973 paper “On Sonic Meditation”, published as part of the 1984 book Software for People, Oliveros describes this process: “I began to translate the breath rhythms and the slow natural motions of T’ai Chi to my solo improvisations” (Oliveros, 1984, p. 148).

In the early 1970s she began to study some of the “deeper” aspects of listening and music-making with a group of women collectively called the “♀ Ensemble”, and became interested in creativity on both metaphysical (dreams, myths, meditation) and physical (Tai-Chi, karate) levels. This co-exploration of the senses culminated in the first series of *Sonic Meditations* (1971), a collection of 12 text works – or rather, what Oliveros describes as “... recipes for ways of listening and sounding...” (Oliveros, 2002) – carefully designed to guide the participant into new levels of interplay between two models of information processing – focal attention and global awareness. “Attention is narrow, pointed and selective. Awareness is broad, diffuse and inclusive” (ibid., p. 139).

The first series of *Sonic Meditations* can be categorized into four different kinds of sound exploration: actually making sound, actively imagining sounds, listening to present sounds and remembering sounds (Oliveros, 1974). The works themselves are presented as text instructions for the physical and mental actions to be performed, and provide a mix of straightforward and suggestive directions. An example of this kind of juxtaposition of instructions can be found in *IV*: “Divide into two or more groups. Each group must have a tape recorder and be sound isolated from the other groups. The distance might be small or great, i.e., thousands of miles or light years” (ibid.). This kind of suggestive imagery may serve to further remove the participant from a familiar musical or aesthetic framework. Katherine Setar likens Oliveros’ “imagining

meditations” to Zen Buddhist *koans* (Setar, 1997, p. 323), which were discussed in comparison to the Sufi *zikr* in chapter two of this dissertation.

Over the years, Oliveros has referred to a number of “Eastern” mystical traditions in relation to the theory and practice of her own work (e.g., Sufi traditions) (Setar, pp. 353-354). However, the spirituality of Oliveros’ *Sonic Meditations* is subtle rather than imposing; the terminology was employed more as a way of distinguishing meditation from concentration than as a statement of religious intention: “I use the word meditation, rather than concentration, in a secular sense to mean steady attention and steady awareness... for continuous or cyclic periods of time” (Oliveros, 1984, p. 138).

In 1973 – after the first set of *Sonic Meditations* was committed to paper – Oliveros embarked on two funded research projects to further her creative exploration in this area. The first project consisted of an intensive period of research into the existing literature on myth, ritual and psychology (Setar, p. 343). The second project was a practical investigation, conducted over a number of weeks with a fixed group of people into the combined effects of a number of different disciplines, including Oliveros’ own *Sonic Meditations*. In her report titled “Meditation Project” (also published as part of the Software for People collection), Oliveros explains that during the course of the project, the group worked with experts in T’ai Chi, Karate, biofeedback, lighting design and kinesiology, while psychological assessments were made of each participant at the beginning and conclusion of the research period (Oliveros, 1984, pp. 158-161).

This research allowed Oliveros to draw connections between her musical ideas and other practices, including mysticism, psychology, movement disciplines and interactive technology. “My *Meditation Project* was an intended exploration of mental and physical exercises in concentration (or attention) and awareness, in their relationship to the techniques of rehearsal and performance in music” (ibid., p. 158). In 1974 she completed *Sonic Meditations XII-XXV*, and has since further refined these works into an entire creative and aesthetic framework called “Deep Listening”.

Deep Listening has become Oliveros’ primary creative tool for composing, performing, writing and teaching. She has published a number of papers and a collection of works called *Deep Listening Pieces* (1990), and has made a number of recordings with colleagues including Stuart Dempster and David Gamper (collectively called “The Deep Listening Band”), exploring the application of these techniques in musical improvisation. More recently, Oliveros has expanded her teaching of Deep Listening to include annual week-long “retreats”, in which Deep Listening is applied not only to

listening and musical improvisation, but also to movement (in collaboration with Tai Chi artist Heloise Gold) and dream perception (in collaboration with Ione, a dream expert and qualified psychologist).

Although Deep Listening evolved from (and is still used as) a particular approach towards musical improvisation, its applications and implications have expanded into a philosophy of *being*. The nature of the techniques themselves heightens a participant's perception, not only of audible sound, but of the dynamics and interplays between all actions and thoughts, resulting in an intimate sense of the interconnectedness between all phenomena:

Deep Listening is listening in every possible way to everything possible to hear no matter what you are doing. Such intense listening includes the sounds of daily life, of nature, or one's own thoughts as well as musical sounds. [...] Deep Listening represents a heightened state of awareness and connects us to all that there is. [...] [It] takes us below the surface of our consciousness and helps to change or dissolve limiting boundaries (Oliveros, 1999, pp. 1-6).

### **5.1.2 New Aesthetic and Creative Considerations.**

#### **Points of Similarity and Difference Between the Creative Visions and Practices of Stockhausen, Schafer and Oliveros.**

The three composers discussed above have all used particular methods to “bypass” traditional Art Music role-plays and establish new creative frameworks for the participants to draw from. Normally, many creative decisions are restricted so as to ensure that the performer's main concern is to interpret and transmit the music within the parameters set by the composer. As was discussed in chapter four, new structural forms and creative preoccupations have more recently been developed that offer the performer either a greater (as in improvisation) or lesser (as in indeterminacy) level of control. However, these performance alternatives still exist within specific structural or aesthetic parameters set by the composers; ultimately the composer and the performer are still separate personas.

In the works discussed thus far in this chapter, Stockhausen, Schafer and Oliveros have all sought to further dissolve the boundaries between these two roles. Their reasons for doing so vary to some degree, however all three have indicated that in order to realize their creative intentions, the performers need to enter into a state of mind that cannot be realized within the normal parameters of the composer/performer role-play. Thus, alternative musical structures need to be created so as to:

1. allow the performers to work within a system that does not provide the traditional musical “cues” that would trigger a “trained” response,
2. design works that act as a guide to the state of mind required, rather than impose a specific aesthetic or “musical framework” envisaged by the composer,
3. offer a malleable environment in which participants can establish their own identity both as individuals and as a group.

Another traditional role that has been re-assessed is that of the audience, although this has been more of a priority for Schafer and Oliveros than for Stockhausen. Schafer and Oliveros both feel that the separation between the perceiver and the perceived contribute significantly to the “artificiality” of the Western Art Music experience. They both indicate a need to return to more “ancient” forms of co-participatory music-making in order to realize the full potential of a musical experience (Gablik, p. 87) (Setar, p. 329). For them, this approach breaks beyond the boundaries of “art” as separated from “life”, allowing it to also become a powerful tool for personal self-realization and societal transformation.

Another aspect of Western Art Music that has not only been challenged but re-defined by these composers is the “performance space” itself. Particularly for Schafer and Oliveros, removing the distinctions between composer, performer and audience has required a space that contains no suggestion of a “stage” or a similarly segregated space.

By rebuilding music from these basic fundamentals, these composers not only create new musical styles, but entirely new methodological frameworks. Every aspect of the “ritual” is a significant, meaningful and necessary part of that framework, rather than an anachronistic and largely meaningless convention.

Stockhausen, Schafer and Oliveros each apply this approach in different ways, and to different ends. Stockhausen uses his “intuitive music” works as a means by which musicians can learn to unfetter themselves from the limitations of “human” musicianship and become pure channels to higher vibrations. Throughout the *Patria* project (and particularly within the Wolf Project), Schafer creates a mythological and ritual framework that evolves through the co-operative efforts and creative visions of the collective, allowing participants to engage in the total, “sacred” experience. Oliveros has developed Deep Listening as a way of understanding the universality of the seeming multitude of human experiences, and in doing so, develop methods of perception that are applicable not only to music, but to life.

Whether the structures employed are designed to be totally open, or offer a new mythological and ritualistic framework, all three composers indicate the need to evoke altered states of consciousness in order to realize the creative concepts being communicated. Because these concepts exist outside of the commonly understood realms of ‘Western’ logic, ‘Eastern’ psychological tools such as meditation have been utilized.

### **The Utilization of Meditation Techniques in Collective Music Making.**

For Stockhausen, Schafer and Oliveros, mysticism and mythology are important sources of inspiration, and all three have drawn upon techniques and concepts derived from traditional meditation systems to help communicate their ideas to others. These ideas are fundamentally experiential, and cannot be conveyed intellectually.

Stockhausen designed his “intuitive music” works to enable the performers to transcend their personal egos, allowing them to realize and utilize their oneness with God. Stockhausen views human consciousness as a fragment of a greater “Cosmic” consciousness, but through intellectual identification, people mistake this energy as “their own”, leading to sense of personal achievement and ego. By removing this sense of personal identity, the energy can flow naturally and unaltered.<sup>7</sup>

Schafer creates symbolic role-plays to transport participants into an alternate reality, using archetypal identities to allow people access to the deeper and more “universal” levels of the psyche. By constructing a ritualistic format, this kind of work encourages “communal consciousness”, uniting the individual with the collective.

Oliveros’ *Sonic Meditations* and *Deep Listening* works are designed to enable people to access perceptual experience beyond the confines of cultural, aesthetic preconceptions. This state of “pure observation” extends beyond audible sound to include physical sensation, movement, thought processes and interpersonal dynamics. *Deep Listening* is considered to not only be a practice for musical performance and other kinds of art-making, but can be integrated into every aspect of a person’s life.

These summaries indicate that all of these composers use conceptual and practical elements common to the meditation traditions discussed in chapter two. Naturally they

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<sup>7</sup> This idea has also been noted in a subtle way by Oliveros: “I’m not necessarily discovering something that doesn’t exist. But I’m tapping into what’s out there for myself what works for me. ... You tune in” (Oliveros, cited in Setar, p. 358). “None of us who compose and improvise music can claim credit for inventing music. Music is a gift from the universe. Those of us who can tune to this gift are fortunate indeed” (Oliveros, 1998, p. 11).



do not all share the same commonalities, since each of these composers is approaching the same ultimate goal from different directions (as was the case with the meditation disciplines discussed earlier). Stockhausen aims at *transcending* normal human states, which can be considered a Yogic or Christian perspective. Oliveros seems to take an approach more akin to Theravada Buddhism, that is, achieving a state of pure observation from which the world is perceived in its true form, unaffected by mental preoccupations. A symbol that Oliveros uses extensively to demonstrate Deep Listening is that of a circle with a dot in the center, representing “focal attention” (i.e. single-point concentration), and global awareness (i.e. *vipassana* consciousness). Schafer, although also influenced by “Eastern” spirituality (Schafer, 1975, pp. 16-17), has also reflected on more ancient shamanic concepts and practices in *The Wolf Project*.

Shamanism was not included as a direct subject for discussion in chapter two. These ancient practices are highly complex and various, and to discuss them to a satisfactory level would require space and resources well outside the bounds of this dissertation. Unlike the practices discussed here, branches of shamanism exist almost entirely as oral traditions, and the mystical experiences of shamans themselves are highly personal and specific to the individual (Naranjo, in Naranjo and Ornstein, p.111). However, these experiences do still take place in the more “standardized” symbolic framework of the spirituality of that culture. For readers interested in shamanic spirituality, more information can be found in Holger Kalweit’s *Shaman’s, Healers, and Medicine Men* (1987) and Michael Harner’s *The Way of the Shaman* (1980).

Despite the differences between the mystical practices of ancient shamanic religions and those discussed here, they do share some commonalities. Many modern religions have either evolved from shamanistic origins, or have been married to these older religions, forming a hybrid practice, such as Tibetan Buddhism (Encyclopaedia Britannica, Vol. II, 1982, p. 137). Group rituals, ecstatic trance, spirit possession and magic are important aspects of shamanic spirituality, and can be found in various guises in more “modern” religions as well. However, as “civilized” culture has superceded “primitive” culture, so have these older spiritual practices been absorbed or obscured.

Schafer’s utilization of pilgrimage, rites of passage, group ritual and wilderness settings in his music allows him to create works in which an individual may be able to access more fundamental and ancient aspects of their own psychology.

As in traditional meditation practices, unity is one of the primary motives for these composers, either between individuals (composers, performers and/or observers), elements of perception and consciousness, or aspects of lived experience. The conventions of Western Art Music, steeped in the traditions of European science and religion, do not offer the experiential elements necessary to evoke the states of mind these composers aim for; the concepts and practices of “Eastern” or “tribal” cultures provide a more useful framework. Of course, it has been shown throughout the discussion that many specific practices lose their effectiveness and meaning when taken out of context, and that merely emulating a “romantic ideal” of a particular culture by no means replicates it. In order to avoid the danger (and all too often the reality) of what could be called “cultural appropriation by the Western New Age”, these practices need to be recognized purely as perceptual tools, and applied in a way that makes them useful and relevant to those who will be using them.

These composers use the methods they do to immerse the participants in a number of intensely “unfamiliar” sensory settings, and in doing so, subvert not only their musical and aesthetic preconceptions regarding temporal structure, spatial orientation and musical/timbral content, but also their culturally determined notions of identity and relatedness.

### **The Further Realization of the Immersive, Meditation-Based Musical Experiences using Interactive Technology.**

In the last few decades, a number of significant technological developments have allowed composers and artists to begin the use computer-based technology in ways that were previously impossible. Not only was the equipment previously too cumbersome, complex and expensive, but the medium itself carried a stigma of “novelty” that made it difficult to hear beyond the machines themselves. More recently, however, these technologies have begun to find their own “voice”, rather than being limited either to a separate “machine aesthetic” or attempting to emulate “real” instruments. “In a great deal of music since the advent of electronic sound production, the electronic elements have been used to imply the non-human. [...] Part of my contention here is that this view of technology is now no longer relevant. Technology is beginning to empower people” (Garnett, 2001, p. 21).

As computer technology has become more accessible, practical and powerful, its potential as an artistic tool has greatly increased. Rather than trying to “fit” into pre-existing artistic contexts, it can now be used to explore creative realms previously unheard of.

Can new technology be used to further realize the artistic concepts discussed above? In the following section, a number of recent “new media” works will be discussed that also challenge preconceived musical/artistic notions of “self – other”. The concepts, design and execution of these works will be discussed so as to draw further points for consideration in chapter six.

## **5.2 INTERACTIVE TECHNOLOGY: COMBINING USER INTERFACES AND IMMERSIVE ENVIRONMENTS.**

### **5.2.1 Works by Current-Day Artists.**

#### **Tod Machover: The Singing Tree and other Interfaces.**

Tod Machover is well known for his work in refining and expanding the subtle expressivity of musical instruments (e.g. his collaborations with performers such as Yo-Yo Ma (1991) in his design of the so-called “hyperinstruments” – gestural controllers designed to work in conjunction with existing instrument such as the ‘cello), and he is also a highly creative designer of completely new instruments and compositional models.

Much of his work involves the creation of instruments designed to be played by non-musicians. As opposed to the hyperinstruments, which are designed to enable professional performers to reach new levels of expressivity, instruments such as the Melody Easel, Gesture Wall and Drum-Boy are designed for ease of use, allowing amateurs to create and shape their own sounds and musical structures without being intimidated by instruments that are difficult to play. “If we could find a way to allow people to spend the same amount of concentration and effort on listening and thinking and evaluating the difference between things and thinking about how to communicate musical ideas to somebody else, how to make music with somebody else, it would be a great advantage” (Machover, cited in Oteri, 1999).

Machover has put a lot of thought into how gesture and sound are intuitively joined, and has developed instruments that are designed to be played in such a way. With colleagues Maggie Orth and Gil Weinberg, he has designed musical toys designed for children such as the “Squeezables” and “Stretchables” – instruments made of soft, pliable materials that take full advantage of the malleability of synthesized sound, and thus simulate this flexibility in a fully experiential, tactile way. In 1996 Machover launched the first stage of a large-scale project called the *Brain Opera*, created with a multidisciplinary team at MIT during 1995-1996 (Paradiso, 1999). Both hyperinstruments and instruments for amateurs are used in a combination of live

performance and audience activity, in which Machover attempts to find a perfect balance between predetermined structure and performer/participant free will. “My interest lies in understanding the balance between central organization and anarchy – in our minds and in our lives. The Brain Opera is intended to encourage audiences to reflect on this process” (Machover, cited in ..., 1996).

In practice, the first stage of the *Brain Opera* takes place in a large open “Lobby” or “Mind Forest” (Paradiso, p. 130), in which more than two dozen installations of various kinds are available for free exploration by members of the public. After approximately one hour of this interaction, the audience progresses to a second space in which a performance takes place by musicians using modified versions of the same interfaces. As well as “set” musical material, the musicians also use samples of sound gathered during the period of creative exploration by audience members in the Lobby, thus integrating their creative experience with that which they are now witnessing on stage.

A major artistic goal of this project was to integrate diverse, often unconnected control inputs and sound sources from the different Lobby participants into a coherent artistic experience that is “more than the sum of its parts”, inspired by the way our minds congeal fragmented experiences into rational thoughts (Machover, cited in Paradiso, p. 131).

The Singing Tree was one major interface/installation combination created as part of the *Brain Opera* project. It consisted of a “tree-like” structure that carried a microphone, a set of headphones and a viewscreen. The only source of input from the participant was via the microphone, through which he or she would sing while wearing the headphones and watching the viewscreen.

The mapping and feedback system for this installation is quite complex, analyzing 10 dynamic parameters of the voice, which drive an algorithmic composition engine that resynthesizes the voice on a synthesizer. The Singing Tree uses a form of audio and also visual feedback that guides the user’s choice of vocalization. It looks for consistency within the sound being produced by the user – the longer a distinct pitch is held, the more “pleasing” the resynthesized soundscape becomes. In addition, a screen animation in front of the user displays an image (a video sequence that evolves from simple images into a dancing ballerina) that becomes clearer as the pitch is held longer. “The audio and video feedback on the singing voice has proven quite effective; the tonal and visual rewards encourage even poor amateurs to try for a reasonable tone” (Paradiso, p. 133).

In the *Brain Opera* project, Machover is exploring the potential of creating a set of tools and circumstances that provide the audience with the opportunity to actively and creatively participate (via the Lobby installations) in a musical context (the performance) that would normally be a passive experience for them. Not only do they hear, as part of the on-stage performance, the sounds that they themselves have made, but they have a level of connection and understanding with the instruments being used by the onstage musicians that would normally not exist for them. “To create precisely the situation where somebody can do something really personal and special and contribute and feel like something wonderful has happened, that’s I think a major goal for a certain kind of work that should be done now, and it’s very hard to do” (Machover, cited in Oteri, 1999).

