

CONCLUSION



Fig. 5.1. Sideband performing *From the Waters* for Laptop Orchestra by Anne Hege
Photo by Stephen Taylor

As Donna Haraway foreshadows in her 1991 book *Simians, Cyborgs, and Women: The Reinvention of Nature*,¹⁸⁵ technology and the body are integrating one into the other. The woman who wears her Bluetooth earpiece all day, the child with a pace maker, and the student who relies on Evernote to trigger their memory mid-conversation about the lyrics of their favorite song are examples of the cyborgs we have become. Returning to embodied cognition theory's proposal that the body and environment are key players in any philosophy of mind, one can see how technology that influences our perceptive abilities, such as hearing aids, recording devices, megaphones, Google Glass, and binoculars, shape what we perceive in this world and thus

¹⁸⁵ Donna J. Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century," in *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), 149-182.

change what and how things are meaningful.¹⁸⁶ Andy Clark and David J. Chalmers push the relationship between technology and meaning or the idea of mind further when they postulate in their article "The Extended Mind" that tools and technologies, from a notebook, to a smart phone, to bodily implants, can be considered extensions of mind.¹⁸⁷ Clark and Chalmers argue that there is no meaningful difference between a person who relies on their memory and a person who relies on their notebook to establish their beliefs. For them, the notebook is equivalent to a mind, and the notebook could be exchanged for a smartphone or other mental aids. Considering these two views together, what we know is intricately woven together with the technology and tools that surround us. Technology is changing how we think, what we perceive, and how we create meaning from our interaction with the world. It is also changing what we consider intrinsically human.

Entwined within the second, third, and fourth chapters of this dissertation are descriptions of the role of the body in relationship to the technologies that are involved in these contemporary multimedia works. The technologies used in these works visualize the body, analyze the body, record the body, manipulate the body, and augment the body. Technology is the means by which internal experiences are augmented externally (Galás's drugged perception), imagined or metaphoric experiences are presented as real (the levitating or floating body in

¹⁸⁶ Composer and thinker Pauline Oliveros describes the tape recorder as a machine that revolutionized her perception of sound. She received her first tape recorder as a gift in her early twenties and she began to record the world around her. Upon listening back to these recordings, she realized that her live listening greatly differed from what she heard on the tape playback. This realization began her lifelong pursuit to improve her listening and attention. In this way, the tape recorder inspired, modeled, and became a method to practice a different way of listening. Sherry Turkle's research, and specifically her article "Authenticity in the Age of Digital Companions," has also influenced my thinking on our ever-evolving relationship with technology. Sherry Turkle, "Authenticity in the Age of Digital Companions," *Interaction Studies: Social Behaviour and Communication in Biological and Artificial Systems* Volume 8 Issue 3 (2007), 502-517, accessed on February 27, 2014, http://web.mit.edu/sturkle/www/pdfsforstwebpage/ST_Authenticity%20in%20age%20of%20digi%20comp.pdf.

¹⁸⁷ "The Extended Mind," Philosophy at the University of Edinburgh, accessed on Dec. 26, 2013, <http://www.philosophy.ed.ac.uk/people/clark/pubs/TheExtendedMind.pdf>.

Viola's video), and movement is recreated in a new body (Jones's animated body). Diamanda Galás, Bill T. Jones, and Bill Viola rely on contemporary technologies to help communicate the nuance of a moving, living body in a way that explores what the body means. Perhaps we can conceive of these multimedia works as more than an aesthetic past time, but a form of “epistemic action,” as defined by David Kirsch and Paul Maglio,¹⁸⁸ where “*epistemic* actions alter the world so as to aid and augment cognitive processes such as recognition and search (italics in the original).”¹⁸⁹ These art works form a collective, cultural research of who we are and what we value. Through this investigation, one can see how these beliefs are indeed impacted by our new tools.

