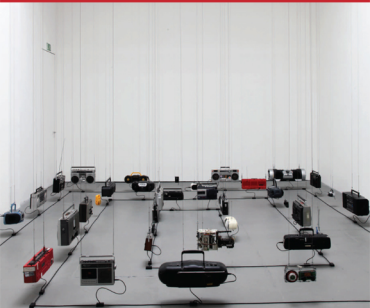


Volume 23

LEONARDO MUSIC JOURNAL

with compact disc

LMJ



Sound Art

The MIT Press
\$37.00

CD included with this issue

SOUND—OR ITS ABSENCE

curated by Seth Clontz

LMJ 23: Sound Art

What's in a name? That which we call "Music" is judged by the full weight of history and fashion; substitute "Sound Art" and most of these preconceptions fall away. As recently as a decade ago the reaction instead might have been bemusement. The term Sound Art was coined in the late 1960s to describe sonic activities taking place outside the concert hall: interactive installations, listening walks, environmental recordings, open duration sound events—even "happenings" and performance art were occasionally lumped under this rubric. For many years Sound Art remained an interstitial activity, falling between music and visual art, embraced fully by neither. Many composers viewed self-styled Sound Artists as failed members of their own club pursuing "a career move . . . a branding exercise" (as Chris Mann is quoted as saying in Ricardo Arias's contribution to this volume of *Leonardo Music Journal* [1]). Most museums and galleries, in turn, shied away from an art form that was often stunningly unvisual even by the standards of Conceptual Art and for which there appeared to be no market. (Gallery assistants often found it very irritating to boot.)

By 2013, however, Sound Art clearly has been accepted as an identifiable musical genre, an art world commodity, and a subject of critical study. Its newfound visibility can be traced to a number of aesthetic, technological and economic factors. First and foremost, I suspect, is the ubiquity of video in contemporary life: On the heels of the ever-declining price of camcorders, cellphone cameras have brought the world—from out-of-tune Van Halen concerts to the Arab Spring—to our laptops, and every video clip is invariably accompanied by sound. As I observed in an earlier volume of LMJ,

For many artists . . . the digital camcorder has become the new sketchbook, and it's so difficult to defeat the camera's built-in microphone that most video footage is accompanied by sound by default. And, just as a camera often redirects the artist's eye, so the constant presence of a soundtrack, whether intentional or not, draws attention to sound [2].

This "video-isation" of our lives contributes to the muddling of the distinction between Art and Music: Art keeps getting noisier while music is increasingly represented in visual formats, creating an ideal nurturing environment for Sound Art. Moreover, the development and dissemination of powerful digital tools minimize the importance of domain-specific training: One doesn't need to master counterpoint or life drawing to be a virtuoso of ctrl-X/ctrl-V; artists can cut sound as easily as musicians can arrange images. And, of course, the recent visibility and financial success of a handful of artists identified with the genre, such as Christian Marclay, Janet Cardiff and Susanne Philipsz, has heightened public awareness.

The ascendance of Sound Art could be seen in the flood of proposals we received after choosing the subject as the theme for this volume of *Leonardo Music Journal*—four times as many as for any previous issue. The submissions we accepted illustrate the rich inclusiveness of the field as it stands today.

Environmental sound (both pastoral and urban) and the spatial distribution of sound, while of marginal significance in traditional music, are common obsessions in Sound Art and are germane to many of the papers in this volume. Llorenç Barber documents his citywide performances with church bells. Peter Batchelor, Marc Berghaus, and Jane Grant and John Matthias contribute essays on various aspects of sound spatialization, ranging from multi-speaker arrays to motorized "sound showers." Mike Blow suspends solar-powered circuitry

in trees. Florian Grond, Adriana Olmos and Jeremy R. Cooperstock employ echolocation technology in the design of sculpture for the visually impaired. Sound walks and portable electronics are central to the work of Yolande Harris, Rob van Rijswijk and Jeroen Strijbos, Jessica Thompson, Edwin van der Heide and Emma Whittaker. David Monacchi, Jos Mulder and Colin Wambsgans employ field recordings in their gallery presentations, while Florian Hollerweger creates time displacements from real-time recordings of visitors to his installation.

Several of the articles focus on technical innovations, employing both cutting-edge and antiquated materials. Yuan-Yi Fan and David Minnen describe their research in gesture control for 3D sound distribution. Jess Rowland builds loudspeakers using copper tape on paper and other flat surfaces, integrating sound directly into graphic artworks. Jay Needham and Eric Leonardson use historic gramophone horns, old mechanical clocks and other spring mechanisms in their performances.

This volume contains a number of historical and critical essays as well. Ricardo Arias reviews the work of three contemporary Colombian artists; Gascia Ouzounian surveys Sound Art in Belfast; and Simon Polson discusses the role of the Berlin Wall in the work of Terry Fox and Anthony Hood. Daniele Balit focuses on artists experimenting with audio perception and what he calls “discreet sound,” while Ethan Rose looks at examples of Sound Art in which the physical object is of great importance. Dugal McKinnon writes about the role of silence in Sound Art. Chuck Johnson analyzes the role of cybernetics and system theory in several pioneering electronic performers. Daniel Wilson contributes an account of relatively unknown pre-loudspeaker Sound Art in Victorian music halls.

The choice of theme for this edition of LMJ was prompted by a symposium on “Sound Art Theories” organized at the School of the Art Institute of Chicago in the fall of 2011 by my colleague Lou Mallozzi. Hosted by the first American art school to have a Department of Sound, the event was distinguished by the inclusion of several younger critics. The papers from this symposium (by Daniela Cascella, Michael Eng, T. Brandon Evans, Erin Gee, Seth Kim-Cohen, Åsa Stjerna and Salomé Voegelin) form a special on-line supplement to this volume, with abstracts and an introductory essay by Mallozzi included in print.

The CD for this issue is curated by Seth Cluett, and demonstrates how listenable Sound Art has become. As the wall between art and music crumbles, it is being replaced by a very inviting promenade.

NICOLAS COLLINS
Editor-in-Chief

References

1. Ricardo Arias, “Rakes, Live Deaths and Modified Cassette Players: Three Contemporary Sound Artists in Colombia,” *Leonardo Music Journal* 23 (2013).
2. Nicolas Collins, “Noises Off: Sound Beyond Music,” *Leonardo Music Journal* 16 (2006) p. 7.

A Music out of Doors

Llorenç Barber

Traveling along the Spanish highways, especially along the wide and flat Castilla, the image that impresses me the most is a bell tower rising up as if being born from the asphalt. Antonin Artaud suggested that metaphysics enters through our skin; in Spain meta(l)physics has traditionally entered through the ears: Saint Bernard called it *fides ex auditu*. The bells in these towers have, for centuries, been the vehicle, the very substance, of the most profound aural thought.

Humans inhabit sound as they inhabit space and time. Bells have demarcated spaces and times throughout history; they have functioned as sonic regulators in rural and urban communities until so recently that their sounding still conforms to our most intimate and mysterious references. With their trembling, bells announce births, the toil of work, misfortunes and festivities, as well as encounters with the beyond such as consecrations. During droughts bells summon rain; during storms they protect from lightning; in the darkness they guide; and in some communities they accompany—and make public—the agony of death.