### **Mariko Mori: Biofeedback.**

Since the early 1990s, Japanese artist Mariko Mori has been creating digital artworks depicting scenes and characters that combine ultra-modern pop culture and Buddhist spirituality, possibly as a reflection of her own part-Japanese, part-American upbringing (Belcove, 2000).

More recently, Mori has been creating immersive video-based installations. *Nirvana* (1997) incorporates video, still images and sculpture, “... creat[ing] for the viewer a traditional meditative environment using modern technology” (... , 1998). Another work in this style was *Dream Temple* (1999), which accommodated one person at a time in what was described as “... an individual meditation space...” in the background notes accompanying her *Wave UFO* exhibition display notes (... , 2003).

Mori’s latest installation, *Wave UFO* (2003), incorporates an EEG biofeedback interface that accommodates three participants at a time. *Wave UFO* is more “interactive” than her previous installations, in that it utilizes active participant (EEG) feedback, and incorporates multiple participants: “With *Wave UFO*, Mori’s focus shifts from individual enlightenment to a more expansive contemplation of shared experience” (ibid.).

The interfaces themselves are housed in a giant teardrop-shaped structure that has a simultaneously futuristic and organic appearance. With the help of an attendant, each participant has two electrodes taped to their forehead, and is helped into the structure. Each participant reclines on a couch (the three couches are arranged in a circular formation, with participants’ heads towards the center), and looks up at a dome screen that encompasses the entire ceiling of the space. The electrodes on the scalp activate

and control an audio/visual projection that responds to various aspects of their EEG in real-time. One-third of the screen is devoted to each participant, with the three images forming a mandala-like circular structure.

The images depicted on the screen correspond to a number of parameters. Two floating “bubbles” per participant represent the left and right hemispheres, which change colour and shape according to the participant’s primary brainwave frequencies in each hemisphere. A second set of smaller, silver bubbles are placed closer to the center of the common viewing area, and their merging and separation reflects the synchronization between brain hemispheres. When all three participants become “in sync”, all six silver bubbles merge to form a ring.

I was fortunate enough to encounter *Wave UFO* when it was being exhibited in New York City during August 2003. Although I found the installation very engaging, the seven-minute time limit was insufficient to become fully immersed in the experience, especially because the responses on the screen were difficult to match to my thought patterns.<sup>8</sup> The most striking moment during the experience was when, for a few moments, the silver bubbles formed a ring, indicating a synchronicity between myself and the other two participants. This image expanded my attention beyond my own feedback display toward the whole display, creating a moment of intimate connection with the other two participants that was both powerful and unexpected.

Drawing upon the Buddhist principle that all forms of life in the universe are interconnected, *Wave UFO* seamlessly unites actual individual physical experience with Mori’s singular vision of a cosmic dream world. Within the tranquil interior of the work, Mori sends participants, three at a time, on an aesthetic voyage that seeks to connect three individuals to each other and to the world at large. (ibid.)

Through the varied new media forms of digital photography, video and immersive installation, Mori has been exploring the notions of interconnectedness – whether it be between traditional and modern cultures, real and imaginary worlds, or individual people. “It’s my interest to have people experience transcending time and space[,] going into a deeper consciousness through the visualization of an imaginary world” (Mori, cited in Belcove, 2000).

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<sup>8</sup> Although EEG feedback techniques are effective, it does take some time and an understanding of the processes taking place to successfully initiate a reliable EEG biofeedback pattern (Cade, Coxhead, p. 20).

## Char Davies: Virtual Reality.

For more than ten years, Canadian artist Charlotte (Char) Davies has been developing highly evocative interface-based environments using Virtual Reality (VR) technology. By donning a helmet-like headset equipped with two viewings screens (one for each eye) and headphones, a person can enter into an immersive 3-dimensional audio/visual space. VR technology has become well-known in recent years for its various applications in new military hardware and computer gaming. Because of these associations, applying this kind of technology in an artistic context unfortunately often carries the novelty of gaming or combat-based implications.<sup>9</sup>

For Davies, the exploration into VR and digital art was not because of a particular interest in the technology, but because of her recognition of its potential as a means to realize her artistic vision in a way that her previous medium, painting, could not.

Originally a realist painter, Davies began to experiment with more abstract imagery in the early 1980s, reflecting her own actual optical perception (Davies has severe myopia) rather than the hard edges of the realist “ideal”. Working with these softer, more subtle images allowed her to begin to explore the relationships between form, space and perception in a way that subverted what she states are the conventions of “King Logos and the status quo. [...M]any decades after Einstein's relativity theory, in everyday life we continue to conceptualize the world around us in terms of the old Newtonian/Cartesian paradigm, i.e. as an aggregate of solid separate objects in empty space” (Davies, 2004). In 1987 Davies began to work with 3-D digital graphics, a medium in which she believed she could further explore these subtle intersections between form and formlessness. In 1994, with a small team consisting of a programmer, sound designer and composer, she began work on her first fully-realized interactive VR environment, *Osmose* (completed in 1995). *Osmose* consists of a number of permeable, translucent environments that are arranged in a primarily vertical, rather than horizontal, structure. The “immersant” (ibid.) navigates through these worlds, not with the more common joystick or pointing interfaces, but via a vest that monitors balance and respiration. Horizontal movement is controlled by leaning

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<sup>9</sup> Davies explains the inherent tendencies, and thus dangers, in applying VR technology to art:

Conventional ways of thinking about and producing immersive virtual space faithfully mirror this metaphor. 3-D computer graphic techniques, as commonly used in VR environments, tend to rely on 3-D Euclidian geometric models, Renaissance perspective and the xyz coordinates of Cartesian space, all applied in a never-ending quest for visual realism. The resulting aesthetic/sensibility (what I call the “hard-edged-objects-in-empty-space” syndrome) reflects a dualist, objectifying interpretation of the world. (Davies, 2004)

the body in a particular direction, whereas vertical movement is controlled by the breath (inwards = upwards, outwards = downwards).

The nature of the interface is important to Davies, who seeks to reconcile the common tendency for interactive technology to separate the user's physical being with their perceived world. Paradoxical as it may seem, Davies talks about using this technology to create an experience that is simultaneously disembodied and intimately physical, which further demonstrates her intention to explore transitions between the supposed hard edges between things, whether they be visual, conceptual, or visceral (ibid.). Like her earlier paintings and digital images, the forms in *Osmose* are not "solid"; the immersant can meld themselves into a tree or a leaf, descend into the earth, or even merge with the written code of the computer program itself.

In 1998, Davies created another VR work, *Ephémère*, which further developed the approach taken in *Osmose*. In addition to the "forest" and "subterranean" worlds, the immersant is also able to journey through a world of bodily organs, blood and bone. Also, *Ephémère* has a temporal element in which the environments are constantly morphing through seasons and life/death cycles.

*Osmose* and *Ephémère* have important sonic components that, like the visuals, also respond and change according to the actions of the immersant, and support the nature, positioning and changes of the visual elements. "Each zone [in *Osmose*] has its own localized sound; in fact, sound in general plays a decisive role in generating the feeling of presence. It accentuates the visual impressions..." (Grau, 2003). Although the sounds in both *Osmose* and *Ephémère* are diverse, they originate from simple sources. For *Osmose*, all the sounds are digital renderings of human voices; for *Ephémère*, most of the sound comes from sampled viola tones.

The sound design of these works is not gratuitous; it forms an integral part of the immersive experience:

[S]ound, as an all-encompassing flux which penetrates the boundary of the skin, further erodes the distinctions between inside and outside. [...] Sound, like soft vision, also returns us to what I have come to call the "presence of the present". In this perceptual state, rather than being mentally focused on the future and thus inattentive, even absent, to the present, one becomes acutely aware of one's own embodied presence inhabiting space, in relation to a myriad of other presences as well. (Davies, 2004)



Davies states that there is no specific spirituality underlying her works, however she does have a deep interest in human perception, and finding ways of reuniting elements of experience that have been separated through what she describes as:

... habitually perceived boundaries between subject and object. [...] My work is my attempt to understand more deeply the very fabric, the very extraordinariness of our being here, being alive, embodied, sentient. The very "*such-ness*" or "*is-ness*" of life. [...] I desire to apprehend some kind of flow or flux that is "*behind*" the world of appearances. I call it the life-flow. I certainly would never call it God and I don't see it in Christian terms or in terms of any of the traditional religious systems I know. It is that life-flow, an awareness of being immersed in that extraordinary life-flow, that I wish to communicate to others (Davies, cited in Gigliotti, 2002).

Many people who have encountered *Osmose* and *Ephémère* have described the experience as highly spiritual and revelatory, while others have wept following their experience. One person is quoted as stating, upon emerging from the experience, "...that being in *Osmose* had taken away her fear of death" (ibid.)

### **The Utilization of Meditation Techniques in Immersive Installation/User Interface Design and Realization.**

As for the composers in section 5.1, these three new-media artists each have their own particular creative visions, resulting in different approaches towards designing interactive interfaces and installations.

In the *Brain Opera* and other projects, Tod Machover explores the balance between structure and spontaneity, and how the dynamics of this balance influence thought, creative flow and interpersonal communication. By designing unconventional user interfaces, Machover hopes to create a means by which non-musicians shed their musical inhibitions and begin to access a normally suppressed source of intuitive creativity.

Mariko Mori – through her recent immersive installations – explores the dynamics arising as a result of the juxtaposition of ultra-modern culture and traditional Buddhist spirituality. She uses modern technology to create enhanced perceptual experiences that evoke meditative states of mind and “mental landscapes”. In *Wave UFO*, this idea is extended to create a meditative space in which people can interact with each other.

Char Davies utilizes sophisticated VR technology to create perceptual and psychological spaces that immerse participants in a disembodied “fantasy” world while

simultaneously grounding them in the reality of their physical being. She is concerned with offering people active experiences that allow them to exercise perception beyond the confines of “Newtonian/Cartesian” paradigms (and their inherent concepts of “separation”), and into a state in which the very fabric of being, or “life-flow”, can be accessed.

Through their work, these three artists present clear examples of how current-day interactive technology can offer people perceptual experiences beyond the confines of established musical and artistic practice. Like the composers discussed in section 5.1, these artists provide alternatives to the established notions of role-play, ritual and aesthetic discrimination, by creating malleable systems that respond to the participant rather than imposing a set structure, by creating interfaces that offer totally new symbolic associations, and by encouraging the active exploration of dynamics either between people or within one’s own mind. Once again, meditation principles have been applied in an artistic setting for the purpose of enhancing the intensity and intimacy of the experience, and offering an opportunity for people to access personal creative resources normally not available as a “passive” observer.

### **Summary and Points for Consideration.**

Throughout this thesis, a number of topics have been examined in order to create a theoretical and practical framework for answering the questions arising from the primary thesis title.

In order to be able to use meditation principles in the design and realization of co-participatory musical systems, a number of important questions needed to be raised:

1. What are the practical and conceptual features that actually define meditation?
2. How can these definitive features change depending on changes in cultural conditions and applications?
3. What features of meditation remain effective and relevant when reapplied in a new context (in particular, modern secular “Western” society)?

Following these discussions, it needed to be determined whether these “fundamental features” could be used as creative tools for the purpose of creating effective “co-participatory” musical systems. Some points raised included:

1. How have the established role-plays (i.e. the separation between composer, performer and audience) within the Western Art Music tradition restricted the

actively experiential potential for its audiences and listeners, even when new creative and aesthetic systems are developed to replace older ones?

2. What are some of the strategies adopted by certain current-day composers and artists that offer alternatives to these conventions, not simply by replacing certain features, but by developing completely new systems?
3. How, and why, have these composers and artists utilized concepts and techniques derived from traditional meditation principles as a part of these new creative systems?

As these composers and artists have worked on creating art that penetrates deeper into the essence of experience, it becomes clear that the goals sought and methods used are very similar to those found in various traditional meditation systems. Essentially, both are seeking reconciliation – and ultimately, unity – between the seemingly separated aspects of existence, whether that separation be represented by relationships between people (or groups of people), body and mind, object and observer, or the real and the imaginary.

The actual techniques used for attaining these states of mind vary depending on the cultural setting, since it is now clear that it is the *symbolic significance placed on an experience within a particular cultural context* that generates the desired effect.

However, if we refer back to the key features of meditation outlined in chapter two, we can see that many of the original “practical” – and even some of the “philosophical” – features are actively utilized by the composers and artists as well. It seems that many of these features are not necessarily bound by a particular tradition or religion, but are rather *a recipe for enhanced human experience*. Needless to say, a composer or artist needs to feel compelled to use these techniques in the first place, and all of them seem to be driven to a greater or lesser degree by a desire to connect various aspects of human experience into a greater, unified whole. Whether this whole is called “the Divine”, “cosmic rays”, or “life-flow”, it is felt that this re-connection is the key to unlocking the full potential of human experience.

## **Chapter 6. *The Wheel of Life Project: Conception, Design and Realization.***

**\*Note: Most of the media (audio, video footages and Max/MSP patches) referred to in this chapter is present on the accompanying DVD. The images referred to can be found at the end of this chapter.**

This chapter presents an exegesis on the three projects conducted throughout this research period (2002-2004). The original concepts, design processes and subsequent realization of these projects will be discussed in relation to how they have evolved out of my earlier works from 2000-2002, how they function as individual works and as a unified whole, and how they reflect upon the concepts discussed earlier in this dissertation. In addition to the discussion on these three projects, a number of my relevant earlier works will be examined in relation to how they contributed to my current ideas and creative preoccupations.

The composers discussed in chapter five were a significant source of creative inspiration for me throughout this period, however the original concepts for my own projects predate much of my knowledge of their work. Throughout the research period, I discovered a number of significant parallels between my work and that of these artists, not only practically, but also philosophically. Over time, these projects evolved as a result of the melding of my own ideas with those of these other artists, as well as my growing understanding of the various mystical traditions discussed in chapters two and three.

All the works are “self-contained”, in that they can each be (and have been) presented as independent projects. However, they can also be considered as progressive stages within a larger structure, and ideally they should be presented together in a certain order. This larger structure will also be explained.

The outcome of these research projects will also be discussed. Subjects for consideration will include:

1. How effective was each project in conveying its concepts and intended processes to the participants?
2. How did the design and presentation of the projects help or hinder their “interactivity”?

3. Were there any unexpected successes or disappointments during the realization of these projects?
4. How well did the entire project enable a practical realization of the ideas discussed throughout this dissertation?
5. Are there any aspects of the projects that could be improved or refined so as to make them more “effective” at realizing their creative aims?

## 6.1 BACKGROUND.

### 6.1.1 Previous Works.

#### *A-che Lha-mo* (October 2000).

*A-che Lha-mo* (Tibetan for “morality play”) was created for two clarinets, prerecorded CD, live sample triggering and live effects processing. This work was my first attempt at combining prerecorded and live electronics as well as live performers. The full work can be heard on “Track. 1” of the accompanying Audio CD.

The work is structured on a poem by Novalis which I encountered when reading Lama Anagarika Govinda’s *Foundations of Tibetan Mysticism*:

All that is visible, clings to the invisible,

the audible to the inaudible,

the tangible to the intangible:

Perhaps the thinkable to the unthinkable

(Novalis, cited in Govinda, p. 17).

*A-che Lha-mo* represents the evolution of an individual’s consciousness from the intellectual to the intuitive, and how clarity of thought (i.e. “right meditation” – see section 2.2.2) emerges when the scattered fragments of the “thinking” mind are united. The two live clarinets engage in a dialogue using a series of notes representing the different syllables of the above poem. Once the clarinets’ “text tone-row” cycle is completed, a fragment of the poem is revealed in speech (the first triggered sample), followed by the next clarinet cycle. Each time a word is revealed in text, it disappears from the next clarinet cycle, until eventually the entire text – representing the realization accompanying total mental clarity – is revealed, while the clarinet melodies that represent the fragmentation of intellectual thought, become united on a single note.

This note represents single-point consciousness (see chapter two), and corresponds to the first work in the text, “All”, indicating unity.

*A-che Lha-mo* requires three performers. In order to synchronize the sample triggers and reverb effects to the clarinets, a third (off-stage) performer was required to control the electronics, rather than adding the samples to the CD and automating the reverb. At the time I had considered equipping the clarinetists with foot pedals so they could control these features themselves, however this idea was soon abandoned in favour of keeping the stage as clear as possible (the only visible signs of the technology were the speakers and the clarinetists’ microphones, as the third performer was off-stage). Originally, I had intended the work to have a ritualistic component in which the two on-stage performers would begin the piece at either sides of the stage (facing each other), and throughout the performance walk towards the center in a spiral pattern, ending the work together in the center, back to back. However, I was unable to access cordless miniature microphones at the time, and the performers had not had sufficient time to memorize the score.

Although the music effectively conveys the intention of the piece, I believe the live performance (this work has only been performed once) would have had a greater impact and conveyed more meaning had this ritualistic component been included. This made me consider the importance of physical layout and performer actions in the realization of musical ideas, which led to my later research in the nature of ritual and how it effects the nature and intensity of human experiences.

***Belly Breathe, Belly Brain* (September 2001).**

*Belly Breathe, Belly Brain* was my first attempt at creating a musical work that used an unusual physical interface with interactive electronics. At the time I did not have access to a CV-MIDI converter<sup>1</sup> and had very limited knowledge of electronics, so the system was not sensor-based. Instead, the work utilized a pre-recorded CD which provided the background layers of sound, live sample triggering using an Ensoniq ASR-10, and a small “sound sculpture” that I constructed, the sounds of which were amplified with guitar pickups and fed through an effects unit that I also controlled live. The sculpture (Fig. 1, see page 129) was a freestanding wood and metal frame from which hung

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<sup>1</sup> A CV-MIDI converter is a device that converts control voltage information into MIDI messages that can be used to control synthesizers, effects units, lighting desks and other devices. MIDI is the standard method of transmitting digital information between devices using binary code, and is also often used to send control information to and from software-based systems.

several pieces of metal “junk”, which were struck to produce a variety of bell-like tones. Unfortunately, no recording was made of the only performance of this work.