Similarly, the theoretical work used to defend much of this dissertation, such as the work of Marc Leman and Mark Johnson, is based on contemporary scientific studies that rely on technologies that enable increasingly complex ways of recording and analyzing the body. In both science and art, technology is stretched through use, demonstrating the true potential and power of these tools. Although they are often posited as a duality, man vs. machine or technology vs. the body (as demonstrated in the traditional John Henry folktale), multimedia works play a crucial role in exemplifying the reality that what we know of both technology and the body is known through the means of the other. In the studies above, artistic research brings technology into a performance setting that prioritizes empathy, connection, and relationship.

¹⁸⁸ David Kirsch and Paul Maglio, “On distinguishing epistemic from pragmatic action,” *Cognitive Science* 18 (1994): 513-49.

¹⁸⁹ “The Extended Mind,” 3.

COMPOSITIONAL PRACTICE¹⁹⁰

Over the past fifteen years, I have practiced my own form of compositional research through my study of the role of the body as a vocalist, performer, and multimedia composer. I have explored the body and technology in performance, with my early ensembles *Folk3000*, *Mythologues*, and *Wisdom of the Heart*, and more recently with performance duos *New Prosthetics* (with video artist Harrison Owen) and *Sidecar* (with pianist, composer, and writer Heather Heise), as well as my work creating music for Carrie Ahern Dance productions *SenSate*, *Borrowed Prey I*, and *Borrowed Prey II*, and composing for and playing with The Princeton Laptop Orchestra (PLOrk) and the affiliated touring ensemble *Sideband*. With all these projects, I have been searching for seamless and meaningful ways to meld technology and the body together within a musical performance.

My latest work for laptop orchestra most directly speaks to the relationship between body and technology. As an artistic medium, the laptop orchestra balances technological and musical possibility, and so, is a particularly rich and important form of artistic expression for contemporary society. As a musical and multimedia medium, works for the laptop ensemble demonstrate many possible ways to weave technology and art together. My works for laptop orchestra have been shaped by a lifetime of choral singing, extensive training as an acoustic and electronic music composer, eight years of experience writing and performing laptop ensemble

¹⁹⁰ An earlier version of the following description of my work for Laptop Orchestra was presented at the Symposium on Laptop Ensembles and Orchestras and published in the proceedings publication as "Middle Passage: Reclaiming what is Lost as Performance and Practice" pp. 47-50, in 2012 (https://ccrma.stanford.edu/~ruviaro/texts/SLEO_2012_Proceedings.pdf). A revised version of this paper was presented at the Conference on Contemplative Practices for a Technological Society at Virginia Tech, Blacksburg, VA in April 2013.

music, as well as extensive studies in political science, social theory, and embodiment practices. My work is guided by my compositional commitment to the idea that music has social and political significance and that a composition demonstrates a way of interacting and more, becomes a form of modeling social possibility or reality. Because the laptop is such a powerful tool, the laptop orchestra becomes an especially interesting socio-musical phenomenon that represents our social relationships with each other as well as our relationship with technology.

TECHNOLOGICAL POTENTIAL

There is immense technological and musical possibility within the laptop orchestra. At the heart of this diverse potential is the laptop. The laptop is more than an instrument: it can be a conductor, composer, performer, listener, or any combination of the above. As an instrument, the laptop can synthesize sounds, use samples, or record live input and can process or combine any of these sound sources. **The laptop's power and versatility is based in its ability to abstract sound from its source.** As Marc Leman explains, in "electronic music, electricity is independent from haptic biomechanical energy...the controller is decoupled from sound production."¹⁹¹ To say it another way, the laptop allows for disembodied sound production. In acoustic music, biomechanical energy directly transfers to sound energy. For example, the weight of the bow being pulled across a violin string directly creates the tone of the instrument. Electronic instruments can be designed to mimic this coupling of physical and sonic energy with the use of various sensors and specific programming, but it is difficult for these instruments to be as nuanced or sensitive as an acoustic instrument.