To the Spaniard, bells are part human and part divine. They are ceremoniously baptized and given names. The public knows how to decipher their messages: They are instantaneous and intelligible newspapers at the service of all.

As with every Spaniard, my childhood fears and joys have been nurtured by the sounding of bells. I was born on the day of the greatest celebration in Valencia, the city of my birth, and gasped my first breath while the bells rang 200 meters away. Later, attracted by the sounds of the bells, I would hide in the bell tower to feel their vibrations in my body. Today as an urban man, I carry a rural bell tower in my memory—its cosmic magnetism still reverberates at the slightest cause.

My earliest postconservatory works were of strong minimalist flavor until one day in 1981, while looking for a smoke outlet for my stove, I found some industrial metal pieces shaped like UFOs, with resonances marvelously similar to those of bells. Touched by their sound, I suspended them from the ceiling of my studio and explored them at my leisure with mallets made of metal, wood, yarn and plastic. I brought my mouth close to their lips and gave birth to a sort of micromelodies never heard before. It was then that I began a sonic love relationship with the bell. This is how *linguopharin campanology* was born: a rumble of crisscrossing vocal-metallic harmonics that generate, like threads, capricious third voices that come and go as they please, touching the outer edges of auricular perception.

Of course, to arrive at this point, I first needed to meet and enthusiastically join the Spanish Fluxus (called ZAJ), to

which I devoted my doctoral thesis, and also visit Darmstadt where I met and connected with the *Free Music Group* of Vinko Globokar, J-P Drouet, etc. and the extended voice and attitudes of Roy Hart (all of them involved with the first performance of the intuitive music of K. Stockhausen's *Aus den sieben Tagen*), and also the first European performance of Terry Riley's *In C*, as well as Helmut Lachenmann (*Air-Musik*), Frederic Rzewski and Dieter Schnebel, and to experience the first performance of Kagel's *Acustica* and Stockhausen's *Stimmun*, and become acquainted with the warm person of Ligeti and his devotion to repetitive music in pieces such as *Selbstporträt mit Reich und Riley*.

I also began collaborating with the *London Musicians Collective* (1987–1988) and presented my first animal and street interventions, in the feeling of R. Murray Schafer's *The Tuning of the World*, at their festival *Music Context*.

I constructed a portable bell stand (Fig. 1), which gave greater richness and versatility to my presentations with only one hung bell and voice, even when the bells were intentionally tuned irregularly—imitating the groups of bells in Mediterranean bell towers. The result is no scale is formed, which emphasizes the timbre and the characteristic “broken” sound of our city, where cracked or false tone bells abound.

All through the 1980s I developed a subtle combination of diphonic voice and bells that—always in an improvised way—spread out everywhere, in Europe as well as in Latin America and the United States. Meanwhile, I participated in three audio art symposia, the first in Stuttgart (1985), the second in Hasselt (1987) and the third in Linz (coinciding with the *Ars Electrónica Festival*). At those events, our discussions were intense about the nuclear and specific notion and practice of what we then called “audio art,” and what we now refer to as “sound art.”

Questions about synaesthesia (the old “Correspondences” of Baudelaire), and even more so about the emancipation of sound from music and the rigid structures of formal composition, etc., were essential parts of our seminars as well as the combinations of different elements to create unknown situations that placed the receptor or the context or a certain manifestation of the technology as the central “personage” of the sound proposition.

Installations, performances, events, collages, new sonorities, new combinations—and even such a boundless proposition as my *De Sol a Sol* (“From Sun to Sun”), which years later I was

ABSTRACT

The author describes the inspiration and influences behind his compositions, installations and performances, from solo work with voice and bells to performances in city centers with bells, horns, ship-alarms, sirens, groups of drummers, symphonic bands and cannons.

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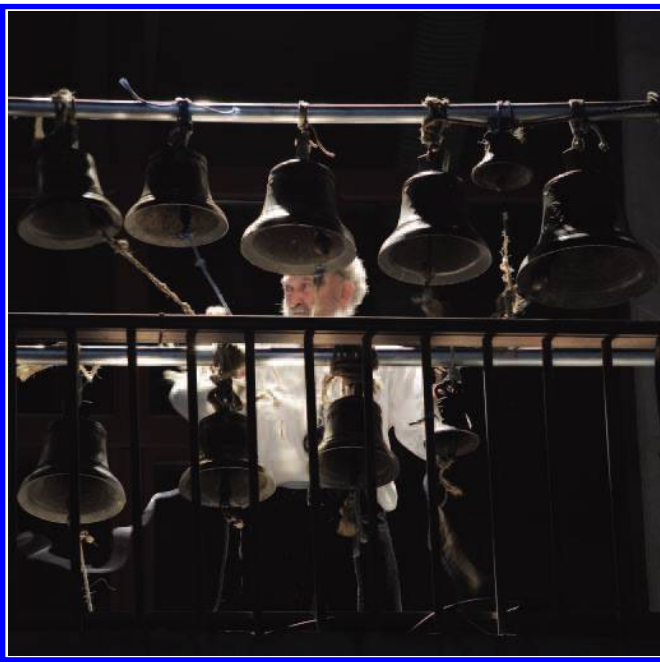


Fig. 1. The author performing with bells. (Photo © Iraida Cano)

able to realize (more than 12 hours playing without stop!) at the Berlin “Sonambiente Festival für hören und sehen” (1996)—all were the result of those early symposia. These experiences, along with my appearances onstage with Gordon Monahan, Horst Rickels, Christian Marclay, Shelley Hirsch and many others, are still alive in my memory, as are musicians and philosophers such as Daniel Charles, Robert Ashley and the astonishing Conlon Nancarrow.

MUSIC AT THE MERCY OF THE ELEMENTS

In a way the whole history of music of the last century is one of extending nineteenth-century limits—integrating to various degrees the dimension of “reality” with the heart-strings of “the artistic.”

To grasp, to integrate and to make “artistic” matter that is immediate, instantaneous, full of movement and speed: collage, assembly, simultaneism, *objet trouvé*, phonetic poetry, action music or synaesthetic installations, intermedia interventions and settings—among others—is but the tip of the iceberg.

Focusing on the world of sounds, the acceptance of dissonance, the incorporation of noise and the sonic “continuum” with all its microtones, new sound sources such as *concrète* and electronic sounds, and sounds of nature, as well as the manipulations of all the above either in the studio or live (moving the sound around a space in real time, at the same time that it is being produced and interacting with its environment) and the radical acceptance of “whatever is there, as it is” of the paradigmatic 4’33” by John Cage, all

this—I say—has fostered an “expanded” concept of music, one that is integrative and all-encompassing but one that, nevertheless, coexists both with traditional forms of the sounding art anchored in the past yet still apparently fertile and with a whole hermaphroditic series of transitions (smooth or not) among musical practices with very different aims.

BELLS AND THE CITY

When, in 1987, after several years of work within the barbarian and improvisational *Taller de Música Mundana* (“World Music Workshop”) and solo with bare music, voice and small bells (Fig. 2), I made the leap—not without great hesitation, several times somersaulting without a net—to propose and prepare a concert for a whole city. At the time I could not imagine how much reality and how much expansion I was inviting to that which I conceived (and still conceive) of as “music.”