During informal conversations regarding *Belly Breathe*, *Belly Brain* with audience members following its only performance, it seems that the visual spectacle proved to have a significant impact on how people responded to it. I had the advantage of talking to people both in the viewing audience, and others who could hear but not see the performance (they were behind the stage curtain at the time). People in the viewing audience found the performance very emotionally charged, with an interesting juxtaposition of calm and intensity, whereas people behind the curtain found the piece soothing.

Such an interesting range of audience responses further fuelled my interest in the “ritual” of performance, and how the presence or absence of certain personas and physical objects strongly affect the way we interpret music as an actual “experience”. At the time I considered creating another version of this work that involved the entire audience, an active ritualistic space using a mixture of natural and electronic sound-making methods. Although this work never eventuated, it did lead me to further investigate these concepts and apply them in the form of this current research project.

***Pillars of Sleep* (as part of the installation *contrappunto v*) (November 2002).**

In late 2002 I worked with Perth visual artist Sarah Douglas on her immersive installation *contrappunto v*, for which I created the sound component. Having already begun my own Masters research, I was keen to apply some of my early findings in a creative context. The result was *Pillars of Sleep* (the name I have given this sound work when presented independently), which was the first piece that I created entirely within the Max/MSP graphical programming environment.<sup>2</sup> The full work can be heard on “Track. 2” on the accompanying Audio CD.

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<sup>2</sup> Max/MSP (distributed by Cycling '74 – [www.cycling74.com](http://www.cycling74.com)) is a programming environment that uses a primarily graphical layout than a purely code-based layout (although Max/MSP programs can also be written in the C programming language). “Max” is the component that works with pure numbers or MIDI messages, and “MSP” works with audio signals (a third component, “Jitter”, works with graphics, however this was not used in this project). Each box in a Max/MSP patch contains either information, a command, or is an indicator. The boxes are connected with “cables” representing lines of data flow. Not being a computer programmer, I find Max/MSP an environment that allow me to program complex software-based systems without too much difficulty; the graphical nature of the environment is more “user friendly”, both for the programmer and the person reading the program. For those readers not familiar with Max/MSP, I have included (with permission from Cycling '74) on the accompanying DVD some of the reference documentation distributed by Cycling '74 with Max/MSP. In addition the patches themselves contain extensive notes that can allow the reader to navigate through the patch without too much difficulty.

*Pillars of Sleep* is a self-generative work, in that the sounds and digital effects processors within the Max/MSP patch act upon each other according to a set of random processes programmed into the patch. Although the work is non-interactive, and was recorded to CD for the purposes of the installation, these random processes could have easily been reconfigured to be triggered by a user interface. This possibility was considered at the time, but not pursued for a number of artistic and practical reasons.

*Pillars of Sleep* introduced me to using Max/MSP as a means for creating “non-linear” musical systems, while also opening the possibility of further developing the project to be user-interactive.

The nature of the soundscape itself also marked a new creative strategy for me. For *Pillars of Sleep* I wanted to create a sonic environment that would accentuate cyclic “breath-like” textures, and as a result, I decided to use only one sound source for the entire piece – a single sample of myself breathing in and out. All the textures (apart from the background cricket sounds) were created using pitch transposition and VST effects plugins of this single sample. At the time I was concerned that the soundscape might have been too sparse, but instead I discovered that the slow, subtle changes encouraged the listener to engage more deeply in the experience. Many aspects of *Pillars of Sleep* and the *contrappunto v* project influenced my later work, particularly *Beneath, Becoming*, which utilizes a similar soundscape in which the listener is drawn, over time, into a deepening meditative state.

### **6.1.2 Original Concept for *The Wheel of Life*.**

#### **Conceptual Progression.**

The works described above demonstrate the creative progression over the two years spanning 2000 and 2001 that led to my present research and creative projects. Although I found electroacoustic music and soundscape composition creatively satisfying, I felt a need to further extend the interactivity of my works beyond the realm of performance and pre-recorded media.

In 2002 I began work on a series of projects in which I could further explore these ideas. In earlier works such as *A-che Lha-mo* and *Belly Breathe, Belly Brain*, I had experimented with a mixture of live and electronic sources so as to create works that presented a more ritualistic and mentally evocative format. However, I was interested in creating what could be described “musical potentials” – malleable sonic environments that would encourage people to explore aspects of their own innate creative nature in ways that may not normally feel comfortable for them. It was hoped



that by suspending a person's social and cultural inhibitions, this innate, spontaneous creativity could be a means by which the participant could become more aware of the interconnectivity of their mind, body and soul.

When I began work on the projects, there were a number of issues raised in my earlier works regarding "interactivity" that I wished to address. With recent developments in computer software and hardware, many options have become available to current-day composers who wish to work with interactive systems. However, the availability of a piece of technology does not necessarily warrant its use; care must be taken to ensure that the chosen system serves the artistic intent of the work, not vice-versa. Similar caution must also be applied when working with human collective-based music; as R. Murray Schafer pointed out in chapter five (section 5.1.1), the novelty of "audience interaction" can easily override the artistic integrity of a work.

The other important point that I needed to consider regarding interactivity was the actual receptivity and willingness of the participants. Because these projects were intended to *encourage* people to open up creatively and engage in a way that would stimulate emotional as well as intellectual responses, the systems could not be intimidating or unnecessarily complex. However, they did need to incite enough interest so as to invite the participants to explore for an extended period of time if they wished.

### **Application of Meditation Principles.**

Much of my knowledge about traditional meditation systems came about once this research was already underway. Therefore I cannot say that these traditions "inspired" the original project concept, rather they provided a solid theoretical and practical foundation for me to further refine my ideas (a similar experience to that of Pauline Oliveros when working on her *Sonic Meditations* and *Deep Listening Pieces*).

In order to properly realize the creative and philosophical intentions outlined above, I needed an authoritative source of information regarding the "essence of human experience", that is, how the processes of the mind dictate thought, action and interaction, and how cultivating those processes can lead to a greater level of experience. The theories and practices of meditation proved to be ideal, however drawing upon any particular tradition would have restricted me to a certain cultural framework (and led to the practical and ethical issues discussed in chapters three, four and five). By comparing a number of traditions, I was able to isolate more general concepts that could hopefully be applied outside of any particular cultural context.

## **Original Project Format.**

After an initial period of research into both meditation traditions and the work of a number of current-day composers and artists, I began to organize my own ideas so that they could be explored as a series of projects. Each project was to focus on a particular set of ideas and techniques, while at the same time representing one part of the larger project.

I called this project *The Wheel of Life*, partly as a reference to the Buddhist symbol for the manifested universe (*bhavacakra*: the endless circle of birth, life and death perpetuated through *samsara*) (Sangharakshita, pp. 68-81), but also to represent the simultaneously progressive and cyclical structure of the project.

The original concept consisted of a number of projects that would all be presented in adjacent rooms in a single venue, so that participants would move from one area to the next in a particular “cumulative” sequence. As was mentioned in the discussion on *Pillars of Sleep*, I had become aware of the need for progressive stages of participation over a period of time for participants to fully engage in the experience. Traditionally, meditation systems would employ a progressive sequence of exercises to slowly build upon the skill of the practitioner. In *The Wheel of Life*, such a progression was designed to be a means by which participants could enter into the experience gradually, as a kind of participatory “acclimatization”. The progressive stages of the meditation process in *The Wheel of Life* were to be as follows:

**1<sup>st</sup> Stage:** Meditation on Breath, Sound, and the relationships between the two.

**2<sup>nd</sup> Stage:** Meditation on Breath (also as the Voice), Sound, Visual Images, and the relationships between the three.

**3<sup>rd</sup> Stage:** Meditation on Breath (also as the Voice), Sound, Visual Images, Interpersonal Dynamics, and the relationships between all of these elements.

The sequence begins with simple processes that allow the participant to engage in fundamental levels of meditation. As the participant progresses through the three stages, more senses become stimulated and the level of immersion deepens. Processes become more complex and more “active interaction” is required from the participant. The experience is designed to be cumulative, as the final stage (which was originally intended to take the form of a ritualistic “group meditation”) utilizes all of the elements of the previous stages including some additional ones. Although the experience is cumulative, I also intended it to be cyclical, with certain fundamental elements present in the initial stages returning later on.

As well as having all three projects in adjacent rooms, the sonic elements were designed to further accentuate these structural links. Some of the sound samples used in the first installation would also be used in the second, and certain elements from both would be transmitted into the third room.

Due to time, available venues and budgetary restrictions, *The Wheel of Life* could not be presented in this original, all-inclusive form. However, the eventual projects do retain some of the original concept, and have laid the groundwork for the future possibility of realizing the original structure.

## **6.2 PROJECT DESIGN AND REALIZATION.**

### **6.2.1 *Beneath, Becoming.***

#### **Project Background and Concept.**

The concept for the first stage of this project evolved from my earlier electroacoustic soundscape works, which were essentially “guided sonic meditations”, rather than dramatic narratives. As stated earlier, I wished to extend my work in this area so as to enable the music to evolve according to the psycho-physical state of the listener.

In *Pillars of Sleep*, I had created a Max/MSP patch that used a set of random process to manipulate the texture and structure of an ambient soundscape consisting of multiple layers of a single breath sample. In this new installation I wanted those random processes to be replaced with simple user control parameters, so that what would normally be the passive experience of sitting in an armchair listening to music becomes a self-guided sonic meditation.

This initial installation was intended to be the first step in the meditation process, in which a solitary participant meditates on the sound, their breath, and the connection between the two. As such it needed to be simple to use, visually unobtrusive, and rely on user input that would most effectively encourage the initial stages of meditation process.

#### **Interface Design.**

In order to create an interactive system that correlated to these basic principles, the actual interface needed to be relevant to the user’s current state of mind and body. After considering a number of biofeedback options, including EEG, skin resistance and heart-rate readings, I decided to use the breath as the data input method. The breath has been an important tool in many traditional meditation systems (refer to discussions in chapter two on yogic *pranayama*, the Hesychast *Jesus Prayer* and the Sufi *zikr*), and

has also been used by other composers and artists seeking a connection between the mind-body state (e.g. Char Davies' VR works). In addition, the advantages of a breath-controlled interface included that it does not need to be in the foreground of the user's awareness to work effectively (we breathe whether we think about it or not), and it requires no special skills to operate it. As a form of biofeedback it gives an accurate and non-invasive assessment of the user's state of relaxation (and presumably, meditation), without the need of specialized and expensive biofeedback equipment.

I envisaged a system that consisted of an armchair in which the participant would sit while wearing a pair of headphones and a kind of "seat belt" made of elastic or flexible rubber, to which would be attached a strain gauge or flex sensitive sensor system.

Sourcing a ready-made breath-sensing belt that was reliable, inexpensive and robust enough for a public installation environment proved very difficult, so I decided to build my own device from scratch. Rather than using a flex or strain gauge sensor, I used a 50kOhm slide potentiometer housed inside a small plastic casing. The slider itself was attached to a piece of elastic that stretched and relaxed in response to the participant's breathing (Figs. 2 and 3, see page 130). The movement of the potentiometer was fed into a CV-MIDI converter and to an Apple Macintosh computer, controlling the Max/MSP and subsequently creating the soundscape.

This original version of *Beneath, Becoming* was exhibited as part of the Spectrum exhibition in April/May 2004 (Fig. 6, see page 132). However it was superseded in July 2004 by a new design that was more reliable and robust (Figs. 4 and 5, see page 131). This second design was exhibited at the Westspace gallery in Melbourne in July 2004 (Fig. 7, see page 132). The new version was also easier for participants to fit without assistance from an attendant.<sup>3</sup> For both the Spectrum and Westspace exhibitions, the chairs were also fitted with pressure sensors (under the lining of the seat cushions). This was so that when a participant rose from their chair, the soundscape would reset itself to its initial state (leaving only the initial breath sample) and retain the last breath-rate/depth reading. This was so that the system would not be waiting indefinitely for the next "outbreath" reading when a participant would remove the belt, and so that the next participant would engage the system in its initial state. In

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<sup>3</sup> Although sometime necessary, I have tried to avoid the use of attendants in these installations. Since these installations are designed to be personal "ritual spaces", the presence of an attendant could disrupt the experience and reinforce the participant's social inhibitions.

addition, by activating the system upon sitting down, the process of fitting the belt (while standing) would not produce any false readings.

### **Sound Design.**

In keeping with the style of my earlier soundscape composition *Pillars of Sleep*, the sound for *Beneath, Becoming* was generated largely from a single pre-recorded breath sample. In all, four layers of breath sounds were used, of which the first three were directly controlled by the speed and depth of the participant's own breathing (monitored via the sensor belt). The first layer would replay in "real time", without digital effects, and would synchronize with the rate of the participant's own breathing.<sup>4</sup> This layer created a sense of "immediacy" to the soundscape, giving the participant an element of feedback that would respond to their breathing from moment to moment. The second and third sound layers were designed to evolve more slowly, each entering after a certain number of monitored breaths. These layers formed the "bass drones" of the soundscape, also responding to the participant's breath-rate (in both pitch and speed).

These layers of sound created a sparse but evocative soundscape that heightened the participant's awareness of their own breath. However, in order to develop this state of awareness into an actual meditation, a number of additional parameters and sounds needed to be included.

Two other parameters were included that mapped changes in the person's breath rate and depth *over time* rather than on a breath-by-breath basis. The premise here was that as a person became more relaxed and "tuned in" to the processes taking place, their breath would become steadier. Two sets of sub-patches within the main Max/MSP patch analyzed the rate and depth (respectively) of each breath, comparing it with the previous one. Each breath that gave the same reading was added to a tally that, when reaching a certain number, would introduce additional elements into the soundscape.

The fourth breath sample layer was a similar bass drone to layers 2 and 3, this time being fed through a bank of harmonic filters controlled by the "breath *depth* tally". The higher the tally, the richer the harmonic textures would become. In addition to these four breath-sample layers, there were a number of other samples controlled by the "breath *rate* tally". As the participant breathed more steadily, the soundscape became richer with these additional sounds (although the overall texture is still quite sparse).

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<sup>4</sup> A phase vocoder was used to alter the speed of the breath sample without altering the pitch.

Some of the sounds (such as the “bell” sample) were designed to synchronize with the participant’s breath rate; a subtle suggestion of “rhythm” to guide the participant’s breath-rate.

These different user input and feedback features formed a simple biofeedback system; the breath guided this soundscape which further guided the breath, and so on. It was important to design a system that did not favour a particular *kind* of breathing, as Machover (see section 5.2.1) did with the voice in his Singing Tree installation, but rather encouraged a *process*. The system used the data over time, creating a soundscape based a comparison between the breaths of the current user, rather than basing that comparison on some “ideal” breath rate or depth.

The Max/MSP patch “BBPatch.pat” can be seen on the accompanying data CD ROM.

To listen to audio of this installation, either open the “BBSimulation.pat” patch of *Beneath, Becoming* (an “automated” version of the installation), or listen to “Track 3” on the accompanying Audio CD.

## **6.2.2 *IntraSpectral*.**

### **Project Background and Concept.**

*IntraSpectral* was in some ways a conceptual progression from earlier works in which I explored the harmonic spectra of sounds, as well as my interest in composers French “spectral” composers Gerard Grisey (1946-1998) and Tristan Murail (1947-). I wanted to create an installation that would allow people to hear the different partials of the vocal sounds that they make, and to be able to use their own voice to create an immersive soundscape with these harmonic spectra.

As a part of *The Wheel of Life*, this installation would be the second stage of the meditation process. Using the harmonic partials of vocal sounds would not only direct the focus on the breath outward to the voice (as a further manifestation of breath), but also allow them to “reach inside” the sounds and experience their constituents as well as their whole. This simultaneous macroscopic and microscopic approach to sound could be viewed in relation to Pauline Oliveros’ “focal attention, global awareness” theory (see section 5.1.1).

*IntraSpectral* also contained a number of visual components that further translated the sounds made by the participants into moving images. Including visual as well as aural feedback in this installation expanded the “presence” of the sounds beyond what would normally be considered “hearing”, while the nature of the images themselves would

remind participants of the inherent “physicality” of sound, both inside and outside their bodies.

Using the voice in a creative, non-verbal way is confronting for many people, which is why *IntraSpectral* was intended to follow *Beneath, Becoming*. It was hoped that by connecting the participant’s voice directly to this audio/visual feedback system, it would allow them to suspend their social and cultural inhibitions and encourage a more spontaneous and intuitive use of their voice.

### **Physical Layout.**

In the 2004 Spectrum exhibition, *IntraSpectral* consisted of a 3x4 (Fig. 8, see page 133) metre square-shaped carpeted space completely lined with black cloth, which served partly to conceal any unnecessary pieces of equipment, objects or empty space, and partly to provide a sense of spatial continuity with the previous room which housed *Beneath, Becoming*. At each corner of the space (and concealed behind the cloth) was a self-powered speaker that delivered the quadraphonic soundscape from the computer, and in front of each speaker (within the space, thus visible to the participant) was a one metre high plinth. These plinths were painted with black gloss enamel, with open tops into which has been set an outward-curving glass lid. In between two of these plinths was a fifth plinth, identical except that the lid was frosted, not clear. Light emitted from all of the plinths: white for the central one, and red, yellow, green and blue, respectively, for the four others. The light from these four coloured plinths produced four large coloured disks of light on the ceiling. In the center of the entire space were a number of cushions.

All controlling and sound emitting equipment for *IntraSpectral* (computer, mixer, amp, speakers etc) was out of sight (i.e. behind the cloth), the result being a minimal and quite evocative environment.

### **Interface Design.**

Like *Beneath, Becoming*, *IntraSpectral* is controlled using a single input point, now expanded from a breath-based interface to a microphone. Early versions of *IntraSpectral* exhibited during 2003 used a Shure SM58 microphone and four speakers. Although these versions were well received, some issues were raised regarding the visual nature of the interface (microphone) system.

An installation space is in itself a piece of art; every object within the space carries significance and symbolic meaning. The purpose of a microphone is very clear, which makes it a useful interface that has an obvious use. However, these preconceptions

regarding use and response could potentially hinder a participant's intuitive responses or further exploration of the system: "... if it looks like a drum, users will hit it, even if a caress was the intended response" (Ulyate and Bianciardi, 2002, p. 47). Some people would tend to react only according to their preconceptions, producing sounds that resulted in a less than ideal response from the system, and subsequently would not try anything else. By presenting the participant with a microphone, they were faced with many of the same inhibitions that they would be faced with had they been standing on a stage in front of an audience, rather than an intimate environment in which they could freely express themselves and explore the system.