¹⁹¹ Leman, *Embodied Music Cognition and Mediation Technology*, 163.

In electronic music, sounds are not only free from embodied physical production, but also free from time, place, sound source, quality, tone, musical style, tempo, or any attribute can become a variable through synthesis, processing or sampling. The ability to mash up different musical styles, time periods, and players creates immense musical possibility and meaning. Sonic energy is no longer bound to an embodied source.¹⁹² We can pump up the volume with the adjustment of a knob without breaking a sweat. Networking allows for collective compositional control where any compositional parameter can be controlled by any connected laptop. Musicians may play the same instrument while being thousands of miles apart. Sound output also becomes a variable where a laptop may send its sound to a specific location or many locations or nowhere. Multiple players may be run through a single PA system or each player may have their own speaker system. All this allows for immense compositional and technological possibility. What restrains this massive possibility? For me, the electronic potential of the laptop is reined in by musicality — what communicates musical meaning and relationship.

¹⁹² Except in the marvelous example of *Our Lady of Detritus* (2009) a piece by Jill Sigman with music by Kristin Norderval where all the energy needed for the piece is made by the audience or performers during the piece using crank generators and solar panels. I have also seen wonderful examples of solar powered electronic instrument systems by Perry Cook and Skot Smallwood.

MUSICAL POTENTIAL



Musicality
(my own list of symptoms)

listening
interaction
response
virtuosity
(or the ability to improve
any of the previous elements)

at the root of these symptoms is

LEARNING

about sound, players, space, instruments...

Figure 5.2. Musicality Tree

For me, musicality is defined by the presence of listening, interaction, response, and virtuosity, or the potential to improve any of the previous elements (fig. 5.2). At the root of these attributes is the ability to learn about sound and sounding, both alone as well as with others. If musical potential is dependent on one's ability to learn about sound,¹⁹³ technological advances that break the innate relationship between biomechanical energy and sound energy disrupt embodied learning. One can still appreciate the physics of sound, but sound is no longer directly related to the body. This abstraction of sound energy means that the listener is not given the same kind of clues about how the sound is made or what it means. For example, the violinist who forcefully pulls the bow across the strings making a fortissimo sound with a strident tone coupled with aggressive physical action communicates tension and force through sound, sight, and touch.

¹⁹³ This learning is not limited to sonic input, but formed through vision, touch, movement and all embodied senses.

Here, sound and physical gesture complement each other.¹⁹⁴ Similar to one's experience screaming or yelling, most are familiar with the relationship between force and energy in sound production. The complementary relationship between body and sound is very important to musical meaning and communication. How then, do we understand what music means without these physical clues?

RECLAIMING WHAT IS LOST: PERFORMANCE

While struggling with these questions, I wrote *Middle Passage: Reclaiming what is Lost* for the Princeton Laptop Orchestra (PLOrk) in 2010 and reworked elements into a new work, *From the Waters* in 2012. Inspired by Maya Deren's study of Haitian Voudoun practices, *Divine Horsemen: The Living Gods of Haiti*, I decided to try to create a ritual practice for laptop orchestra. Specifically, I was interested in the ceremony of reclamation.

The gros-bon-ange [soul of a person], as the repository of a man's history, his form and his force, the final resultant of his ability, intelligence and experience, is a precious accumulation. If, after his death, his descendants were able to provide this disembodied soul with some other means of manifestation to substitute for the flesh which perished, they could salvage this valuable legacy. One of the major Voudoun rituals is the ceremony of retirer d'en bas de l'eau, the reclamation of the soul of the deceased from the waters of the abyss.¹⁹⁵

My goal was to construct a modern reclamation ceremony. My compositional choices were guided by my decision to prioritize body language and choreography that would support a sense of ritual. I used archetypal movements to communicate a world of conjuring and calling. I structured the piece around two formal elements, the circle and the line, both of which are used

¹⁹⁴ According to Nicholas Cook in his book *Analyzing Musical Multimedia*, complementary movement and sound communicates clearly to an audience and is one of the ways that we have learned to interpret multimedia interaction. Cook, *Analyzing Musical Multimedia*.