Indeed, despite the fact that the concept and praxis of music have expanded—embracing and making prominent concepts of space, projection, mass, chance, structure, landscape, interferences, etc.—the fact of composing for a place as irregular, unrepeatable and unencompassable as a city, unequally seeded with nests of bells—was an endeavor that implied a generous acceptance of redundancies, of the individual and responsible listening point and perspectives of each one, of the atmospheric influences (winds, humidity, storms, heat waves, etc.) of the urbanism (with walls where disorienting clapper-beats bounce, alleys that convert into sonic tubes, corners where different

sources and distances cross and blend, squares that act as a vibrant drum, and awful avenues flooded with deafening, speeding engines), or of the foresight and consent of our town councilors who limit and defend certain public spaces from the occasional sonic recreation.

As a matter of fact, after so many acceptances of, in short, so much reality that for some, particularly for musicians, seemed and seems excessive, I was still determined to continue calling “music,” “compositions” and “concerts” something that, for them, is frayed and chaotic or merely an accidental hearing of bells, without knowing where they are.

There was a musician who did not hesitate to describe my city concerts of bells (over several years there have been occasional additions of horns and ship-alarms, sirens, groups of drummers, bands, cannons, etc.) as “utopian,” adding an evocative nuance of unreality to something that, nonetheless, is as real as a slap in the face, as beautiful (although not always and not completely) and, in any case, as *topical* (relating to *topos*, to the terrain) (and therefore impossible to realize anywhere else) as a custom-made suit for a clumsy and hunchbacked body.

In fact, to take a city, a landscape (Cartagena Bay, in a *Navmaquia* of 1993) or one night (the mountain concerts of *De Sol a Sol*) as something that “is” or something that “is there,” albeit in profane dumbness, and to transform it—even if very fleetingly by means of the meticulous and skilled labor of writing (a score for each city or occasion), rehearsals in which the timings and chronometers

Fig. 2. The author performing with bells. (Photo © David Jiménez)





Fig. 3. Llorenç Barber performance with bands of mobile wind instruments. (Photo © David Jiménez)

are looked at under an eyeglass, acts of persuading many people (it is essential to count on exquisite collaborators) to conveniently set up that “something” and rescue it from its dull exile, giving it presence, dimension, intensity and new, significant depth for whomever wants to earn it—is an enormous challenge.

Moreover, it is necessary to give precise information to a public who in this case is summoned to a complex sound-making in which they—rather than acting as passive receptors—become intuitive detectives weeding out clues and evidence, coming to conclusions and acting accordingly. Their location(s) during the concert are determining aspects: whether they are in one street (or plaza) or another, whether they climb to a terrace or balcony, remain motionless or wander peripatetically around the sonic environment. Their personal decisions are determining factors for the simple and physical fact that a body cannot occupy two spaces at the same time.

A heap of challenges thus accompanies the displacement of the limits of artistic proposals, challenges that run up against certainties that some people do not want to abandon (whether due to laziness or aesthetic choice), and above all to a trembling, tribal *fear of reality* and its direct and dislocating *virtus*. This reality is, in one sense, simple acoustics but it is also urbanism with cubbyholes within which music—always fleeting, erratic and stumbling over spaces—seems to live so rapidly that, at times, quoting Rulfo, “I imagine it playing races with time.” But this reality is also, in this case, historic sediments of events, sayings and legends (*genie du lieu* [spirit of the place]), since bells and their soundings are loaded with fertile knowledge/analog taste.

So much so that we can affirm that the sound of bells is in itself a complex found object, something unmistakable thrown

out there like dust or rain falling over things, houses and people: the insisting, hammering clacks of bells, rather than notes or chords, are *documents*, bundles (clusters) that, armed with secret keys, fly in with a fuss (one that is simple but concrete and intense), precluding transits (whether individual and/or collective) of times and states. The bell is, ultimately, immediate communication, but also memory (a conversation that is retroactive as well) and therefore melancholy.

A MOTIVE CALLED “BAND”

After several years of composing and producing concerts for cities, both in Europe and America (how rich the memory of that sonic accompaniment to a solar eclipse in Oaxaca!), a halting “beyond” came to me when I suddenly stumbled upon the possibility to use nothing less than 22 symphonic bands from my homeland (Valencia) as a disciplined and above all mobile instrument (Fig. 3) that adds a suggestive counter-position to those heavy and immovable pieces of bronze, which bells are.

With sabbatical enthusiasm I dove into creating sonic pots of choral intensity kneaded by means of the thoracic effort of 2,000 performing and displacing musicians. All this gave birth, in 1994, to *El Concierto de los Sentidos*, whose “locus” was a wandering walk around Murcia’s Cathedral, where, at the same time that we were making sound, we were also enjoying touching, tasting and above all smelling in successive waves of incenses and other aromas, while the public strolled in a jammed, Jerichonian procession.

Almost purposelessly, I, as composer, had become an uninvited guest to the celebration, a party of coarse gears that gave me an endless present of formulas, melodies, rhythms, dispositions, encounters and connotations of all kinds (sacred,

mythical, ceremonial, etc.). It was thus that I recently entered in *Alberomundo*, a sort of *Tauromaquia*, a provocative summoning of the public to become the central navel (*omphalos*) of a sonic, very singular massage that, according to how we lived, was very magical.

In fact, a bullring is a solar place loaded with the numerous resonances of bells and band sounds. Above all, if subverting conventional relationships (as in the urinal fountain of Marcel Duchamp) the public occupies the *albero*, and the musicians become fighting bulls that climb up the terraces, trapping us with their game-ballet of sudden hiding places, their races, their clustered rackets, their ceremonial *pasodobles*, their trumpeteer announcements and their accumulative final drunkenness, it is a catchy and insisting place under an unfair sun.

In front of such craziness, it seems useless to act as an analyst of parts, themes and conclusions (“why care about ‘because,’ why care about ‘why,’” as ZAJ, the Spanish Fluxus, used to say). The bottom line in bewitching sonic celebrations such as *Alberomundo* is not dismembering by the book, but rather the luxury of experiencing excess without a model for the eye (or the ear), the storytelling in the company of our people. It is, council, *sinodal music*, that is, one of walking-in-company, allowing oneself to be showered by the cluster of heterophonies in movement that, stubborn, do not want to go anywhere, but instead can only be humming confusion.

A certain ecstatic happiness (as in good healing or minimal music) invades us at concerts like this, a happiness that intensifies our senses and memories. In the case of *Alberomundo*, perhaps due to the ceremonial environment, musicologist Lothar Siemens’s words were: “*a subjugating creative unity, a true testimony of blood which impresses and fascinates.*”

Manuscript received 2 January 2013.