This suggested the possibility for other interface systems that are not so immediately obvious, and therefore potentially intimidating; however, as also noted by Ulyate and Bianciardi, an unfamiliar interface can result in much more unpredictable behavior from participants (p. 47).

I addressed this issue by redesigning the interface so that the microphone was housed inside a similar plinth to the four coloured ones. It was the same height, and had a similar (this time frosted) bowl-shaped lid. The front of the plinth was porous so the sounds from the participant could reach the microphone inside (I placed a chair in front of the plinth as an indication of where the participant should sit) (Fig. 9, see page 134). This effectively "disguised" the microphone, but simultaneously made its purpose more ambiguous. In order to provide some initial feedback to the participant (i.e. "you need to sing into it!"), I placed a 5W halogen globe inside the plinth, which, when the participant made a sound that was detected by the microphone, would light up and subsequently make the plinth "glow" (Figs. 10 and 11, see page 135). The globe was controlled by the computer via a Teleo system, a small device made by the Californian company Making Things ([www.makingthings.com](http://www.makingthings.com)).<sup>5</sup>

The four other plinths in *IntraSpectral* were designed using the principles of Cymatics; a body of research founded in the 1950s by Swiss scientist Hans Jenny. Jenny is most well-known for his experiments in which he studied the nature of wave phenomena (particularly sound) by exciting a surface membrane on which was placed some kind of material such as sand, powder, liquid, or viscous material. The resulting dynamic patterns are highly complex, but potentially very harmonious and aesthetically

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<sup>5</sup> The Teleo is similar to a CV-MIDI controller, but works using much smaller increments than MIDI (creating a smoother control curve). The Teleo can also have additional power sources attached so as to power higher current devices (such as the halogen globe). For more information on the Teleo system, please refer to the Making Things website ([www.makingthings.com](http://www.makingthings.com)).



pleasing. For more detailed information on Cymatics and Jenny's experiments, please refer to Jenny's book *Cymatics: A Study of Wave Phenomena and Vibration* (2001).

This principle is used in the *IntraSpectral* "Cymatic" plinths, in which each was fitted with a subwoofer speaker facing a shallow water bath (Fig. 12, see page 136). For each harmonic spectrum produced by the participant, the fundamental would be duplicated, transposed down several octaves and routed to the subwoofer corresponding to that particular oscillator bank. The speaker would excite the coloured water and produce various patterns that were projected on the ceiling by means of lights shining from inside the plinths (Figs. 13 and 14, see page 137). Originally, I had considered creating these images digitally with a computer program such as Jitter, which works in tandem with Max/MSP. However I preferred the principle of creating "real" images, and the presence of the plinths added to the "ritualistic" feel of the installation space.

### **Sound and Visual Feedback Design.**

Using the Max/MSP (Cycling '74) programming environment, I created a patch that analyzed and separated the pitches and amplitudes of the first 8 harmonics of any sound. This pitch and amplitude data was then routed to eight virtual oscillators and recreated as audible sine-waves. To create a more complex harmonic structure, I created 4 banks of oscillators, which enabled the system to remember and play the spectra of 4 successive sounds made by the user, provided each was loud enough to trigger the data capture.<sup>6</sup> These banks would be updated in sequence once they were used up (i.e. bank 1, bank 2, bank 3, bank 4, bank 1, bank 2, bank 3, bank 4, etc.).

Having laid the foundation of this interactive system, I decided to add some features that would create a more engaging soundscape that would encourage participants to experiment with their voices.

In deciding what the parameters for these control features should be, I also had to consider how they would be inputted into the system. I had to think carefully about my own intentions for the installation; an inappropriate or overcomplicated interface could potentially undermine these intentions, distract the participant, and "... depart from the attractive simplicity of the original interface" (Robson, 2002, p. 54).

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<sup>6</sup> In order to prevent the system from receiving too much input from the microphone, an adjustable amplitude threshold system was developed that prevented sounds below a certain amplitude from activating the system. This feature also encouraged people to "speak up", or be able to talk quietly with other people in the space without necessarily activating the system. In addition to this feature, I included another threshold that prevented sounds of a very short duration from being registered. This was to prevent people from resorting to hand claps and similar non-verbal sounds to interact with the system.

In keeping with the single-source design of *Beneath, Becoming*, I decided that the audio input from the microphone would provide not only the raw data, but also be the source of all the control parameters, which in this case would be the pitch, amplitude, and duration of the sounds made by the participants.

These parameters controlled a number of features that altered the texture of the oscillators, including their patterns of onset and decay, and the order in which they would be activated. A more complete explanation of these processes can be found in my paper “Interfaces for Public Use Interactive Installations: Some Design Concepts, Problems and Possible Solutions” which is published in the proceedings of the Australasian Computer Music Conference 2003 (please refer to the Appendix on pages 149-158 for the full text of this paper). Since this publication, a number of significant changes were made after 2003, including the removal of all the VST effects plugins except for the direct vocal output, and the inclusion of the plinths.

There are two Max/MSP patches for *IntraSpectral* on the accompanying data CD ROM. The first – “ISPatch1.pat” – is the patch that was used for the April-May 2004 exhibition at the Spectrum Project Space in Perth, Western Australia. The second patch – “ISPatch2.pat” – has been designed to further develop the idea of using the installation as a “progressive vocal meditation”. A set of sub-patches were built that would analyze the participant’s voice over a period of time. As the participant sings more tones, the sub-patches build a “harmonic profile” of their vocal range, based on Pythagorean ratios.<sup>7</sup> Based on an averaging system similar (but more complex) to the one used in *Beneath, Becoming*, this profile would become more stable as more data is fed into the system, until these “harmonic averages” start to become audible. The “fundamental tone” of this profile would be entered by the participant when they first encounter the system, by singing the lowest tone they can comfortably sing.<sup>8</sup>

Over time, as the participant sings more and the system acquires more data, thus calculating more stable averages, a second soundscape would start to emerge beneath

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<sup>7</sup> As discussed in chapter four, Pythagorean tuning is only one of many tuning options available. Although not the most desirable for the natural harmonics of the voice, I chose Pythagorean tuning for *IntraSpectral* because of its mathematical simplicity and relative ease by which it could be implemented within the Max/MSP patch. Future versions of *IntraSpectral* could include a “switchable tuning” option, by which the user could choose from a selection of different tuning systems as a basis point.

<sup>8</sup> Within the main Max/MSP is a sub-patch that switches between the main audio feed, which sends the audio data to the main analysis patches and oscillators, and the “fundamental tone” audio feed, which sends this initial tone to the “averaging” sub-patch for analysis. The controlling mechanism for this switch can be any “on/off” MIDI switch.

the first. This soundscape uses the more slowly evolving values from the average analysis as its input data, rather than the immediate inputs from the microphone, thus creating a more stable sonic texture. It would (subtly at first, then more obviously) start to reinforce the participant's perception of this "spectrum of averages," and hopefully encourage them to meditate more intensely on them.

Essentially, this feature would create what could be called a sonic "chakra meditation," in which the participant over time fashions a spectral soundscape that reflects their own personal sonic range and set of ratios. The set of relationships has been designed to become richer in this meditation, in which the participant could contemplate not only the sounds they hear and their active physical and psychological relationship with them, but also the sounds they make and how these may also interact with the system.

As the participant begins to sing more tones that are in accordance with their "charkas", additional sampled sounds would be triggered. This feature is similar to the "tally" system in *Beneath, Becoming*, and by using some of the same samples, links it with the former. It also emphasizes the simultaneously "expansive" and "focused" intent of the entire project, by establishing a connection between the sounds the participant hears and "sees" around them with the internal dynamics of their own body.

Unfortunately, these features could not be used during the Spectrum exhibition, and have not yet been tested "in the field". One difficulty was finding a suitable mechanism to engage and disengage the initial "fundamental tone" feed. I considered using a proximity sensor, but this would have forced the participant to remain directly in front of the plinth (I wanted to allow the participant the opportunity to move around the space in between making sounds). Another option was a foot switch to be operated at will by the participant, but this seemed to be somehow aesthetically incompatible with an otherwise purely voice-activated system. The intention was to make *IntraSpectral* a "single-input" system controlled entirely by the voice, so that the participant could concentrate fully on their vocal sounds the effect they had on the slowly evolving sonic and visual textures.

An IR "entry/exit" sensor was another possibility, however this would only be viable if the installation was specifically intended for one participant at a time. For example, if the installation was occupied by a hypothetical "participant A", who was later joined by "participant B" within the space, the IR sensor would either have to be designed to trigger upon "participant A's" departure (meaning the space could not be shared), or upon "participant B's" arrival, cutting short "participant A's" interaction with the

installation. Taking into account these different possibilities, it seems that future versions of this installation will either have to include some kind of secondary interface, or become a single-user system.

### **6.2.3 The *Listen and Learn* Project.**

#### **Original Project Design.**

Although a large proportion of *The Wheel of Life* project exist in the form of computer-based installations and user interfaces, it is ultimately concerned with the nature of *human experience*. Its third and final stage progresses to a multi-participant environment, while also returning back to the basic elements of breath, body awareness and listening to the natural world. Once again this state can be likened to Oliveros' "focal attention/global awareness" theory (section 5.1.1), or the more traditional states of "bare attention" or "*vipassana*" (section 2.2.2).

*Listen and Learn* is a title that suggests both the fundamental actions and the fundamental intent of entire *Wheel of Life* project, that is, to attain a greater understanding about the "true nature of the Self" through a heightened and more cultivated level of sensory perception. Not having created this kind of work before, I decided to conduct a series of fortnightly experimental workshops over a period of 12 months, through which I could gain further understanding into group improvisation, sound meditation and toning. It was important for the group to consist of both musicians and non-musicians, so that the project outcomes would not be too determined by "musically trained" sensibilities (see section 5.1.1).

During this time I had also become aware of Pauline Oliveros' Deep Listening work, and the sound meditations of Don G. Campbell (1989). I began to incorporate some of the ideas from these and other artists into my own project, which at the time I envisaged as having a clear final objective: a "ritual culmination" of the other two projects. I was aiming to create an "inhabited" installation space in which members of the research group would perform a continuous "sound-meditation-ritual". Members of the public (having already interacted with *Beneath, Becoming* and *IntraSpectral*) would enter the space and be "initiated" into the ritual. In the spirit of *Beneath, Becoming* and *IntraSpectral*, this work would be malleable and adapt to the actions taken by the new participants. Thus, this final work would be a meditation on human interaction, as well as the physical, aural and visual components of the other two installations.

## **Project Execution.**

As the project unfolded, *Listen and Learn* took on a somewhat different form than I had originally envisaged. At the outset of the project, approximately twenty people signed up for the regular workshops. I had intended to maintain the same group of people throughout the duration of the research, of whom a number would take part in the final “work” to be presented at *The Wheel of Life* presentation. However, the number of participants and the frequency of workshops fluctuated significantly throughout the research period, making it impossible for me to work consistently with a set group of people. As a result, the resulting workshops evolved into a series of workshop-style exercises that could be used in different combinations depending on the size, experience and dynamics of each group of people.

Although *Listen and Learn* could not take place during the exhibition of *Beneath, Becoming* and *IntraSpectral*, I created an “introductory space” within the exhibition in which participants could sign up for the final workshop, which was held two weeks later. This space (shown as the “Listening Room” in the “Video Clip 1” footage on the accompanying DVD) contained some elements that would be present in the upcoming workshop, including the small bells and the sound of crickets.

The final *Listen and Learn* workshop was also the longest, consisting of over four hours of exercises over a single day. The workshop was conducted in a semi-rural setting, as a kind of “mini-retreat” (originally this retreat was to be held over a weekend), in which I directed a progressive sequence of exercises that had evolved during the research period. A short film (Video Clip 2) documenting the stages of this workshop can be found on the accompanying DVD. They can be summarized as follows:

**Exercise 1:** This was both a relaxation exercise and a way of establishing an initial focal point for sound and body meditation. This focal point began with the heartbeat, then expanded outwards to the breath, and to the whole body. The exercise continued with the participant’s awareness being gradually expanded into the environment to the limits of their hearing. As this expansion occurred, the participants were encouraged to imagine their field of perception as being an expansion of their actual physical body, and that the sounds they hear are physical sensations. This meditation concluded with these experiences being slowly drawn back inside the body. This exercise was partly inspired by Don G. Campbell’s book *The Roar of Silence: Healing Powers of Breath, Tone and Music.* (1989) and Evelyn C. Rysdyk’s *Modern Shamanic Living: New Explorations of an Ancient Path* (1999).

**Exercise 2:** Here, the meditation on the breath progressed into an audible vocal sound. This vocalization is done with special attention to the physical sensation of the sound, and how its presence acts and reacted with the other sounds inside and outside the body. This exercise bears a resemblance to Oliveros' *Sonic Meditation* "Teach Yourself to Fly".

**Exercise 3:** this was an exercise in "sonic discrimination", and how many of our judgments about sound are the result of personal memories or culturally determined symbols. The participants performed a similar exercise to No. 2, however this time using their name (a particularly potent sonic symbol) as the "meditation object". Following the exercise, the participants again listened to the sounds around them, this time trying to hear them as *sounds* rather than mental symbols triggered by sounds.

**Exercise 4:** This exercise was the first that involved group interaction, and includes elements from the previous exercises. The participant each took a small bell (the same as those used in the "Listening Room" of the Spectrum exhibition) and a beater. A six-part meditation process then took place, with each part delineated by the "group leader", who sounded a larger bell:

1. The participants sat with eyes closed, holding their bell in one hand and their beater in the other, and focused on the rhythm of their breath, paying particular attention to the point between the out-breath and in-breath.
2. Participants began to allow their arms and upper body to move in the rhythm of their breath.
3. At the point between outbreath and inbreath, participants allowed the beater and bell to make contact (with eyes still closed). Whether the bell and beater actually made contact was not essential. The main focus was on the rhythm of the breath; the bell allowed that rhythm to become audible and the participant to become aware of the rhythms of the other participants' breathing.
4. On the out-breaths, the participants allowed their breath to evolve into vocalization.
5. The body movements and bell-ringing ceased, but the vocalization was maintained.
6. The vocalization ceased, and the participants returned to breathing and listening. During all parts of this exercise, the participants were encouraged to observe (but not deliberately manipulate) the natural relationships that would

form through the interaction of their different breath rhythms, bell tones and vocalizations.

**Exercise 5:** This exercise consisted of a soundwalk in the surrounding forest. Soundwalks are a form of “walking meditation” in which participants walk slowly and pay special attention to the physical senses in their bodies and the sounds around them. In this soundwalk, I wanted participants to maintain the awareness gained from the previous exercises, that is, to maintain a connection with the focal point within their own bodies, while expanding their awareness outward, and to hear the sounds *as sounds themselves*. During the course of the soundwalk, each participant was to “choose” a sound for the following exercise.

**Exercise 6:** This exercise contained a number of stages:

1. A period of time was spent in which each participant re-created their chosen sound visually on a piece of paper. Emphasis was placed on drawing the *sound*, rather than its symbolism.
2. In a brief ritual, each participant handed their drawing to another, with eyes closed so that the exchanges were anonymous.
3. Participants sat in a circle, facing outward. Looking at their newly acquired drawing, the participants re-created the drawings as vocalizations. While this vocal soundscape took place, participants would take turns to sit in the center of the circle and try to “locate” their original sound.
4. The participants discussed the outcome of the exercise, that is, which sounds they thought were “theirs”, and how they interpreted the drawing they received into sound. Participants also discussed their own drawings, and how they had recreated them on paper.

The workshop concluded with a final soundwalk, in which the participants again listened to the sounds around them, taking into account their perceptual experiences throughout the day.

### **Listen Learn as a Study in Meditation.**

Over the research period, I designed a number of exercises that focused on various stages of the meditation process. Each exercise had a particular inclination between “passive observing” and “active interaction”, either with the environment or other people. Although this stage was not fully realized as a “ritual”, it did fulfill many of its original intentions, that is, to provide an environment which presented a culmination of

the experiences of the two other installations, to extend the meditation process to human “ritualistic” interaction, and to draw the participant back to the meditational fundamentals of physical sensation and “simple observation”.

Most of the *Listen and Learn* workshops I conducted included a number of “beginners”, so each workshop was designed in a progressive manner, with the simpler and more passive exercises first and the more complex ones later on. This style of “progressive experience” is similar to that created for both *Beneath, Becoming* and *IntraSpectral*.

Unlike the co-participatory works of Karlheinz Stockhausen and Pauline Oliveros, the *Listen and Learn* exercises do not exist as finalized “texts”, but rather as an instructional “flow”.<sup>9</sup> Another difference lies in their delivery. Unlike Stockhausen’s and most of Oliveros’ similar works, the instructions to most of the *Listen and Learn* exercises are usually given *throughout* the process, rather than before.

## 6.2.4 Project Outcomes.

### Participant Feedback and Subsequent Project Developments.

All of the projects in *The Wheel of Life* underwent a number of stages of development following initial presentations and subsequent feedback from users and colleagues. In the case of *Beneath, Becoming* and *IntraSpectral*, this feedback was the result of informal discussions with participants during and after the exhibition, rather than an official survey<sup>10</sup>. For the *Listen and Learn* project, feedback was gathered during the numerous workshops carried out during the research period, in the form of lengthy group discussions following each workshop.

As mentioned earlier, *Beneath, Becoming* underwent a redesign of the breath interface. The soundscape itself was not altered, however during both the Spectrum and Westspace exhibitions I did receive some comments that the connection between the breath and the soundscape was at times difficult to pinpoint. I was able to make some

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<sup>9</sup> Although Oliveros has published the texts for her *Sonic Meditations* and *Deep Listening Pieces*, she states that these texts do not represent a definitive version of the works. Depending on situation or the dynamics of the group she is working with, she can and does alter these texts. “Even though Sonic Meditations (sic.) are in print I often vary or revise the wording I use to transmit the instructions in a new situation”. (Oliveros, 1998, p. 6). Hence Oliveros’ use of the term “... recipes for ways of listening and sounding...” (see section 5.1.1).

<sup>10</sup> A user feedback book was made available at the gallery during the exhibition, however people only recorded their general impressions about the exhibition itself, rather than specifics regarding the user interfaces or other details.



improvements to the Max/MSP patch that made the feedback more reliable, however much of the participant confusion was due to wearing the belt incorrectly.