¹⁹⁵ Deren, *Divine Horsemen*, 27.

in traditional Voudoun practices.¹⁹⁶ Finally, I tried to take advantage of the benefits of abstracting sound from its physical source (such as the way this represents the disembodied spirit) while supporting embodied musical behaviors like listening and responding.

THE ROPE INSTRUMENT



Figure 5.3. The rope instrument in *Middle Passage: Reclaiming What is Lost*

In *Middle Passage*, the circle first arises with the use of a rope approximately twelve feet in diameter. The rope is a collective controller. It is attached to six GameTrak Tether controllers placed evenly beneath the rope. Each tether controller triggers and controls the playback of various samples by sending tether location information to an individual laptop that outputs sound to a hemispherical speaker and subwoofer. There is no networking of the laptops. All coordination is created through the rope controller. The piece begins with the entrance of the ensemble, humming a single tone, lifting the rope, and pulling the rope from side to side with

¹⁹⁶ Deren, *Divine Horsemen*, 27.

resistance, as if pulling to lift an anchor. Through practice, the undergraduate PLOrk ensemble perfected the slow, even, collective pull needed to play the rope instrument and the specific body language that I was looking for. In my instrument design, I was aiming for a dynamic relationship between collective movement and sound production where getting the rope to sound would not be automatic. I was also hoping to support an attention to movement, so that they would have to have a strong collective awareness of movement, change of direction, and the rate of pull necessary to keep the rope taut and the instrument sounding.

The rope instrument reconnects physical energy with sound energy in two ways. The first is that the sound originates as acoustic singing. The audience understands the sound as coming from our physical bodies. The rope plays through a sample that reinforces the acoustic singing so that it is not completely clear what the balance is between acoustic and sampled sound. There is a period of time where the audience believes the sound to be embodied when it is not. Secondly, the movement of pulling the rope mimics the tension and resistance found in string instrument sound production. It is reminiscent of the movement used by players of Ellen Fullman's Long String Instrument.¹⁹⁷ We understand tension and friction as a sounding movement. We also understand this as a listening movement. We know that the movement must happen in unison for the rope to remain taut and to sound. There is a musical subtlety implied by the required listening and awareness of the movement of the other ensemble members. Finally, it is a working movement that has cultural and mythic significance denoting hard, collective work, like pulling up an anchor or sail. As the piece aims to call a spirit from the waters of the abyss, this movement is fitting.

¹⁹⁷ "Ellen Fullman homepage," accessed Dec. 26, 2013, <http://www.ellenfullman.com>.

THE DUAL VOCODER INSTRUMENT



Figure 5.4. Tether pole extensions in *Middle Passage: Reclaiming What is Lost*

Over time, the rope instrument crescendos until it is the dominant sound so that what starts as human voices becomes otherworldly. The piece continues with vocal solos, a solo by my live analog cassette looper, "the tape machine," and finally the addition of pitch consistent sampling. For this sampling, I used an instrument developed by Dan Trueman called the "dualvocoder." This instrument uses tap delay lines to play through a sample so that the playback speed can be varied without pitch shifting the sample. The length of the tether string (z axis) controls where the player is in the sample playback. Sonic moments can be elongated, repeated, frozen, or played quickly.