Born in 1948, Spanish composer, performer and musicologist Llorenç Barber studied in Valencia, Madrid and Darmstadt (1969–1976). Since 1980 Barber has been engaged internationally as an improviser on his own personally constructed bell tower. In addition he has fulfilled commissions from all over the world to write symphonies of bells, each specifically designed for individual towns and cities. In recent years, after sounding more than 100 cities in about 20 different countries, his urban landscape citizens’ concerts have grown with the inclusion of drums, cannons, sirens, ships, fireworks and, most of all, spatially distributed wind bands. This led him to plan Naumaquias (a concert battle with the participation of sirens and guns of ships), Tauromaquias (symphonic bands sounding around the public arena) and Concert os senses (a synaesthetic spatial composition with the participation of hundreds of musicians).

THE INTIMATE AND THE IMMERSIVE IN GRIDS: MULTICHANNEL SOUND INSTALLATIONS

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ABSTRACT

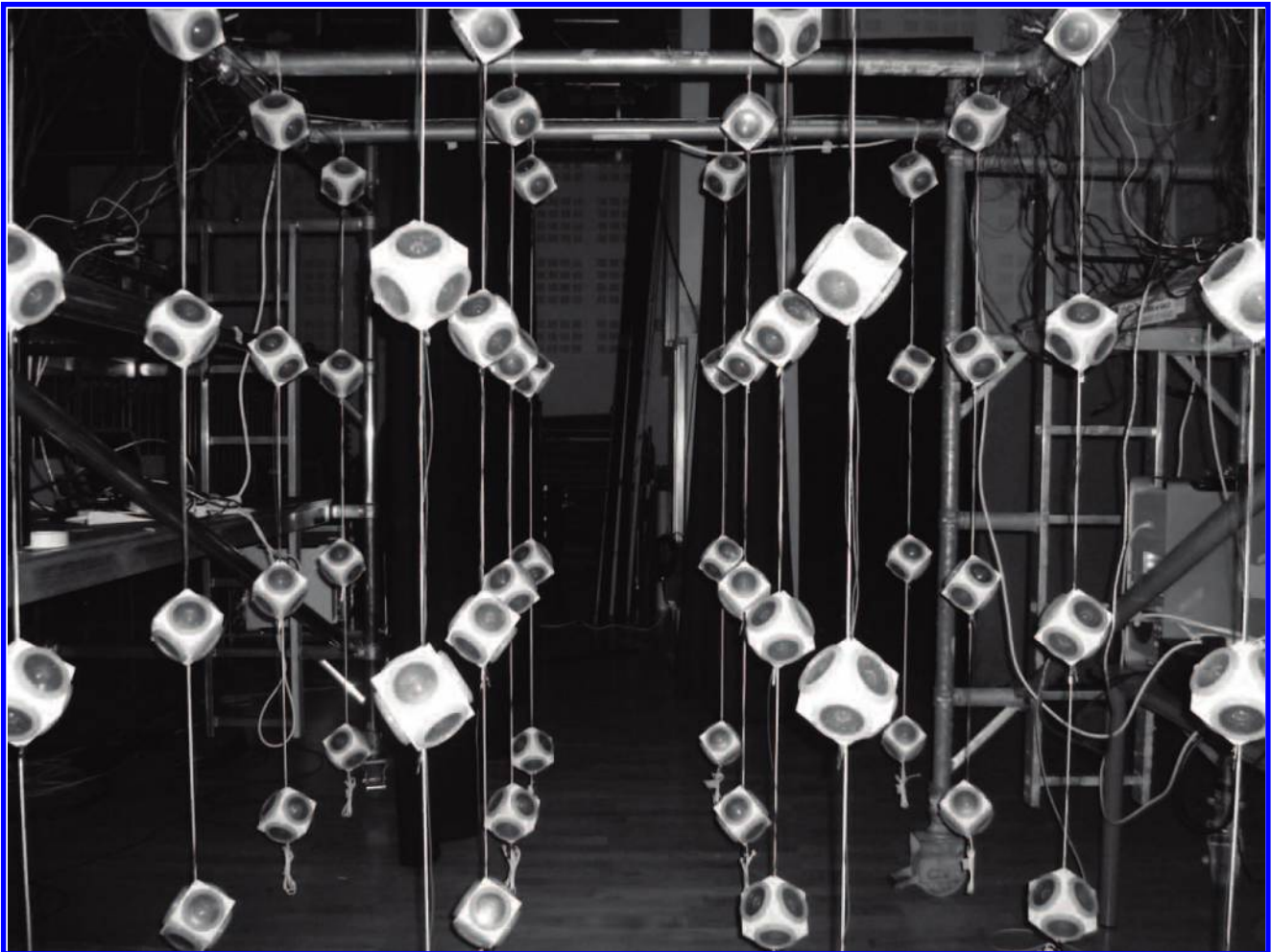
The author discusses his purpose-built visual and spatial environments that are designed to increase a listener's awareness of his or her sonic surroundings.

My current practice emerges from a background of fixed-media composition using real-world sounds, and thus is one that routinely involves the pursuit of spectrally rich and spatially immersive sonic environments, usually performed over large-scale speaker arrays in the concert hall. In my recent work I have aimed to condense such spatial and sonic detail into much smaller-scale, self-contained and, importantly, intimate installation environments. *GRIDS* is an evolving series of multichannel sound sculptures, each consisting of speakers in geometric arrays of many to potentially hundreds of loudspeakers in concentrated spaces. The multiple channels in all of these works are designed to operate collectively, behaving as a single unit in order to convey

coherent, spatially detailed sound landscapes. I am interested in the various ways that the listener might engage with the fabricated space within each work (experiencing sound through, above, beyond or within the physical object) while becoming more aware of the real space that they share or inhabit with and within it.

Studies on Canvas (2004) presents a flat-panel array of loudspeakers behind a blank canvas. The work actualizes an acousmatic veil, two-dimensionally presenting a series of sonic "images" through a "curtained" window onto those scenes. As such, it is designed to be viewed like a conventional painting and encourages a demeanor of looking or listening through that window. The images range from macro-scale

Fig. 1. Peter Batchelor, *CLUSTER* prototype, sound installation, 64 channels, 2011. (© Peter Batchelor)



landscapes (rainstorm with cars passing, countryside environment), to meso-scale details and “still lifes” (a more focused exploration of object behaviors in certain contexts: marbles rolling down a tabletop, a pool of bubbles), and to microscale interiors (the imaginary internal structures of objects). My exploration of surface was significant in designing the studies, particularly the behavior of objects as they might exist at a variety of different depths behind that surface. The canvas invites different viewing perspectives: standing back will reveal the full “picture”; standing closer permits scrutiny of inner spatial detail; standing off-axis affords experiencing various speakers’ different proximities (i.e. varying distance). By changing perspectives, the listener has much greater control over his or her experience of space within the work.

Ceiling (anticipated completion 2013) will also present a flat-panel array of loudspeakers, this time over an entire ceiling within a confined, cell-like space. Inspired by James Turrell’s *Sky-space* series, in which simple apertures in the ceilings of otherwise bare spaces open to the sky [1], I conceive *Ceiling* to operate as a portal to an external (fictional) sonic “reality” that exists above the listener. Much as with Turrell’s work, the environment’s inaccessibility beyond the portal draws attention to the confined, claustrophobic space that the room in which it (and the listener) is “contained” represents.