The developmental stages of *IntraSpectral* described earlier were inspired to a large extent by the feedback from users following its early exhibitions at the Totally Huge New Music Festival (April 2003) and the Australasian Computer Music Conference (July 2003) (Track. 4 of accompanying Audio CD).

Some people had expressed uncertainty as to how their voices were affecting the soundscape, a problem that seems to come up often in interfaces for non-musicians (e.g. Robson (2002)). In this case, all of the control parameters came from the same source, which at times became confusing to the participants, since the components that make up a vocal sound are not generally thought of as separately as the various components that make up certain physical gestures. This kind of problem prompts the installation artist to consider his/her mapping strategy, and whether the method of feedback to the participant is sufficient or appropriate. At the same time, however, the artist must decide whether the participant should receive immediate musical gratification on first encounter (Perry Cook's "Instant Music, Subtlety Later" principle (2001)), or whether they need to spend time with the installation to "work it out".

Like *Beneath, Becoming, IntraSpectral* was designed to be accessible to people whether they interacted with it for only a few minutes, or for a longer period of time. Certain parameters would respond to the participant "moment-to-moment", while others would evolve more slowly, creating an environment that would "draw" the participant into a deeper level of interaction. Introducing the plinths into this installation seemed to enhance this "dual purpose" by providing a level of response that was both immediately gratifying, while also offering an additional tool to those who wished to immerse themselves further into the experience.

The *Listen and Learn* project progressed as a series of workshops involving groups of between four and twenty people. The initial series workshops were conducted on a weekly or fortnightly basis and consisted of two or three simple exercises. These were relatively short (approximately one hour) gatherings and involved a small number of people. Following each workshop was a group discussion during which participants could share their experiences, while offering me valuable feedback regarding the effectiveness of the exercises and the structure of the workshop. This feedback allowed me to develop new exercises, rework existing ones, and design new workshop structures. In addition to these more intimate gatherings, I conducted a number of

longer workshops with larger groups, culminating in the day-long event held in May 2004.

Both the post-workshop discussions and the “real time” responses during the exercises themselves were important aspects of the *Listen and Learn* project, providing valuable sources of information and insight for me regarding not only each individual’s own experiences, but the various levels of interaction between participants within different kinds of group settings. This “spontaneous feedback” process allowed me to design the exercises and workshop structures in a way that provided an effective experience for those taking part, while also being flexible enough to respond to the varying conditions within a group situation.

Although *Listen and Learn* did not evolve into the project that I had originally envisaged, in hindsight the original format would only have worked if all three projects had been presented in the configuration of the original, single venue concept. As a result, *Listen and Learn* took on a much more “informal” character, which prevented me from realizing some of my initial ideas, but at the same time allowed the project to evolve naturally.

### **Using Meditation Techniques to Enhance the “Musical Experience” in *The Wheel of Life* Project.**

The primary objective of this research project was to create musical art works that enabled non-musicians to engage in an active and powerful musical experience.

This need was largely inspired by my own earlier musical endeavors, through which I became intensely interested in the power of musical sound to induce physiological and psychological changes in the listener. Since 1999 I have worked primarily using electronic media, either to create acousmatic, electronic or mixed media works.

Although these styles of compositional practice were (and still are) highly satisfying for me, there did seem to be something missing from the creative process so as to make these works into more engaging experiences. Despite my experiments with acousmatic sound, alternative compositional structures and unusual instruments, I came to believe that the main factor that needed to be addressed was the fact that music is normally presented as a “performing” art. An important contention in this research project has been that the separation between the performer and the audience in Western Art Music prevent the full potential of the “musical experience”.

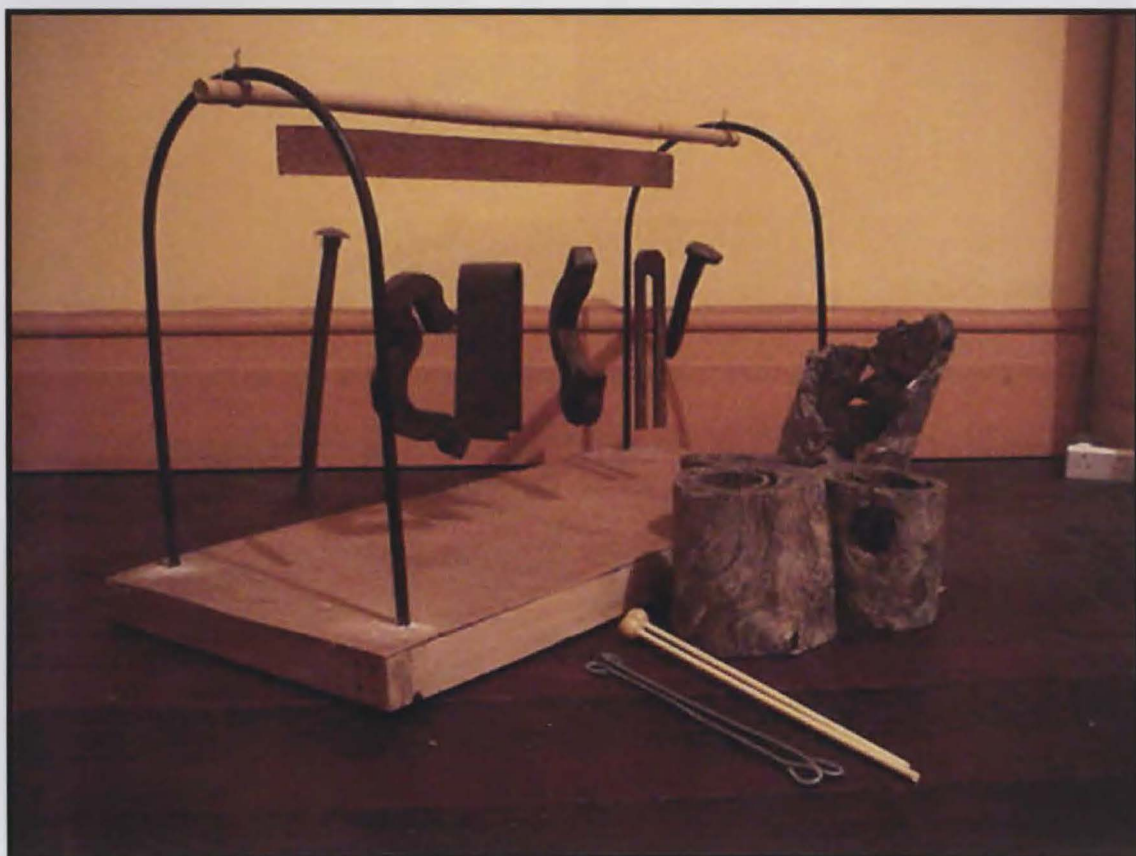
Because of my desire to bypass this (and other) basic principle of Western Art Music, I chose two forms of “co-participatory” music that would allow me to work without the

aforementioned barriers. These forms were, of course, sounds installations (both tactile and non-tactile) and co-participatory group improvisations.

Using principles and practices derived from traditional meditation systems provided not only a solid methodological framework with which to approach these projects, it also enabled me to uncover a number of key aspects of the broader realm of “human experience”. As was discussed earlier, simply reading about a meditation discipline and then applying it to a musical setting in an attempt to “enhance the experience” is both practically and ethically problematic. These projects were intended to encourage people to discover more about their own inherent creativity, so simply presenting them with a number of “scientifically” or “historically” verified techniques would not be enough to guarantee an enhanced experience. Similarly, presenting an activity that, through symbolic associations such as role-plays, objects or spatial/temporal layout, is immediately recognized by the person as “music”, or “meditation”, or whatever, would also initiate a set of culturally predetermined associations and responses, thus sabotaging the potential for an experience that extends *beyond* those associations.

As stated earlier, a piece of art that is intended to properly break away from the conventions of Western Art Music either needs to be totally “open”, or offer a completely new set of symbolic associations. In chapter five, either of these approaches could be observed (to various ends) in the works of Stockhausen, Schafer, Oliveros, Machover, Mori and Davies. In *The Wheel of Life*, the focus has tended towards the “open” approach, not so much as to provide a symbolically *neutral* environment, but one in which the objects, actions and sonic feedback present *potentials for personal symbolic associations*. These works are malleable not only in their practical design, but in their culturally non-specific content. Rather than being totally rigid, or totally ambiguous, these works instead offer “... the opportunity for [*personal*] experience” (Cage, see section 4.2.1).

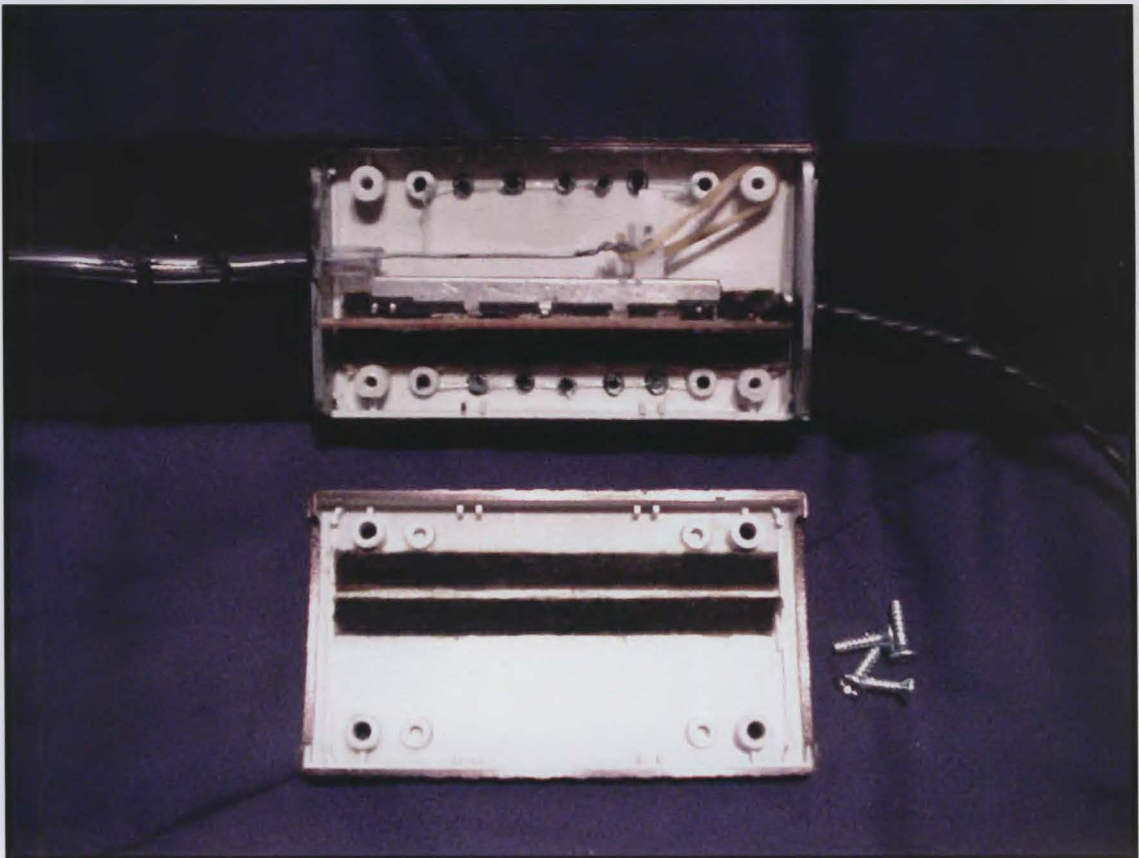
Thus, the use of meditation techniques has not been to create some kind of romanticized ideal of “Eastern” culture, but to make use of mental tools, that, if used within the right framework, have a vast number of potential applications.



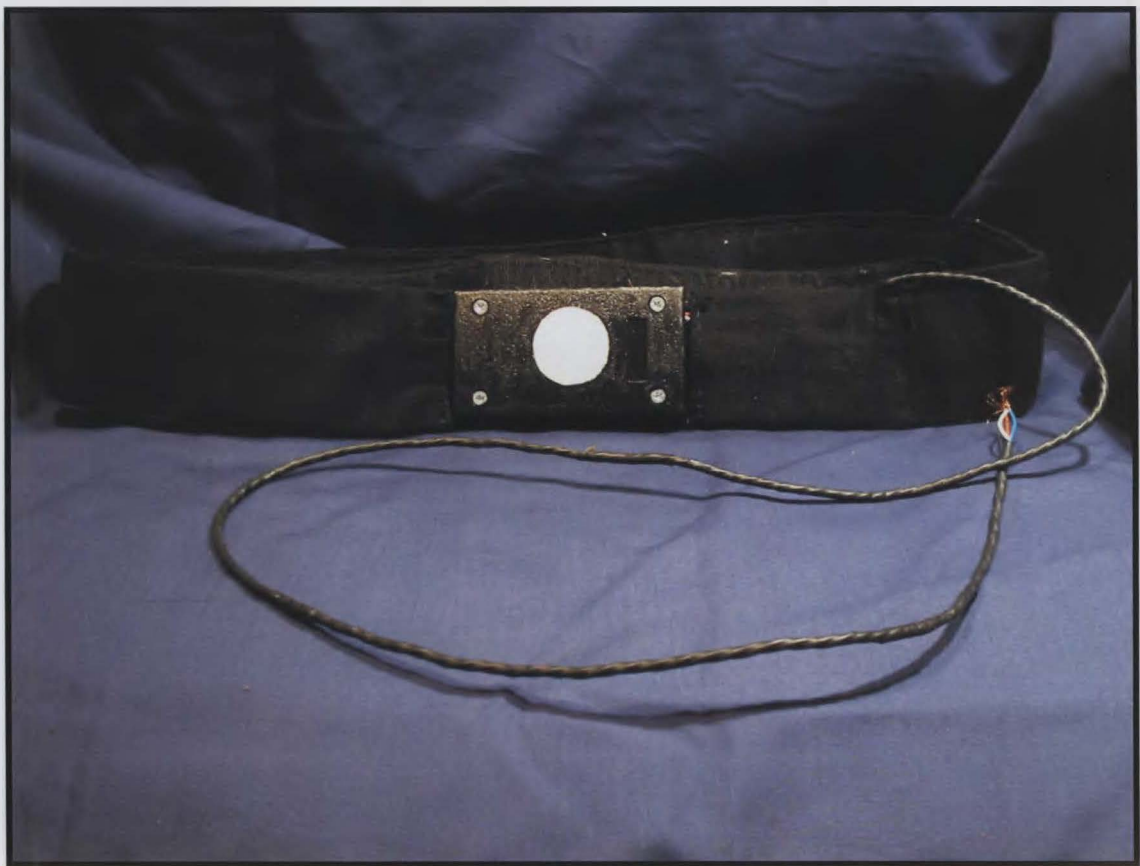
**Fig. 1:** The percussion sound sculpture used in the performance work *Belly Breathe, Belly Brain*. See page 107 for discussion.



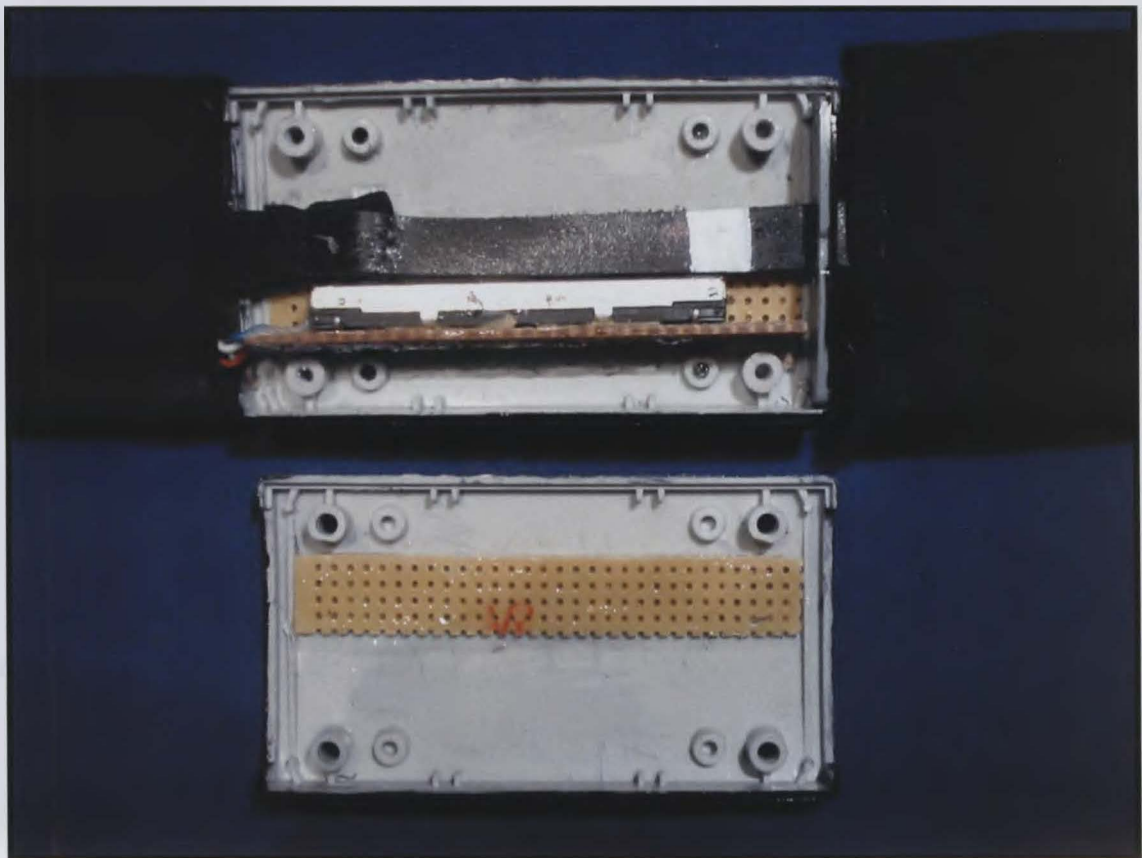
**Fig. 2:** The original breathing belt design used in the April/May 2004 exhibition of the installation *Beneath, Becoming*. See page 113 for discussion.