Figure 5.5. Performers listen while playing a dualvocoder duet

The dualvocoder is a wonderful instrument that is immediately playable and something that players can practice and perfect.¹⁹⁸ The tether controller inspires a fluid and graceful duet between player and tether line. As the player improvises through the sample playback, their intent listening is performative and musical. When two dualvocoders are played simultaneously, the players are both listening and watching, responsive to sound and movement. This observation and responsiveness is innately musical. The player is learning about the instrument, the other player, their own body, and the body's of others while performing. As reviewed in chapter four, embodied cognition theory suggests that this learning through interaction and a cycle of observation and response is central to how something becomes meaningful.¹⁹⁹ The dualvocoder tether line is the linear structural element of the piece. The tether line dynamically interacts with the circle. In the end of the piece, players use poles to extend these tether lines so that the heightened line visually balances the large rope circle (fig. 5.4).

¹⁹⁸ Perry Cook, "Principles for Designing Computer Music Controllers" (*ACM CHI Workshop in New Interfaces for Musical Expression (NIME)*, Seattle, April 2001).

¹⁹⁹ Johnson, *The Meaning of the Body: Aesthetics of Human Understanding*.

LAPTOP ORCHESTRA WORKS AS PUBLIC ART

After the premier of *Middle Passage: Reclaiming what is Lost*, I did not feel that I had answered my original compositional challenge to create a piece that could call a spirit from the waters of the abyss. Following the suggestion of fellow composer MR Daniel, I designed and facilitated a workshop on loss based on *Middle Passage*. The workshop was held at the Oakopolis Gallery in Oakland, California in the summer of 2010. I asked participants to bring a sonic memory (5-10 seconds) and a physical object relating to their loss. I taught the basic elements of playing the rope instrument and, during the break, recorded their sonic memories and prepared the sound files to be played by the dualvocoder. We began by placing our physical objects in the center as an altar. We publicly stated whom we were calling. Then, we began singing the drone and pulling the rope. When this became strong, one by one, workshop members played the dualvocoder instrument in the center of the circle as an aural altar.

It was a very different piece. There was an intention to the pulling of the rope and singing that felt both cathartic and supportive as we each entered the circle. The attention and listening to others was not limited to sound and movement, but also included an emotional listening. The memories from the center aural altar were beautiful, like thoughts or prayers; it was as if we were hearing the inner voice of the player. I had a deep feeling of connection with the ensemble members and my personal loss as well as the loss of others.²⁰⁰

²⁰⁰ I have since continued my research on this work as ritual. I presented the revised version of this piece titled *From the Waters* as a workshop at the First Annual Deep Listening Conference (2013) in Troy, NY and hosted four private rope playing gatherings in California and New York.

The workshop allowed for a sharing of the grief experience that was not language based, but centered in movement and sound.²⁰¹ The rope supported connection without the discomfort of direct contact. The movement and exertion demanded while playing the rope became a physical and sonic mantra that helped to focus each individual and the collective ensemble energy. The dualvocoder instrument provided personal input into the sonic landscape. My compositional focus on connection and listening helped me to make technological and musical choices that established the role of each player and what was expected of their participation. This experience gave me a broader view of the potential of laptop ensemble works as ritual practices.²⁰²

CULTURAL POTENTIAL

Music has a fascinating way of communicating very subtle cultural values. As a relatively new musical practice, there is great potential for diversity in laptop ensemble music, as it has yet to be canonized. Laptop ensemble composers and players explore this cultural potential and this is important. It is important because these pieces model a balance between the spirit and our mechanical tools, a relationship that we have struggled with for centuries.²⁰³ There is an exciting moment of re-signification when, in a laptop ensemble piece, people bend down to deeply listen to their speakers or, as in Perry Cook's *Lux Aeterna*, they gracefully tilt the laptop, singing to it and to each other. Creative and playful interaction with the laptop reinvigorates both what the laptop

²⁰¹ As discussed in chapter four, research in somatic psychology by Eugene T. Gendlin, Peter A. Levine and others suggests that psychological trauma can be captured in the body and must be released physically as well as psychically. Gendlin, *Focusing*. Levine, *Waking the Tiger*.

²⁰² LOrk pieces are especially accessible as ritual works because they are often constructed for elementary players so that the instruments can be adequately mastered within a limited amount of rehearsal time.