DOME(s) (2012) comprises a series of geodesic dome structures with speakers placed in the vertices between the triangular panels of each. Listeners sit within the domes, experiencing sound circumferentially and distally—always outwards or surrounding. The domes are designed to be unenclosed, and thus are acoustically transparent, enabling a listener within to experience the soundscape beyond the playing loudspeakers (ideally a park or other outdoor public space) as an extension of that presented by the dome itself; indeed, sounds from loudspeakers may be indistinguishable from those coming from beyond, since the sound material may be derived from those sounds. Thus, while the dome provides a sense of enclosure and safety, it is paradoxically designed to encourage a much wider awareness of space and place—a listening-beyond of the constructed land(sound)scape into the already-there.

CLUSTER (2013) presents the grid in three dimensions (e.g. a 7-x-6-x-5 matrix) as a cuboid suspended walk-

through array of omnidirectional loudspeakers and thus departs from the surface-based configuration of the other setups. As such, the sound envelops the listener, who experiences it from within but can navigate it, investigating zones of activity from a variety of viewpoints with individual speakers as point sources. It can also be viewed from outside the sculpture, yielding a single coherent spatial image, but one that has physical depth (Fig. 1).

In all of these works I have aimed to translate some of the creative and theoretical preoccupations of the acoustic and soundscape arts to new purpose-built sound environments, allowing the listener to engage with the sonic and spatial detail that each presents, and encouraging ambulatory investigation of, and an intimacy with, their contents. Through the relationship of the audio content of each with its visual and situational setup, these works aim to encourage a greater awareness of the sonic environment in which they exist.

Reference

1. J. Turrell, *Deer Shelter Skyspace*, installation, Yorkshire Sculpture Park, 2007.

Manuscript received 2 January 2013.

Peter Batchelor is a composer and sound artist whose output ranges from two-channel “tape” compositions for concert diffusion to large-scale multi-channel installation work. He lectures at De Montfort University, Leicester.

THREE ENVIRONMENTS

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See <www.mitpressjournals.org/toc/lmj/-/23> for supplemental files associated with this issue.

ABSTRACT

Most of the author’s recent work has centered on the perception of environments and the human body’s navigation through those environments, which has necessitated the construction of large-scale installations. So far, all but one of these installations have used sound as an integral component. The author believes that we, as both biological and cultural beings, live within three interlocking environments—the natural, the built and the media. This third is the newest, but certainly no less real than the other two.

My goal for each of these installations is to create a complete environment in itself, either isolated from or interacting with the larger world. And once viewers enter this space, they will perhaps notice things that were taken for granted earlier. My goal is to subtly bring attention to the obvious but ignored—the background—in our surroundings.

outdoor/indoor/outdoor (2008) (Fig. 1) is a site-specific installation constructed specifically for the rooftop gallery at the Beach Museum of Art at Kansas State University. Enclosed by high concrete walls, it is an ambiguous space. Carved from yellow pine, the work consists of three pieces of large furniture, scaled up from 1950s dollhouse furniture—a very formal sofa, a chair and a large console TV. Inside the television screen is a wide-angle lens focused on a mirror that is set at a 45° angle and aimed up through a window in the top of the TV set. The TV screen “plays” nothing but the sky above—the colors of the sky, clouds, birds passing by.

Installed under each carved “cushion” in the sofa and chair is a tactile transducer, which transmits sound not through the air but through solid material, including human tissue and bone. The sounds encountered while sitting in the furniture are those of weather and nature, among them thunderstorms and birds singing. Although these sounds are audible from anywhere in the space, the work produces a literally thunderous effect only to those seated, rumbling the body and brain. The basic idea of this work is that the viewer/listener goes outside to do what one normally does inside (sit and watch TV), only to look at and listen to the outside.

Because it is isolated from and elevated above its surroundings, the gallery seems disconnected from what we normally think of as “Nature”—grass, trees, life forms. And, in my opinion, this is what we as a culture really prefer. We have always preferred our Nature somewhat distant and controllable—compartmentalized, if not actually mediated. We prefer our houses hermetically sealed, heavy on the antibiotic soaps.

With this installation, I have tried to use the uncertainty of the space to create an uncertain line between what we consider inside and outside, in our own houses and in our daily lives. In contrasting an almost clichéd version of American suburban domestic life with the natural world by placing the



Fig. 1. *outdoor/indoor/outdoor*, site-specific installation in the rooftop gallery at the Beach Museum of Art, Kansas State University, 2008. (© Marc Berghaus)

former outside, I hope to bring attention to how distant we actually are from the world we depend on and coexist with. I have placed a level of mediation between the viewer/listener and the Nature around them, which they are—and already were—in.

Sound Shower #1 (Radio Wave) (2009) (Fig. 2) is a tiny, self-contained world made from the media noise of the outside world. It consists of a grid of 16 radios, each tuned to a different local radio station. Each radio is fed into one channel on a 16-channel mixing board; each station gets its own sliding volume control. There is a motor-driven crankshaft below the mixing board,

connected to the volume sliders via steel rods, which raises and lowers the volume of all 16 channels in a rolling, wave-like motion.

This constantly shifting sound is then fed to an Audio Spotlight <www.holosonics.com> fastened to the ceiling and aimed straight down. The Audio Spotlight focuses sound into a narrow beam, outside of which it cannot be heard. The idea is that the visitor takes a “shower” in the sound, standing directly under the Spotlight—sound that has been forced into behaving like water through the wave motion created by the crankshaft. Of course, we are bathed in these radio waves at all times

anyway, both literally in terms of radio waves themselves, and also in terms of our culture’s background noise.

Not all my recent installations utilize sound, but sound can—and often should—be used as a valuable and integral component in any “simulation” of real-world environments, whether natural, built or media.

Manuscript received 2 January 2013.

Marc Berghaus is a sculptor, writer and sound artist living in Kansas. His work has been exhibited throughout the U.S. Midwest and West and can be seen and heard at <www.marcberghaus.com> or <www.youtube.com/user/berghausmarc>.