**Fig. 3:** Original breathing belt design interior detail. See page 113 for discussion.



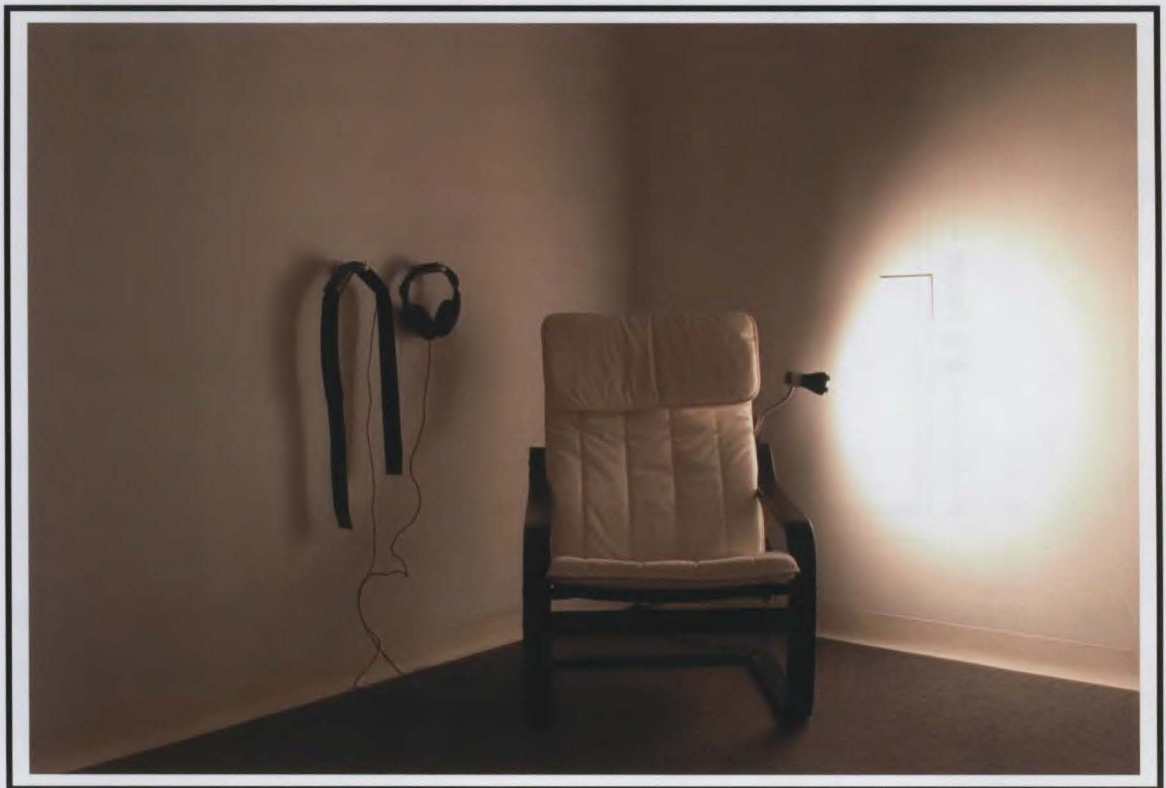
**Fig. 4:** The revised breathing belt design used in the July 2004 exhibition of the installation *Beneath, Becoming* at the Westspace Gallery. See page 113 for discussion.



**Fig. 5:** Revised breathing belt design interior detail. See page 113 for discussion.



**Fig. 6:** The installation space setup for the April/May 2004 exhibition of *Beneath, Becoming* at the Spectrum Project Space. See page 113 for discussion.



**Fig. 7:** The installation space setup for the July 2004 exhibition of *Beneath, Becoming* at Westspace Gallery (photograph by Mark Derbyshire). See page 113 for discussion.

# Spectrum Exhibition Layout

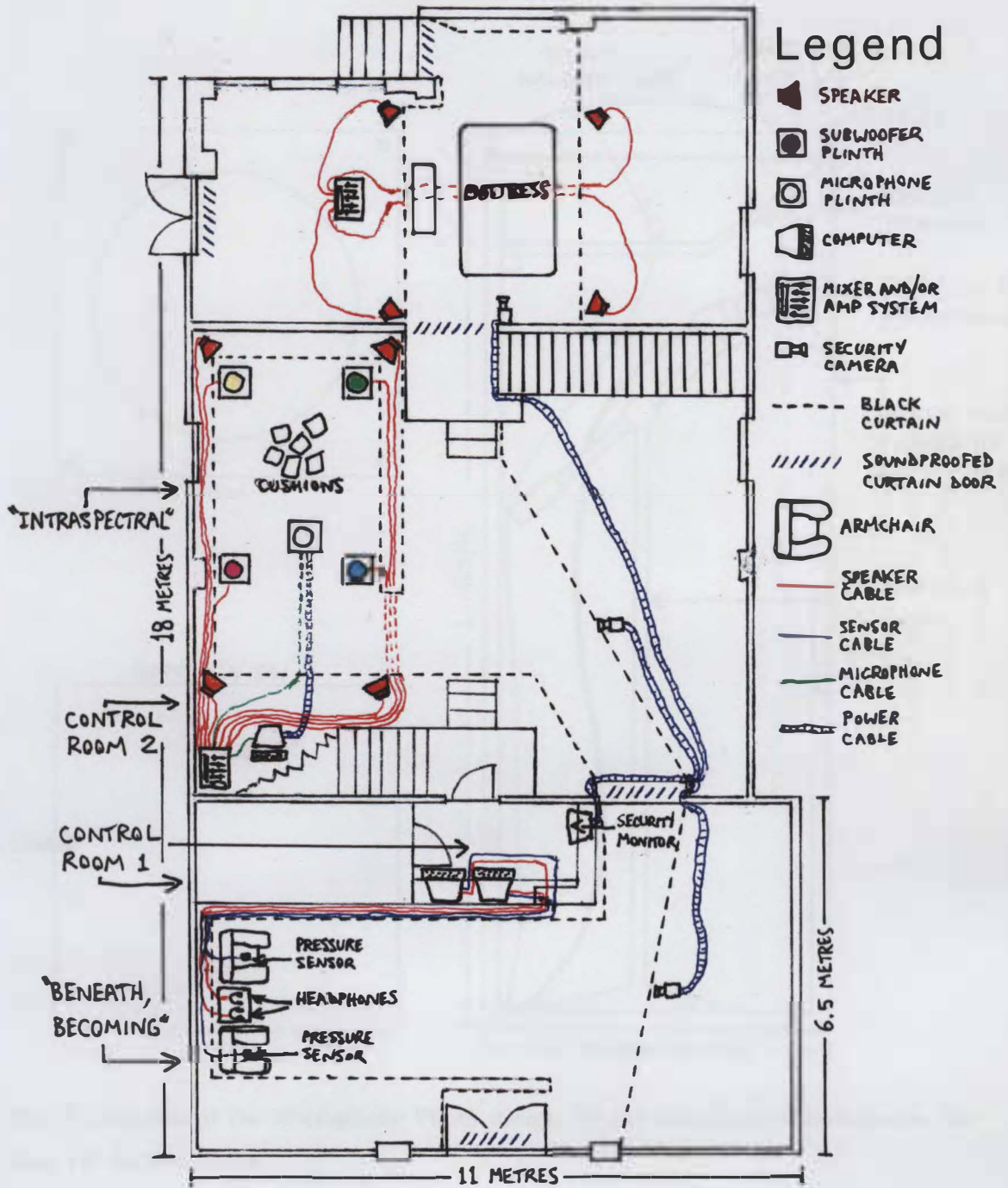


Fig. 8: Floor plan layout for the Spectrum Project Space during the April/May 2004 exhibition of *The Wheel of Life*. See page 116 for discussion.



# Microphone Plinth Design

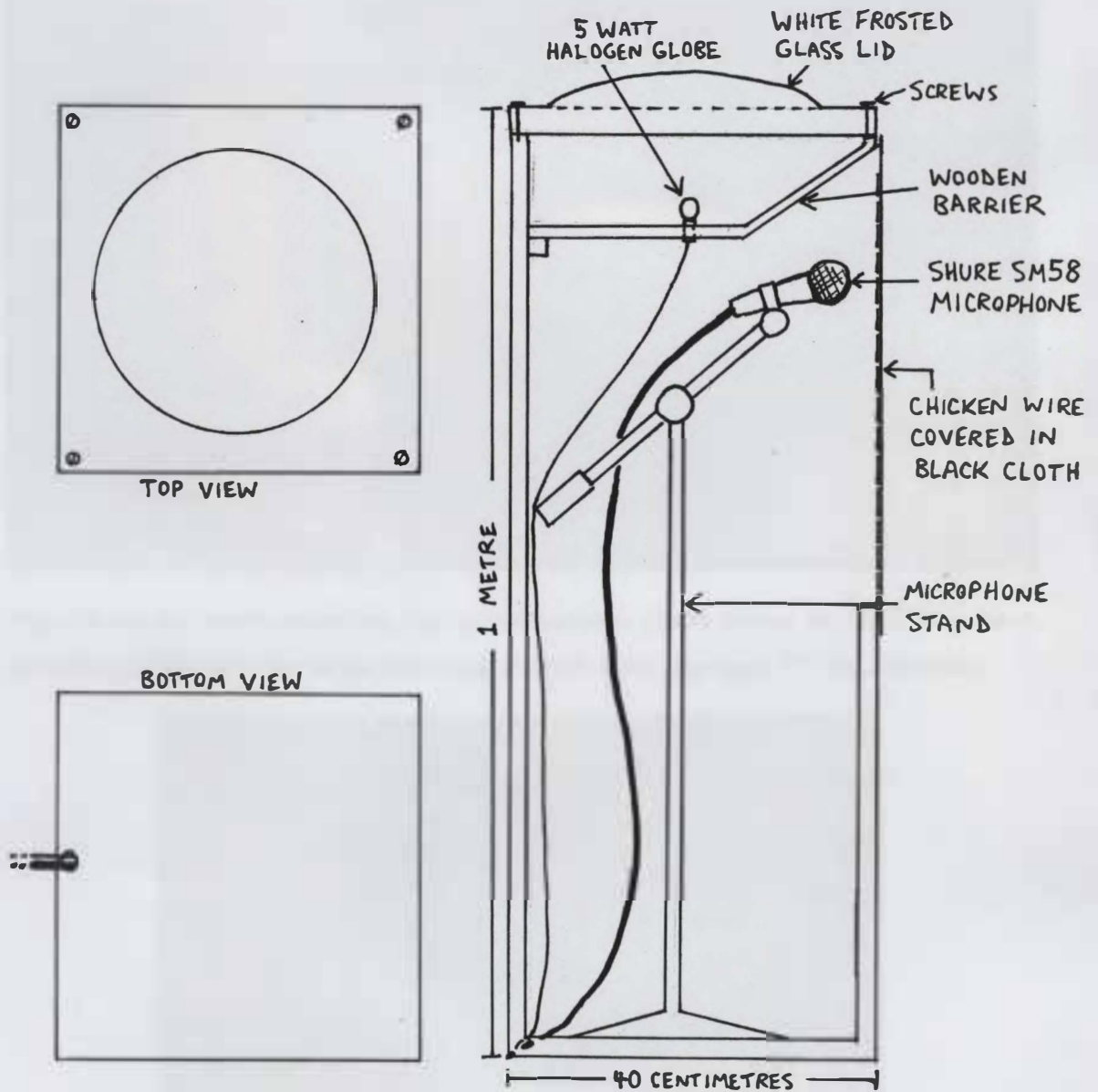


Fig. 9: Diagram of the Microphone Plinth design for the *IntraSpectral* installation. See page 117 for discussion.



**Figs. 10 and 11: Participants sing into the microphone plinth during the April/May 2004 exhibition of *IntraSpectral* at the Spectrum Project Space. See page 117 for discussion.**



# Cymatic Plinth Design

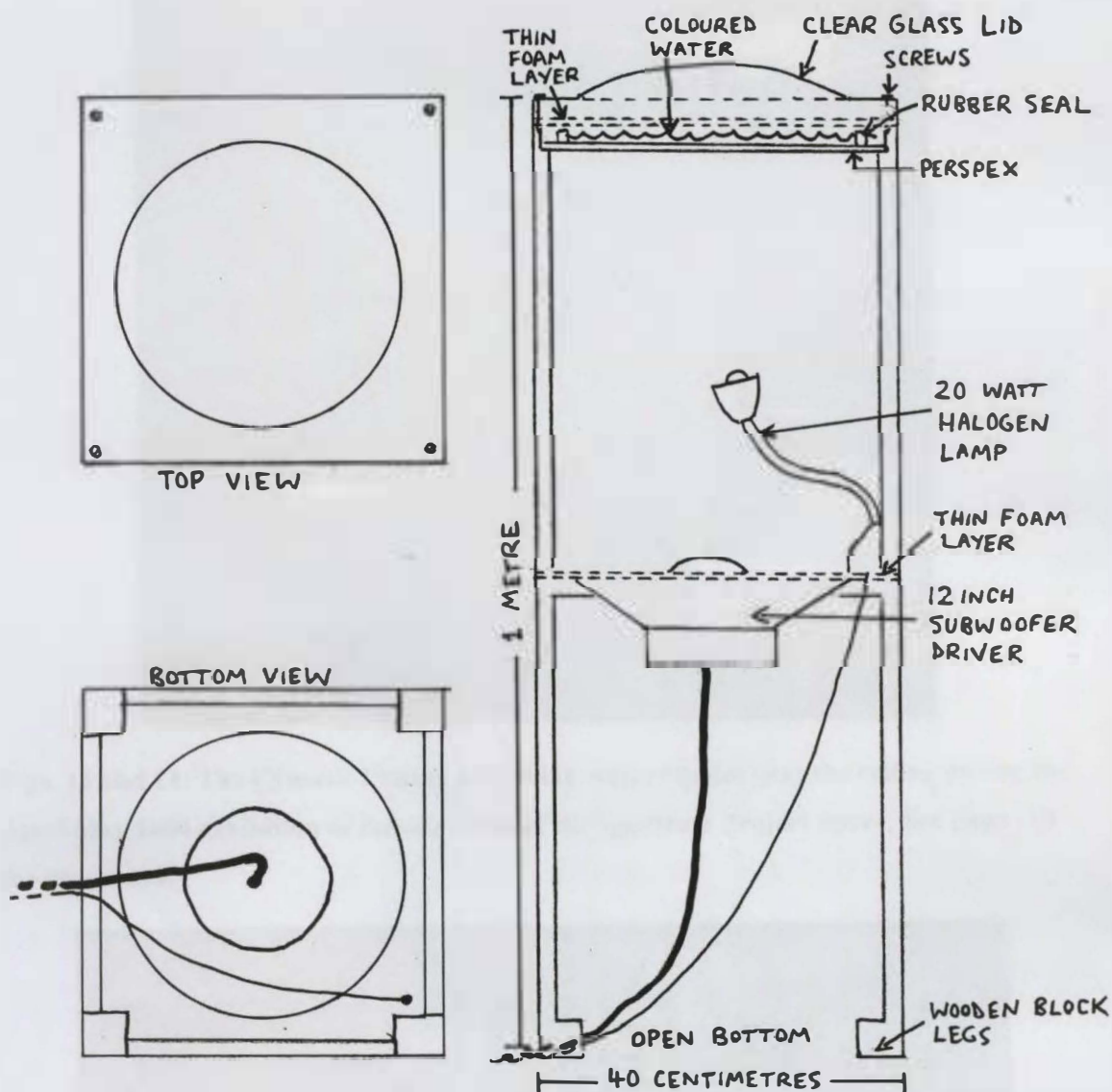
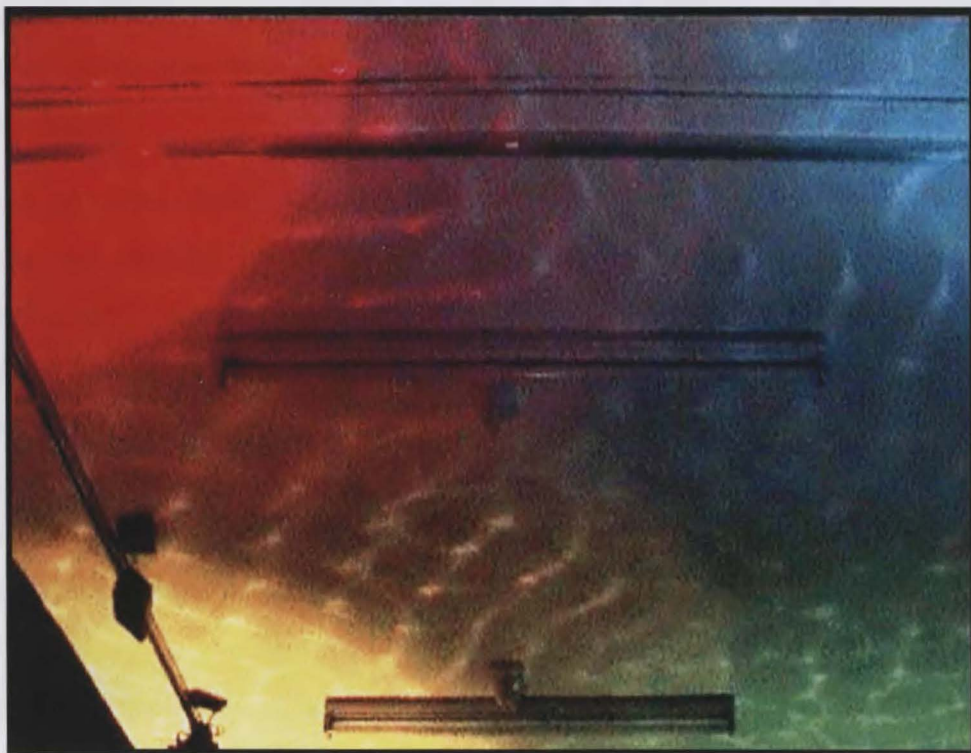


Fig. 12: Diagram of the Cymatic Plinth design for the *IntraSpectral* installation. See page 118 for discussion.



**Figs. 13 and 14:** The Cymatic Plinths projecting water ripples onto the ceiling during the April/May 2004 exhibition of *IntraSpectral* at the Spectrum Project Space. See page 118 for discussion.



## **Chapter 7. Final Comments.**

Although the research presented throughout this thesis is detailed and comprehensive, it is by no means a “complete study”. However, it has served to highlight some important points about the intimate connections between physiological responses, psychological perceptions and cultural conventions. It has also provided a solid body of knowledge that has made significant contributions to my own confidence and clear-sightedness as an artist working in these areas.