²⁰³ Stories like *Icarus*, *John Henry*, and *2001* are examples of attempts to understand this balance.

can mean and how we use technology and our collective resources to make something meaningful together.

RELATIONSHIP AND HOW IT ALL FITS TOGETHER

When studying music through the lens of the body, it becomes a multi-disciplinary art form. According to Nicholas Cook, in his introduction to *Analyzing Musical Multimedia*, music "sops up" what is around it.²⁰⁴ Music adds nuance and depth to meaning attributed to the surrounding media and the other media do the same for music. Analytical methods that emphasize each discipline's autonomy, be it through completely ignoring the presence of another (for example, analyzing a ballet score independent of any choreography) or through a semiotic dissection of "instances of multimedia,"²⁰⁵ comparing each media component, leave no room to talk about what has been sopped up, what has oozed over, what has been infected, what has merged, or what has married.²⁰⁶ As the language implies, the space of conjoining is messy and our cultural attitude towards togetherness is complicated. Barbara White, in her article "As if they didn't hear the music,' Or: How I Learned to Stop Worrying and Love Mickey Mouse," adeptly points to our cultural fear of merging. When discussing "mickey mousing," a parallel or synchronized alignment of movement and sound, such as when a sound glissandos down at the same time that a body or animated character falls, White proposes that "the concerted but often unconsidered effort to dispel the shadow of Mickey Mouse stems in part from fear about what

²⁰⁴ Cook, *Analyzing Musical Multimedia*, introduction.

²⁰⁵ Cook, *Analyzing Musical Multimedia*.

²⁰⁶ Barbara White's discussion of the varying attitudes towards media interaction and the metaphors used to describe the relationship between dance and music in dance works highly influenced my writing and ideas on this subject. Barbara White, "As if they didn't hear the music,' Or: How I Learned to Stop Worrying and Love Mickey Mouse," *Opera Quarterly* Vol 22 Issue 1 (Winter 2006): 65-89, accessed February 27, 2014, doi: 10.1093/oq/kbi108.

happens when dance and music partner each other."²⁰⁷ Perhaps, it is the loss of self that is threatening to our cultural propensity for autonomy, individuality, and ego.²⁰⁸ I agree that there is a fear of real partnership between disciplines. Something grows in that space that is foreign. Our objectivity, authority, and dominance are threatened when we are forced to consider interactions outside our discipline's specialty, and in those works, the analyst may feel the insecurity of witnessing a new being coming to life. By approaching a multimedia work without our powerful tools of traditional musical analysis, with only our bodies, one must question what exactly we do know; what we know as living, embodied people, who not only allow disciplines to partner, but allow ourselves to partner, to change, to merge, to relate, and to open with vulnerability to the magic of a beautiful composition.

Relationship is always present and what I would like to emphasize from somatic psychology, embodied cognition, Mark Leman's application of embodied cognition, and Nicholas Cook's ideas on multimedia analysis is that there is a physical, bodily aspect to understanding relationships in artistic works and this is essential to our understanding of meaning. Audiences perceive through the body, engage physical memory, and, in the end, create meaning that is intricately woven with one's life in their body. More than this, art works have their own bodies and relate to players and audiences as physical beings that inspire physical relationship through empathy, attunement, synchronization, and mirroring. There is a real, physical interaction between an artwork and an audience that is fundamental to the life and growth of both beings. This interaction does not occur "detail by detail," but rather, is a relationship predicated on an acknowledgement and respect for both the participant and artwork

²⁰⁷ White, "As if they didn't hear the music," 67.

²⁰⁸ Are individual disciplines truly unique bodies living within a multimedia state, or is this understanding of discipline autonomy perhaps harmful to our appreciation and respect for an integrated work of multimedia.

as integral beings. With such a focus, the whole of the work comes forth as a unified, complete wonder.