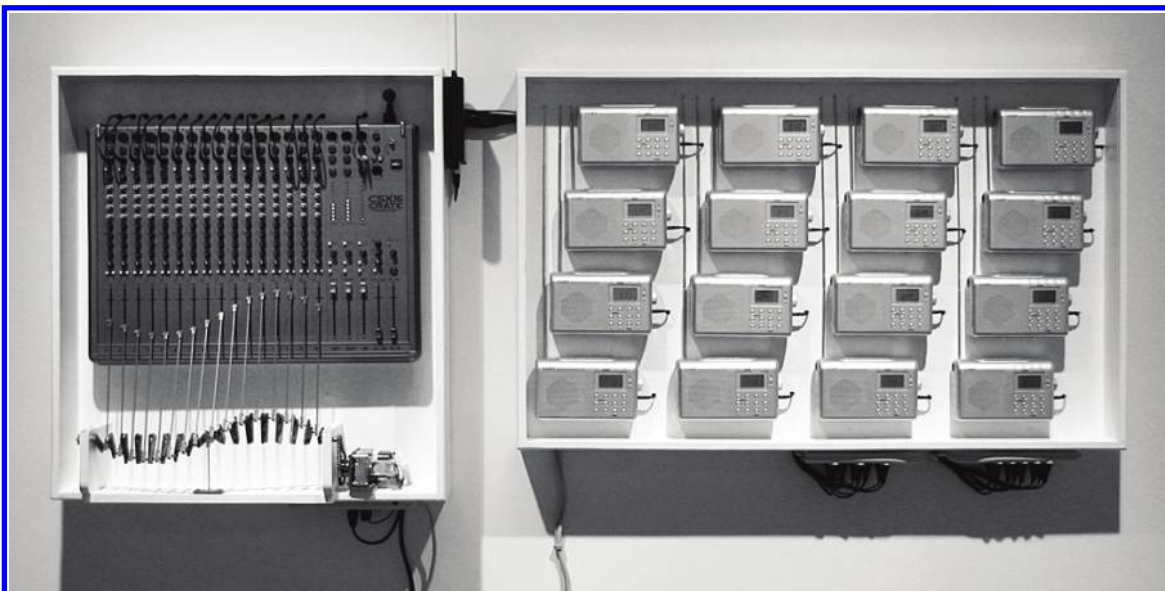


Fig. 2. *Sound Shower #1 (Radio Wave)*, installation of 16 radios with motor-driven crankshaft, mixing board and Audio Spotlight, 2009. (© Marc Berghaus)

Fig. 1. Jane Grant, John Matthias, Nick Ryan and Kin, *Plasticity*, at the onedotzero “Adventures in Motion” Festival, BFI (Southbank), London, 2011. (Photo © Kin Associates Design)



PLASTICITIES AND GHOSTS: RELATIONSHIPS BETWEEN STIMULUS AND MEMORY IN NOISY NETWORKS

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See <www.mitpressjournals.org/toc/lmj/-/23> for supplemental files associated with this article.

ABSTRACT

This paper examines aspects of neurological memory, rhythm and time within the works *Ghost* (Jane Grant) and *Plasticity* (Jane Grant, John Matthias, Nick Ryan and Kin).

Understanding the relationship of the neurological past within the neurological present is something of an enigma. In neuroscience and philosophy, understanding how memory figures as real-time experience is becoming something of a holy grail. Many recent studies point to “noisy networks” where memory is brought forward into the present implicitly as residues in the system of neuronal connections [1].

In 1908, Henri Bergson wrote, “A remembered sensation becomes more actual the more we dwell upon it, that the memory of the sensation is the sensation itself beginning to be” [2]. Bergson describes the compelling idea that recalling a memory is the beginning of experiencing it, despite the absence of the stimulus.

Research undertaken for *Ghost* and an earlier work, *The Fragmented Orchestra* [3], adapted a model of artificial spiking neurons developed by Izhikevich. The complexity of his model affords infinite dimensionality and the potential for “simple thought and memory” [4]. Izhikevich discusses a phenomenon in which groups of firing neurons act as if they are experiencing a stimulus despite the stimulus not being present: a replaying of the past within the present, a sonic ghost.

The ghost transgresses boundaries, both exogenous and endogenous as an emergent structure of time. *Ghost* is built upon these premises and explores the thresholds of the neuronal past within the sonic present, the presence of memory within the lived moment. The concept of the ghost is culturally potent; we may think of it as an excess, an intangible presence.

Ghost is a sonic artwork by coauthor Jane Grant that premiered at the ISEA Istanbul/Istanbul Biennial in 2011. It is composed of eight speakers, eight microphones and a “memory-embedded” network of neurons. Sounds were implanted into the network beforehand to provide the system with a buffer or

“memory,” a small artificial cortex based on a non-linear integrate and fire-spiking neuronal network model [5]. Once installed, live sounds picked up by the microphones outside the installation space stimulated artificial spiking neurons modeled in the computer to “fire,” sending small fragments of sound to the eight speakers inside the building. If the external sounds failed to reach a particular threshold, the “memory-embedded” sounds would be heard. Over time, the external sounds started to embed themselves into the model, gathering sensory information and sonifying the past within the present.

Ghost was installed at Maksem in Taksim Square, one of Istanbul’s city centers. The ambient noises were sounds of the city: trading, coffeehouses, sirens and the Azan in an adjacent mosque. These sounds flickered through the eight speakers, often rendering it difficult to distinguish whether they were being relayed externally or through the system as they cascaded through the neuronal model, a confluence of sonic happenings, each overlapping the present and the recent past, reliving the stimulus of what had already been.

Plasticity (by co-authors Grant and John Matthias, with Nick Ryan and Kin) was first installed in 2011 at the BFI (Southbank) London (Fig. 1). It has six microphones and 16 speakers within one large room, each coiled in LED ribbon. The computer model runs a network of 100 artificial neurons and records the sound input by the public

into the microphones, triggering short sections of this sound when one of the neurons “fires.” The neuronal network is driven by a noisy signal that keeps the system “buoyant” and has an additional algorithmic plasticity code that changes network connection strengths according to causal firing between the neurons, mimicking simple learning. When the neurons fire, their corresponding LED lights also light up, causing cascades of firing events to create a scattering of light and recorded live sound across the speaker network.

The patterns of lights and sounds triggered across the network occur in *polychronous* groups [4], in which the imaginary and the memorial are linked with sensory perception and the collective dynamics of the spiking neurons. Subgroups of neurons become *polychronized* (causal firing together in a group but not at the same time), and it is the pattern of the firing subgroup that represents the signal pattern for the initial stimulation. Izhikevich’s idea introduces simple memory into this scenario by suggesting that the re-firing of the polychronized group of neurons evokes the original stimulus within our imagination.

References and Notes

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2. H. Bergson, *Matter and Memory* (New York: Zone Books, 1988).
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5. E.M. Izhikevich, *IEEE Transactions on Neural Network* 14, No. 1469 (2003).

Manuscript received 2 January 2013.

Jane Grant is an artist and academic. She is Associate Professor in Digital Arts at Plymouth University in the U.K. and co-director of the Art and Sound Research Group.

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SOLAR WORK #2: A SOLAR-POWERED SOUND ARTWORK

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Documentation of the work can be found at <www.evolutionaryart.co.uk/solar2.php>.

ABSTRACT

This paper describes the concept and realization of *Solar Work #2*, an outdoor, solar-powered sound artwork that responds to the sun, creating a field of small sounds and drawing visitors into the physical and sonic landscape.

This work is miles wide and miles high and takes me right into the sound of the world.

—Visitor comment

Solar Work #2 arose from my desire to explore the relationship of a sound art piece to the sonic and visual landscape, with the goal of creating long-term compositions that would reflect changes in the weather and challenge visitors’ concepts of “natural” and “artificial.” The idea of using solar power came from my interest in placing autonomous units outdoors in places where it would be difficult to use conventional power. I wanted to free electronic sound work from its reliance on the grid or batteries and extend the range of potential sites open to artists. It also arose from a dissatisfaction with the tangles of cables and constant battery changing usually associated with electronic sound pieces. Additionally, the project was an investigation of what is possible in terms of autonomous sound pieces using current solar technology.