The issues presented throughout this dissertation have been discussed on a chapter-by-chapter basis, with the conclusions drawn from one chapter serving as a starting point for the next. The first five chapters offered a “cumulative” line of enquiry that provided a context for the explanation of my own works in chapter six. This chapter (chapter seven) serves simply to offer some final observations regarding the nature of the project as a whole, and to provide some kind of perspective for its future prospects.

### **7.1 THEORETICAL RESEARCH: POINTS FOR CONSIDERATION.**

Ultimately, any scholarly research into what is essentially an *experiential* practice cannot address all of the relevant issues. Meditation itself has been designed so as to enable people to understand concepts beyond that which could be grasped with the intellectual mind. That being said, it has also been found that although meditation techniques can largely be reduced to methods of “brain entrainment”, the psychological and physiological effects can only serve a purpose when placed in some kind of known cultural context.

Although all of the “facts” can never be known, the available data has been used in a way that had clarified, rather than confused, the issues raised. The fact that these important issues regarding the complexity of the subject matter have come to light throughout this discussion has served to maintain the discussion’s integrity, and ensured that it has been approached from an appropriately neutral viewpoint. As a result, the research has effectively served its purpose, which was to provide a sound factual and theoretical foundation for the conception, design and realization of the accompanying creative projects.

## 7.2 FUTURE CREATIVE POTENTIALS.

Many of the outcomes of the three creative projects were discussed in the final section of chapter six. However, some comments need to be made with regard to the future direction (if any) for this project, that is, how the outcomes of these projects could influence future manifestations of each individual work (they are, of course, independent projects as well as part of a greater whole).

The first project, *Beneath, Becoming*, has lead me to consider future possibilities using biofeedback equipment to realize my own creative intentions. The use of biofeedback equipment in music is by no means new; highly sophisticated systems involving muscular, neurological, respiratory and other physical responses have been utilized to great effect by great artists such as Atau Tanaka, Alvin Lucier and Stelarc, to name just a few. My own work in this field has not been to develop new systems, but to utilize existing “off-the-shelf” technology to enable me to realize my own creative intentions. In the initial stages of my research, I examined a number of biofeedback artists and their work so as to familiarize myself with the genre. I needed a feedback source that would be relatively simple to track, was non-invasive, and would offer a reasonably accurate reflection of a person’s moment-to-moment psycho-physiological state. After considering a number of feedback sources such as EEG, EMG and heart-rate, I decided that the breath would be the most useful source for me to work with. Although relatively simple in terms of biofeedback, the breath has proven to be an effective and relevant data source (the breath features as an important physical and symbolic focal point in many meditation disciplines). The resulting breath interface belt that I designed is easy to use and reasonably effective, however I am currently considering constructing a new version that incorporates three LEDs that inform the participant of the belt’s functional state on a moment-to-moment basis (e.g. “red” for optimal fitting, “yellow” for in-breath data input present, “blue” for out-breath data input present).

*IntraSpectral* has been a valuable project for me, not only as a creative endeavour, but also for improving my confidence in working with complex Max/MSP patches, multichannel sound, and building materials. Future considerations for this project include devising an effective means by which the “chakra analysis” sub-patches can be implemented, and the possibility of using a software-based graphics generator such as Jitter in conjunction with Cymatics.

In many ways, the *Listen and Learn* project has only just begun. As my experience and confidence grows in this style of music making, I intend to devise further workshop structures, and hopefully realize the original “group ritual” concept.

Ideally, I would like to consider the possibility of one day presenting the *Wheel of Life* project as originally intended. As was stated earlier, the intent of the project was somewhat compromised because of the change in format, and in many ways I believe its full potential can only be realized if it is presented in its original form. Unfortunately, the resources required for such a presentation would be significant, and finding a suitable venue would be difficult. However, with the ever-increasing availability and power of new music and art technology, this project may yet be realized in its original form.

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**Appendix: ACMC 2003 Conference  
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# Interfaces for Public Use Interactive Installations: Some Design Concepts, Problems and Possible Solutions

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Figure 1. Two people using the *IntraSpectral* installation, exhibited during the Totally Huge New Music Festival, April 2003.

## Abstract

*One of the fields in computer music that has blossomed recently is that of sophisticated alternative controller and interface systems, whether for live performance, composition, education, or installation applications. Each creative area has its own specific requirements and limitations, and the choice of interface system, as well as its marriage to particular mapping and user feedback methods, has to be carefully considered in order to create an effective expressive tool. This paper addresses some of the issues related to the use of different kinds of control interfaces within the context of public-access interactive installations. As a working example in this analysis, I will be referring to my own recent installation *IntraSpectral*, as well as works by other artists within the same general creative area.*

## 1 Introduction

In order to make clear the stages of discussion, this paper will be divided into the following sections:

### **IntraSpectral – An Overview**

In this section the reader will be familiarized with the basic creative intent behind *IntraSpectral*, as well as how the first version of the project was designed and created. Particular attention will be paid to the user interface and acoustic feedback system. This section will also address some issues that were raised as a result of user responses to the installation.

### **Interfaces and Controllers**

Here, the issues and problems addressed in the previous section will be examined in the light of recent creative work and research within the field of interactive computer music for non-musicians. The interface used in *IntraSpectral* will be examined in context with a number of similar installations by

other artists in an attempt to address some of the challenges faced in the design and implementation of interfaces for non-musicians.

### Future Developments

*IntraSpectral* is a work in progress. This section will consider some of the issues discussed throughout the paper, and outline possible future developments for this ongoing project.

### Conclusion

Final comments.

## 2 *IntraSpectral* – An Overview

### 2.1 Creative Intent

interactive installation is a particularly effective medium for exploring some of the creative possibilities of this kind of aesthetic approach to musical transmission and reception.

This particular installation was meant not only to provide an immersive acoustic experience, but also to be an environment that encouraged participants to actively take part in the creation of that experience – in this case, using the voice as the means of expression. I am particularly interested in creating sonic spaces and musical “potential” that encourage the participant to explore aspects of their own innate creative nature, in ways that they may not normally feel comfortable for them. It is hoped that by suspending one’s social and cultural inhibitions, this innate, spontaneous creativity can be a means by which the participant can become more aware of the interconnectivity of their mind, body and soul.

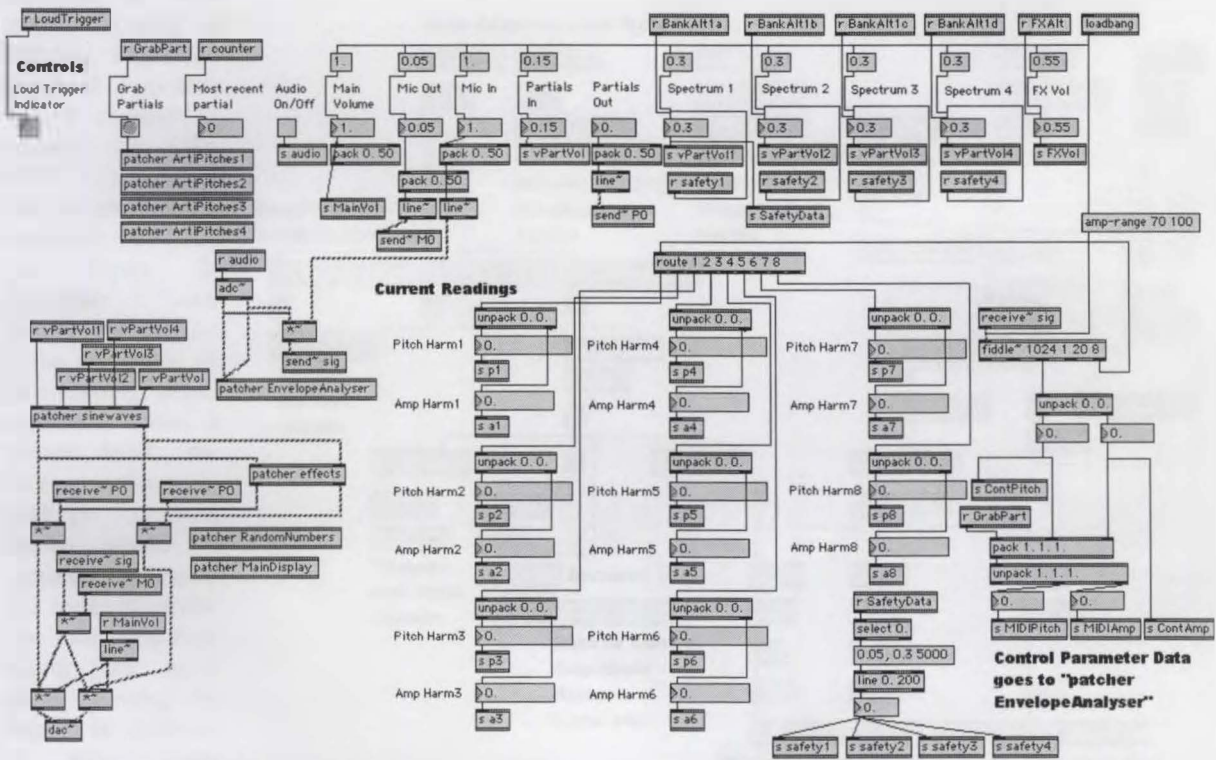


Figure 2: *IntraSpectral*'s main Max/MSP patch window.

*IntraSpectral* was an interactive installation that was created as a result of my interest in the harmonic spectra of sounds. I wanted to create an immersive sonic environment that would allow people to hear the different partials of the sounds that they make, and to be able to use their own voice to create an immersive soundscape with these harmonic spectra. This installation is part of a much larger project, in which I am exploring the way meditation can be used as a creative tool in experimental music (this research has been largely inspired by the work of American composer Pauline Olivero, particularly her ceremonial pieces, *Sonic Meditations*, and her *Deep Listening* method and related works). Specifically, I am interested in “audience interactive” systems (some using modern technology, some not), and the

### 2.2 Design and Construction

The physical layout was quite simple for this installation; a space approximately 5x6 meters was isolated from the rest of the gallery with black cloth, a speaker was placed in each of the 4 corners of the room (arranged in a cross-stereo format), and a Shure SM58 microphone in the center. All controlling equipment (computer, mixer, amp, etc) was out of sight (in the next room). The result was a minimal and quite evocative environment. (see Figure 1)

#### General Concept and Design

Using the Max/MSP (Cycling '74) programming environment, I created a patch that would analyze and separate the pitches and amplitudes of the first 8 harmonics of any sound received by its *adc~* (analogue to digital converter). (see Figure 2: *Current Readings*) A central tool within this patch was the spectral analysis Max/MSP object *fiddle~* (created by Miller Puckette (1999), with the MSP port by Ted Apel and David Zicarelli), which is capable of extracting and separating the pitches and relative amplitudes of the harmonics of incoming sounds. The *fiddle~* object is also capable of calculating an incoming signal's overall amplitude in decibels, and its amplitude and pitch as MIDI information. There are also a number of special messages that can be addressed to *fiddle~*, including the **amp-range** message which allows an upper/lower amplitude threshold to be set to gate incoming sounds. However, for this project I used a different amplitude threshold system that I created to respond to the MIDI amplitude data, rather than the amplitude in dB. (see Figure 3: *Amplitude and Duration Analysis*)

If the amplitude of an incoming sound registered above a certain level, the continuous spectral readings from *fiddle~* would be captured and routed to a series of virtual sine tone oscillators within the main patch, allowing the data to be replayed as pure tones through the speakers. (see Figure 3: *Triggers new Data Capture* and Figure 2: *r* (receive) *GrabPart*) An additional amplitude monitor would trigger if the incoming sound were very loud. (see Figure 3: *Trigger for Loud Sounds* and Figure 2: *Loud Trigger Indicator*) If another incoming sound were beneath this amplitude threshold, it would not trigger the data capture that would initiate a new set of sine tones; the first set of sounds would keep playing.

To create a more complex harmonic structure, I created 4 banks of oscillators, which enabled the system to remember and play the spectra of 4 successive sounds made by the user (provided each was loud enough to trigger the data capture). These banks would be updated in sequence once they were

used up (i.e. bank 1, bank 2, bank 3, bank 4, bank 1, bank 2, bank 3, bank 4, etc.). (see Figure 2: *Controls: Most Recent Partial* and *patcher ArtiPitches 1-4*)

This feature, as well as the amplitude threshold system, was very effective in encouraging people to explore the installation's capabilities. For example, a person might decide to make 4 separate, loud sounds that would fill the 4 oscillator banks, and then stand back and listen. These sounds would continue indefinitely until the system received new input, in which case they would be sequentially replaced with new sounds. One could also approach the system, which might be playing the sounds inputted by a previous user, and add a single new loud sound, overwriting one of the voices in the existing set. One could then sing quietly without triggering new responses; just "singing along" until deciding to add another new sound by raising their voice.

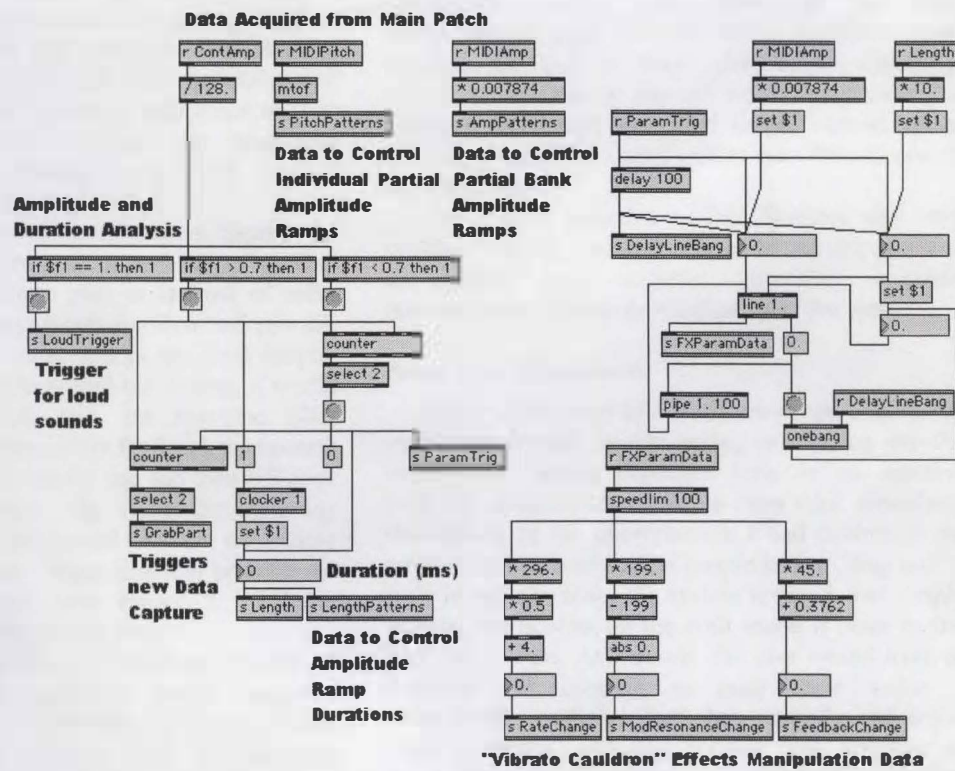


Figure 3: The *patcher EnvelopeAnalyser* subpatch in *IntraSpectral*, for processing the user-control parameter data.

### Further Control Features

Having laid the foundation of this interactive system, I decided to add some user-controlled features to make the soundscape and its use more varied and interesting. In deciding what the parameters for these control features should be, I also had to consider how they would be inputted into the system (i.e. the method of control). I had to think carefully about my own intentions for the installation; an inappropriate or overcomplicated interface could potentially undermine these intentions, distract the

participant, and "... depart from the attractive simplicity of the original interface." (Robson, 2002, p. 54)

For this and other reasons (to be discussed later), I decided to have the method of control be the actual audio input from the microphone, and the parameters being controlled to be the 3 most prominent (and most easily monitored) features of any sung sound; pitch, amplitude, and duration. (see Figure 2: *Control Parameter Data goes to "patcher EnvelopeAnalyser"*, Figure 3: *Data Acquired from Main Patch*) The *fiddle~* object provides the control data for the first 2 (pitch and amplitude), and I used the amplitude threshold system (described above) to determine the duration of a single sound. (see Fig 3: *Amplitude and Duration Analysis and Duration (ms)*) This was done by triggering a *clocker~* object (which records elapsed time) every time a sound exceeds the threshold; the *clocker~* would then be stopped and its results outputted when the sound dropped back below the threshold. Although this generally worked quite well, it meant that a sound that was continuous but not of consistent volume might be interpreted as 2 or more separate sounds; however the amplitude threshold could be calibrated to a lower level if necessary to minimize this problem.

The data from two of these control parameters was used to manipulate a Pluggo-3 (Cycling '74) "Vibrato Cauldron" effects plug-in (a kind of noise sampler with a low-pass smoothing filter and two all-pass filters) that was connected to the final output. Each time a new sound triggered the system, it would cause the noise sample rate, the low-pass filter resonance, and the all-pass filter feedback parameters on the effects plug-in to briefly rise and then fall back to their original positions. The louder the incoming sound, the higher the arch would become; the greater the sound's duration, the longer it would take for the arch to complete itself. (see Figure 3: *"Vibrato Cauldron" Effects Manipulation Data*)

The user input was also used to control a series of multiple arch-shaped amplitude ramps staggered across either the banks of partials – or the individual partials – resulting in different kinds of undulating sound patterns. The amplitude of the incoming sound would control the arch ramps attached to individual partials; the louder the sound, the bigger the arches. The pitch of the sound would control the arch ramps for the partial banks in a similar way. The duration of an incoming sound would determine how long it would take before the current arch patterns would cease. (see Figure 3: *Data to Control Individual Partial Amplitude Ramps, Data to Control Partial Bank Amplitude Ramps and Data to Control Amplitude Ramp Durations*) A special set of amplitude ramps would be triggered if the system registers an especially loud incoming sound. (see Figure 3: *Trigger for Loud Sounds* and Figure 2: *Loud Trigger Indicator*)

By this stage I had created an instrument that responded to three different aspects of the human voice – pitch, duration and amplitude. Being hands free, the instrument could be put into the context of an installation, and made into an accessible and satisfying interactive sonic environment. However, this installation represented only the first stage of a larger long-term project, and many of the methods used to create it could in future be modified or improved as the project develops in complexity and sophistication.