Sonic art powered by solar energy has some precedent. In the late 1970s, Fluxus artist Joe Jones started creating solar-powered kinetic work, culminating in *Solar Orchestra* in 1982 [1]. Alvin Lucier’s *Solar Sounder I* (1979) was designed to explicitly reflect the seasons and revolution of the Earth, and Lucier hated the idea of the piece being changed by human interference [2]. Felix Hess used solar-powered oscillator circuits driving piezo discs in an installation called *How Light Is Changed into Sound* in 1996 [3], and more recently Craig Colorusso created *Sun Boxes*, a collection of 20 sound-producing boxes each powered with a solar array [4].

Long-term weather-driven compositions found expression in Max Eastley’s aeolian instruments [5] and Jem Finer’s *Score for a Hole in the Ground* [6], an interesting example of a permanent outdoor work designed to reflect, sonically and visually, the environment in which it is situated.

In the version described here, *Solar Work #2* consists of seven brass gramophone horns hung in trees roughly 20 m apart, in a line across the landscape (Fig. 1). The line is oriented so as to roughly mirror the sun’s path across the sky (Fig. 2). Each horn is connected by wire to an oscillator circuit and a photovoltaic (PV) cell mounted on a nearby branch, emitting sound that varies in speed and pitch—between a drone, a cicada-like chirp and a siren-like oscillation—with the amount of sunlight. The piece uses piezo disc sounders and simple square wave oscillators [7] and draws very little current; as such, it will work even under overcast conditions, although the sound will be quieter. The volume of the sounds was carefully considered so as not to drown out the sounds of the environment. In bright sunlight it is just possible to discern the sounds from two horns when standing between them.

After many trials, I decided that the optimal system for each unit was two channels, with each of two oscillators in series and each feeding a piezo disc attached to one side of a balsa wood resonator. Along with variations in the circuit’s supply voltage due to the amount of light falling on the PV cell, the oscillators also incorporated a semi-random mixture of component values and photocells. This combination gave a wide variety of pitches and rhythms in changing light. I sourced the brass horns housing the resonators from India (as a custom order from a company that manufactures reproduction gramophones) and hung them in the trees using brass picture wire.

The piece reflects the chaotic nature of the weather; the chance events and indeterminacy inherent in this process are embraced as part of the nature of the work. The sound of *Solar Work #2* can be considered a durational performance [8], an open-ended, long-term composition, in that it will continue for as long as its components last, and each day can be considered a small “movement” in the overall musical structure. In fact, the composition would reflect changes in the weather over years due

Fig. 1. Mike Blow, *Solar Work #2*, sound installation, 1 March 2012. One of the gramophone horns, with wires leading to the oscillator circuit and PV cell. (© Mike Blow.)



to global warming or other climate changes, and can be thought of as a sonification of weather data, as the sound produced responds immediately to weather conditions.

Each visitor's experience of the piece will differ and will be co-created at the intersection of the work, the environmental conditions and his or her own movement. Indeed, the environment is so vital that the work cannot exist without it. Several visitors commented that the sound of the piece led their ear into the sounds of the environment, and as such the dimensions of the work can expand beyond the material and sonic boundaries of the horns to the limits of hearing and sight of the visitor.

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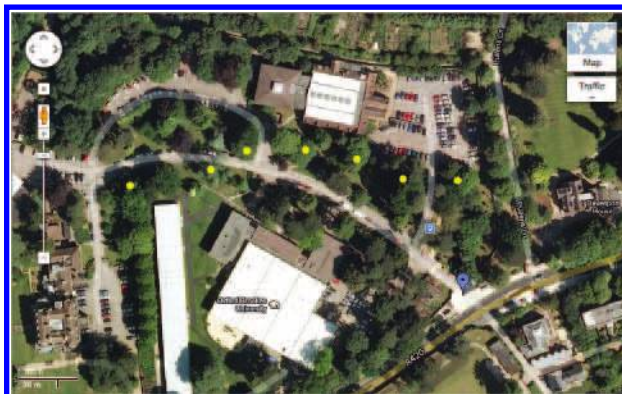
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5. T. Gibbs, *The Fundamentals of Sonic Art & Sound Design* (Lausanne: AVA, 2007) pp. 48–53.
6. J. Finer et al., *Score for a Hole in the Ground* (UK: Stour Valley Arts, 2008). See also Jem Finer, "Contributor's Notes on *Score for a Hole in the Ground*," LMJ23 CD, *Leonardo Music Journal* 20 (2010).
7. N. Collins, *Handmade Electronic Music* (New York: Routledge, 2006) pp. 129–133.

8. Durational work is notable for its aspirations. As David Toop, writing about Jem Finer's durational work *Longplayer*, points out, "In the face of human barbarity, short-term greed and destructiveness, [*Longplayer*] is a benign creation built to last." D. Toop, "Glimmers of Light": essay in Finer [6] pp. 13–19.

Manuscript received 2 January 2013.

Mike Blow's work concerns audiovisual relationships and evoking a deeper consciousness of site and physical objects using sound. He is especially interested in using gaps between the seen and heard to engage the imagination and in open-ended work that is completed by chance events such as the weather or the actions of visitors. Blow is currently completing a Ph.D. in the Sonic Art Research Unit at Oxford Brookes University, U.K. and holds a lectureship in Interaction Design at Plymouth University, U.K.

Fig. 2. Aerial view of the installation site of *Solar Work #2*, 27 April 2012. Dots show the location of each horn. (© Mike Blow)



MAKING SCULPTURES AUDIBLE THROUGH PARTICIPATORY SOUND DESIGN

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See <www.audible-sculptures.ca/blog> for video associated with this article.

ABSTRACT

A research group explores rendering sculptural forms as sound using echolocation and the participation of members of the visually impaired community.

Motivated by observations made during a field study with members of the visually impaired community [1], we were intrigued by the possibility of rendering sculptural forms as sound (Fig. 1). For many blind individuals, echolocation—listening to the acoustic reflections of sharp impulses from nearby objects—is a familiar mode of gathering information about one’s surroundings. While echolocation encourages strong engagement with the audible environment, artworks such as sculptures often remain inaccessible. We attempted to enhance the audible experience of sculptures so that blind individuals could gain a mental representation of their forms and an appreciation of their presence.