## 2.3 Results and Participant Reactions

As well as being a fun instrument to interact with, the main aim of this installation was to give people the opportunity to explore their voice in a new and novel way. At a deeper level, *IntraSpectral* is intended to be the first stage of an interactive installation project that will (in its final manifestation) guide the user into a meditative state through the use of their own voice. Chanting, recitation and toning are all well-known tools for inducing meditative and other altered mental states, and this project is an exploration into the essence of these techniques.

The overall response to *IntraSpectral* was very positive, and the feedback offered by participants was encouraging and insightful, providing valuable information for future developments of the work.

### Some User Experiences

Many of the users of *IntraSpectral* approached the instrument timidly by whispering or blowing into the microphone, which produced little or no reaction from the system (some people even tried scratching the surface of the microphone). I had calibrated the amplitude threshold so that people had to "sing out" a little in order to make the system respond, and simple written instructions on the wall made it clear to the user what to do. As a result, the user would have to summon the courage to raise their voice – subsequently realizing that they actually *did* enjoy making sounds, and that nobody was laughing at them. These people would often end up singing with full voice for a long time. Unfortunately, a few users would give up before trying louder sounds, but by far the majority found themselves singing in a way they never thought possible in front of others.

A small proportion of people would approach the system by shouting at it or clapping their hands. Although this did produce a reaction from the installation, it was much less satisfactory because the fundamental pitch of this kind of sound is much less obvious to the ear; making a connection between the spectra and the sound itself is much more difficult. It seemed that the installation produced the most satisfying results when people sang into it, which seems appropriate since that is what it was designed to encourage people to do.

Not only was *IntraSpectral* an enjoyable and liberating experience for most users, it was a satisfying artistic endeavor that successfully met its expectations – that is, to make people more aware of the sounds around them, and to enjoy the uniqueness of their own singing voice. However, there were two main points brought up by participants (or was made obvious by their interaction with the system) that could suggest possible future improvements. The first issue was the nature of the interface itself (i.e. the microphone), and how some people responded instinctively to it. The second was connected to the ways in which the user control parameters (pitch, amplitude and duration of a sound) were mapped to the parameters within the system (i.e. the effects plug-in and the amplitude ramps). If a person listened carefully and spent a good amount of time in the installation, the connections between cause and effect would become reasonably clear. However, these connections were not immediately obvious, and although the user might realize that they are causing *something* to happen, they were not entirely sure what, or how. I could have included more detailed instructions, but this may have detracted from the exploratory nature of the installation.

The following section continues the discussion on these issues, with the aim of finding some potential solutions.

### Interfaces and Clarity of Feedback

First was the issue of the actual physical interface, and how participants used and responded to it. When one enters an installation space, one is in fact entering a piece of art; every object within the space carries significance and symbolic meaning. The purpose of a microphone is very clear, which makes it a useful interface that has an obvious use. However, these preconceptions regarding use and response could potentially hinder a participant's intuitive responses or further exploration of the system: "... if it looks like a drum, users will hit it, even if a caress was the intended response." (Ulyate and Bianciardi, 2002, p. 47) Some people would tend to react according only to their preconceptions, producing sounds that resulted in a less than ideal response from the system, and subsequently would not try anything else. By presenting the participant with a microphone, they were faced with many of the same inhibitions that they would be faced with had they been standing on a stage in front of an audience, rather than an intimate environment in which they could freely express themselves and explore the system.

This suggests the possibility for other interface systems that are not so immediately obvious, and therefore potentially intimidating; however, as also noted by Ulyate and Bianciardi (p. 47), an unfamiliar interface can result in much more unpredictable behavior from participants.

The second issue raised was that of the actual audio feedback to the participant; some people

expressed uncertainty as to how their voices were affecting the soundscape, a problem that seems to come up often in interfaces for non-musicians (e.g. Robson, Paine (2001) and Paine (date unknown)). Although *IntraSpectral* employed generally *one-to-one* mapping, all of the control parameters came from the same source – the voice. This might become confusing to the participant, since the components that make up a vocal sound are not generally thought of as separately as the various components that make up certain physical gestures.

This kind of problem prompts the installation artist to consider his/her mapping strategy, and whether the method of feedback to the participant is sufficient or appropriate. At the same time, however, the artist must decide whether the participant should receive immediate musical gratification on first encounter (Perry Cook's "Instant Music, Subtlety Later" principle (2001)), or whether they need to spend time with the installation to "work it out". The installation artist needs to decide whether to create a musical toy or a sophisticated musical instrument.

The following section examines the nature and design of some different interface methods, first in a general fashion, and then in the context of the *IntraSpectral* installation. The problems introduced above will be addressed in the light of other possible alternatives, including the approaches taken in 2 other installations by other artists.

## 3 Interfaces and Controllers

### 3.1 Categories and Definitions

Current day technology affords us with a vast number of options for digital musical control. As part of the much larger research field of HCI (Human Computer Interaction), the search for new physical paradigms for musical expression has become one of the most active fields in new music technology.

Within such an active field as this, there are as many different points of view regarding design strategy, aesthetic priority and intent of application as there are artists and researchers.

Wanderley and Orio (2002) provide us with a reasonably easy to navigate map of different categories of controllers:

... instrument-like controllers *that try to emulate the control interfaces of existing acoustic instruments*; instrument-inspired controllers *that are basically designed loosely following the characteristics of existing instruments (but that do not necessarily seek an emulation of their counterparts)*; extended instruments, *that is, acoustic instruments augmented by the use of several sensors*; and alternate controllers, *whose designs do not follow that of any existing instrument. (p. 62)*

Many of the controllers found in interactive installations could be described as *alternate controllers*. Because they are mainly designed for use by non-musicians, acoustic instrument models are generally not appropriate, partly because of their specialized and sophisticated means of control, and partly because they would not encourage the non-musician to use them without fear or aesthetic/cultural preconceptions. These interfaces need to be simple, intuitive and non-associative.

### Sound Toys, Musical Instruments, or Somewhere In Between?

While many designers of interfaces for non-musicians are happy to create what could essentially be described as “sound toys” (e.g. Robson), many others are driven to create something that, while still entertaining and responsive enough to allow the participant to have a “1-minute play”, is also sophisticated enough give those who choose the opportunity to explore more refined control gestures and responses if they wish. This is what David Wessel and Matthew Wright call the “...low “entry fee” with no ceiling on virtuosity....” (2002, p. 12), an ideal that is not easy to reach. Tamas Ungvary and Roel Vertegaal (2000) present some possible reasons for this, by outlining 4 criteria borrowed from cognitive ergonomics for determining the *usability* of an interactive system:

- (1) **Learnability:** *the amount of learning necessary to achieve tasks;*
- (2) **Ease of Use:** *the efficiency and effectiveness with which one can achieve these tasks;*
- (3) **Flexibility:** *the extent to which a system can adapt to new tasks and environment requirements;*
- (4) **Attitude:** *the positive or negative attitude of the user towards the system.* (pp. 245-246)

They claim that the problem is that many of these criteria conflict or inhibit each other; for interactive computer music, the conflict often arises between system *flexibility* (an essential feature for a sophisticated instrument) and its *ease of use* (necessary for non-musicians or non-specialists). In a high flexible and changeable system, there are simply too many shifting parameters for a single user to remember at once.

This conflict has been addressed in different ways by different artists. Gil Weinberg and Seum-Lim Gam (2001) utilize a model based on separating tasks between users to create an interdependent multiplayer environment. The Squeezables is a set of 6 fist-sized gel balls containing sensors attached to a table with rubber bands. Each ball controls a separate set of 2 parameters (controlled by pulling and squeezing, respectively), and they are all played at once by a group of people. Each player can also manipulate particular aspects of the overall musical result

through the same set of control actions. The result is an immersive, interdependent multiplayer system, with different levels of control for people at different skill levels.

This kind of multi-user approach can also be implemented on a much simpler scale, as in Dominic Robson’s Bullroarer project, (Robson, pp. 52-56) or in Garth Paine’s MAP2, (Paine, 2001) in which the installation space is separated into 4 zones for 4 participants (monitored by a video capturing system), each zone triggering a different set of parameters. (Paine, 2001)

By separating the tasks between participants, the *ease of use* and *flexibility* criteria can coexist more harmoniously.

Other systems have also been devised or proposed, including “intelligent systems” that can learn to respond to the idiosyncratic gesture patterns of a particular person. Such a system is proposed by Axel Mulder (2001), which:

*... allows musical instruments to be adapted to the motor skills a performer already may have, may prefer or may be limited to [suggesting greater possibilities for movement challenged people]. (p. 1) [...] It follows that there is a need for musical instruments with gestural interfaces that can adapt by themselves, through “learning” capabilities, or be adapted by the performer, without specific technical expertise, to the gestures and movements of the performer. (p. 3)*

There is also some activity into this kind of responsive system in the area of robot-human interaction (e.g. Camurri, et al, 2000), in which robots are being trained to either recognize and respond to the “expressive content” of human emotions, (p. 189) or to respond with its own set of “artificial emotions and expressiveness”. (p. 188)

The interface utilized in *IntraSpectral* is nowhere near as sophisticated as the systems proposed by Mulder or Camurri. Its concept and design is however more aligned with that of the Wessel/Wright ideal (i.e. “low entry fee”, but also able to allow the user to explore and “master” it), but is somewhat different from the design strategies undertaken by Weinberg/Seum-Lim Gam, Robson or Paine to also create instruments/installations that were both easy to use and expressive. This is because *IntraSpectral* was specifically designed for a single user (unlike the Squeezables or MAP2), and is a voice-activated hands-free system (unlike Robson’s instruments). The dilemma of creating an interactive system that is easy to use as well as expressive and sophisticated thus becomes even more challenging for a project such as this.

The following section delves a little further into the specific interface used in *IntraSpectral*, and how by comparing it to other methods employed by other

designers, the aforementioned issues surrounding design and use can be effectively addressed.

### 3.2 The *IntraSpectral* Interface

Controllers are generally regarded as being specialized devices equipped with sensors for capturing and translating physical actions via MIDI or some other kind of protocol (e.g. a hand movement drives a gestural controller, breath drives a wind controller, etc), a method that M. M. Wanderley (2001) calls “direct acquisition.” The method used by microphones is called “indirect acquisition”, which “... provides information about the performer actions from the evolution of structural properties of the sound being produced by the instrument [or voice].” (Wanderley, p. 5). When using a microphone as a controller, there is no physical control surface with a finite and clearly separated set of control gestures that can be interpreted by the computer in a particular way through data translation and mapping methods (e.g. CV-MIDI).

In addressing the original problems surrounding the usability of *IntraSpectral* (expressivity and clarity of feedback), and based on the discussion thus far on the general complications in designing flexible, easy to use interactive systems, much of the difficulty seems to lie in the fact that the method of control does not have any correlation to an actual physical control surface, thereby not giving the user enough clarity and feedback regarding their control gestures.

While designing *IntraSpectral*, I originally intended to use hands-on continuous MIDI controllers such the Keyfax Phat.Boy or the Kenton Control Freak, or alternatively, a more subtle sensor-based system connected to Angelo Fraietta’s original CV to Midi – Midi to CV MIDI controller for the control of the sound manipulation parameters. However, it was important to remember the original intention of the installation was to encourage people to explore the uniqueness of their own voice. It seemed at the time that additional knobs, sliders, even responses to physical movements, could distract the participant from the main focus of the installation – the voice. However, in the light of Wanderley’s clear separation between direct and indirect data acquisition methods, it seems that another (or additional) method for user control might in this case need to be considered. Another approach may lie in creating a method by which the continuous control data can be monitored by the user, making it clearer and easier to manage. Axel Mulder (2000) provides further reinforcement to this idea, suggesting that in the case of VMIs (Virtual Musical Instruments), virtual control surfaces need to be incorporated into interactive systems that, while not existing in the real world, do correlate conceptually to a physical control surface. (p. 322)

In the following section, the *IntraSpectral* interface/feedback model will be compared with 2 other installations designed for non-musicians in

which some or all of the user input is vocal. In an attempt to solve the *ease of use* vs. *flexibility* conflict that seems to have arisen as a result of analyzing *IntraSpectral*’s shortcomings, along with the model for VMIs offered by Mulder, a workable solution will be sought.

### Comparison with the Singing Tree Interface

The Singing Tree was an installation created as part of the Brain Opera project, a major work conceived and directed by Tod Machover and created by a multidisciplinary team at MIT during 1995-1996. (Paradiso, 1999)

The Singing Tree and *IntraSpectral* both employ similar triggering methods, but represent different artistic intentions and use different mapping and feedback systems. In the case of the former, it analyzes 10 dynamic parameters of the voice, which drive an algorithmic composition engine that resynthesizes the voice on a synthesizer. The process used in *IntraSpectral* is simpler, with fewer control parameters and a less complex resynthesis system. However, the difference between the two installations that is more relevant to this discussion lies in the user feedback method. The Singing Tree uses a form of audio and also visual feedback that guides the user’s choice of vocalization. It looks for consistency within the sound being produced by the user – the longer a distinct pitch is held, the more “pleasing” the resynthesized soundscape becomes. In addition, a screen animation in front of the user displays an image that becomes clearer as the pitch is held longer. “[T]he tonal and visual rewards encourage even poor amateurs to try for a reasonable tone.” (Paradiso, p. 133) The feedback system in *IntraSpectral* does not “guide” participants towards a particular aesthetic ideal, but encourages them to explore the possibilities of their own voice and the richness of the harmonic spectrum through the effects that the 3 parameters of pitch, duration and amplitude have on the resulting soundscape. The system is designed to directly represent the harmonic spectrum of the user’s voice, rather than create a new set of associations (such as connecting the sound to the image of a ballerina).

Despite the differences in aesthetic aims between The Singing Tree and *IntraSpectral*, it is worth considering the possibility of adding visual images to the feedback system of the latter. By adding this new element of feedback, the user would find it easier to correlate his/her vocal gestures to the system responses; the *ease of use* criterion could be more satisfied, without the need to compromise the system’s *flexibility*. However in keeping with the artistic intent of the *IntraSpectral* project, it would be more appropriate to use images that directly represented the *sound itself*, rather than a culturally biased image that would place a value judgment on the quality of the sound input.

## Comparison to the MAPI Interface

MAPI was an interactive installation designed and built in 1998 by Australian sound artist Garth Paine. Like *IntraSpectral* and *The Singing Tree*, it used the sound of participants as the source for the resulting soundscape (in this case audio samples that were captured and subjected to real-time granular synthesis). However, Paine took a different approach with regard to the manipulation of the sound. Instead of using the parameters of the sound as the method of feedback control, he used a small video camera connected to David Rokeby's *Very Nervous System* video motion tracking system to perform gesture/movement analyses of the people within the space. These analyses were used to control the granulation, playback polyphony, sample choice and pitch bend of the audio samples captured by the microphone. (Paine, 2001)

Although this method does not include visual feedback, the means of controlling the system's parameters have been more effectively separated and thus clarified, bringing it closer to the kind of system developed by Gil Weinberg and Seum-Lim Gan. Again, the *ease of use* and *flexibility* conflict has been eased, this time through the separation of control gestures to 2 different cognitive areas, the voice and the body. This method also approaches the suggestions offered by Axel Mulder regarding the need for virtual control surfaces for VMIs. Although not a "control surface" in the sense that it can be seen like a hands-on controller, the utilization of movement tracking allows the installation designer to map control parameters so that they more closely resemble the kind of ubiquitous control gestures found in hands-on controllers.

This method suggests other possible user control strategies for future versions of *IntraSpectral*, in that the original sound input and the parameters manipulating the final output do not necessarily need to come from the same source. As stated earlier, I had originally intended to use a different control interface for the manipulation of the sound; however, rather than video capturing, I was going to use actual hands-on controllers. The video capturing method is more subtle and useful for monitoring general body movement, but is less efficient at registering small gestures. (Morales-Manzanares, et al, 2001, p. 27)

## 4 Future Possibilities

As a result of the problems faced during the exhibition of *IntraSpectral*, a number of issues have surfaced that seem to recur for many artists and developers. The discussion of these issues, along with some possible alternative approaches, have yielded a number of potential "next steps" for this particular project.

The first involves the participant responses to the physical nature of the interface (Section 2.3); in this case, the microphone. Although the participant needs

to know what to do in a general sense, the interface should not hold too much symbolism that could lead to inhibiting preconceptions as to its use and meaning. Two possible alternatives present themselves; firstly, to hide the microphone. Unfortunately, this means that the user would not be given any clues as to the method of control, and since vocalization is less forthcoming for most than movement, they could completely miss the point.

The other possibility is to disguise the microphone, while still giving some indication as to its possible use. For example, encasing the microphone in a frosted dome would obscure its obvious identity, while a variable intensity LED could glow in response to vocal sounds, giving the participant enough feedback to suggest further exploration. In this way, a standard interface is given a somewhat mysterious physical identity, while still indicating its intended method of use to the participant (reducing the dangers expressed by Ulyate and Bianciardi).

The next shortcoming expressed by participants was in response to the correlation of control parameters to audio feedback, an issue discussed at length in Section 3.2 in relation to the conflicts arising between the *flexibility* and *ease of use* of an interactive system. A compromise needed to be sought in order to find a middle ground between the sound toy and the sophisticated cyberinstrument.

The 2 comparative examples (*The Singing Tree* and MAPI) suggest, respectively, the use of some kind of visual user-feedback system, and the separation of control parameters into different cognitive areas (e.g. voice and movement). As stated above, the means by which this is implemented needs to be carefully considered, since although the aim is to improve the controllability of the installation environment, it must still serve its artistic intent.

## 5 Conclusion

The world of interactive computer music is indeed vast, and designing interface systems that can be used by non-specialists in interactive installations presents many of its own particular challenges and issues. Like a musical composition, each installation is a different conceptual world built from available resources. However, unlike an orchestral composer, who has a standard set of instruments to choose from, the computer music artist can create *his/her own* instruments, sound worlds and interface systems. This lack of restriction presents (potentially) unlimited opportunities for expression, but also raises many problems regarding cohesion, integrity and communicability of meaning. This suggests a need to take a firmer hold of the creative intent behind the work, lest it be overwhelmed by the novelty of the technology being used.



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