We adopted echolocation as the interaction paradigm because it allows for a natural engagement with the sculptures by triggering sonic responses through snapping of fingers or tongue clicks. Our program renders back these short impulses as an echo by convolving them with sounds of approximately 1 second in duration. These sounds are not meant to be a musical reinterpretation of the sculpture but instead give a systematic representation of each listening position around the sculpture. The sounds were composed through the sonification of geometric features that vary according to the listener’s perspective. The sonification is based on two complementary methods: one proposed

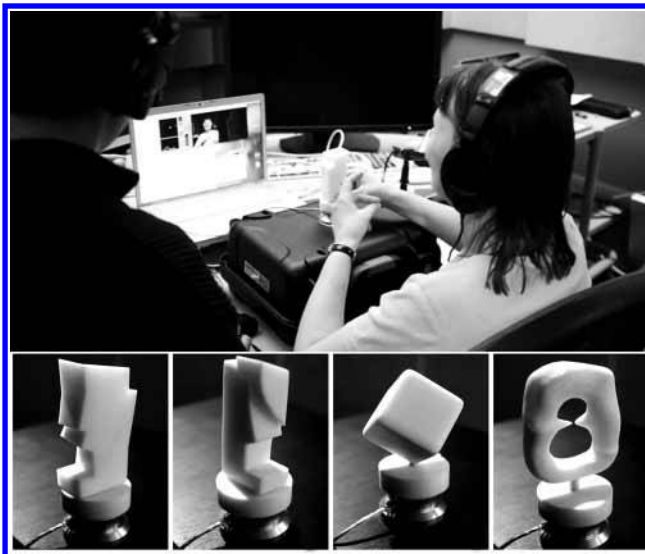


Fig. 1. Evaluation of audible sculptures, 25 September 2012 <www.audible-sculptures.ca>. (© Florian Grond)

by Meijer [2] and one by Hermann [3]. In the combined method, we map geometric information about the orientation of the sculptures’ surface elements to spatial and spectral parameters.

The sound changes its characteristics depending on the listener’s position.

The characteristic of the convolved echo sound varies between dull and sharp, according to the sonic quality of the impulse. Since no finger-snap or tongue-click can ever be reproduced exactly, the interaction paradigm creates an increased level of engagement through the tension between repetition and variation. Although the sound depends on the listener’s actions, it is less a musical gesture than a manifestation of the object itself. At the same time, however, the sound is not an expression of, but a dialog with, the sculpture. The sculpture replies, similar to an echo, with a certain delay. Action precedes perception, and hence echolocation can foster a certain mode of listening that encourages one to attend to the quality of the interaction between the impulse and what the reflections might represent. Directing the listening focus to this link allows the sound to convey information beyond its musical and associative potential.

Developing sonifications with a blind audience made this project an interesting artistic challenge. Like any other art form, sound art relies on some contextual knowledge and aesthetic references of the field. In our case, however, the key to engaging with the sound is related to a listening skill. For this reason, we involved a member of the blind community in a participatory design approach, hoping to ensure that our target audience would find interpretable sonic results. In a small qualitative

study with four blind participants, we found that in some selected cases, the sounds could be well identified with the orientations of small 3D replicas of the sculptures.

In this project we experienced that “echolocation-based” interaction not only has the potential to translate the geometric features of sculptures into sound but that it also refers to the sense of touch and, by engaging other modalities of perception, shares a commonality with sound art [4]. During the qualitative study, we observed that our participants enjoyed being able to experience both sensory modes at the same time. From an artistic point of view, sound can complement the experience of the immediate realm of touch by giving the sculptures a presence that projects into space, resonating persistently in the audience’s mind.

References and Notes

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Manuscript received 2 January 2013.

Florian Grond works as a researcher and sound artist at the intersection between the arts, science and technology, with a focus on sonification and sonic interaction design in auditory display and artistic contexts; his artworks have been presented at various venues across North America, Europe and Asia.

Adriana Olmos works as a design researcher and interaction designer with a focus on visual- and audio-driven interfaces across many devices, contexts and communities, ranging from blind people to professional musicians to power plant engineers.

Jeremy R. Cooperstock is an associate professor in the Department of Electrical and Computer Engineering and director of the Shared Reality Lab, which is broadly concerned with human-computer interaction technologies, emphasizing multimodal sensory augmentation for communication in both co-present and distributed contexts.

PRESENTNESS IN DISPLACED SOUND

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See <www.mitpressjournals.org/toc/lmj/-/23> for supplemental files associated with this issue.

ABSTRACT

The author discusses her works that explore sound's influence on creating a sense of presentness and her aim to increase the audience's awareness of this influence.

The deceptively simple process of recording sounds from a chosen environment and replaying them at another time and place is laden with assumptions about context and portability. Whether considered documentation, preservation or musical material, this practice, usually referred to as "field recording," provokes important questions about establishing relationship to place through listening. The theory and practice from the 1970s to today of sound artists and acoustic ecologists, such as Schafer, Westerkamp, Lockwood, Oliveros, Dunn and LaBelle, echoed in visual art (e.g. Robert Smithson's concept of "Site/Nonsite") provide a rich variety of approaches to this topic. Although field recordings make sounds available to a distant public, any de-contextualization of a

soundscape from its environment forces us to listen as outsiders, inevitably biasing our understanding. This can lead to a pseudo-understanding of a distant location, which, at its worst, I call "sonic colonialism." When listening to field recordings, we need to consider our relationship to the recorded sounds: the context in which they originate, the place in which we hear them and how our experience is mediated by technology. This also applies to environments that we cannot physically access, such as underwater, inside the body or other extremes of physical and temporal scales.

If sound is a form of energy, generated and embedded in place and describing acoustic relationships occurring within a specific location, then a recording is like a sonic ghost of place. How can a sense of presentness—an acute awareness of embodied location—be achieved in such displaced soundscapes? In my work, I consider the listener as the spatio-temporal locus of a perceptual event, emphasizing how techniques of listening can potentially

Fig. 1. Yolande Harris, *Tropical Storm*, sound and video installation, 2009/2012. Installation view, Museum of Contemporary Art, Leipzig, 2012. (Photo © Yolande Harris)



invigorate the use of field recording in sound art. The following three works approach displaced sound through different means: a visual arts exhibition, an Internet sound exhibition and a sound walk workshop, demonstrating various strategies for exploring these ideas.

Tropical Storm (2009) (Fig. 1) poses these questions of displaced sound through the tradition of an immersive playback space [1]. Sound and video recordings of a tropical storm evoke the multisensory experience of being immersed in a torrential rainforest downpour. The installation presents the intensity of noise and energy through minimal editing, allowing the exact synchronization of sound and image to work up an affective space of palpable intensity that can be both overwhelming and meditative. Rather than presenting this in a completely darkened space, I carefully consider the actual exhibition space when installing the work, encouraging visitors to be fully aware of their surroundings and thus question the displaced nature of the field recording.

You Me Swim Blackbird (2012) addresses the listener's awareness of bodies in place and the everyday technology used to retrieve and present personal sounds [2]. Exploring bodily rhythms through sound, the work presents interlocking pulses of a mother and her unborn baby's heartbeats, sounds of breathing while swimming and a blackbird's springtime call: the sound of a body inside a body, a body crossing from water to air and a body calling through air. The sounds were recorded using consumer technology: a handheld prenatal ultrasound device, a small waterproof camera and a laptop computer's built-in microphone. Each captures a different sonic quality that makes the intensity of the sounds more palpable, more internal or more open. Furthermore, this short stereo work was composed for the unpredictable, distributed listening environments of the exhibition website.

In *Displaced Sound Walks* (2010/2012), workshop participants use binaural microphones and handheld recorders to record sounds on a short walk of their choosing [3]. On their return, they listen to these recordings inside the workshop space. Next, each participant listens to the recording on headphones while retracing the exact walk, overlaying the same space with sound displaced in time. The final stage is to experience other participants'

recordings and routes. The shift in temporal relationship between the location seen and the sounds heard provokes a perceptual awareness of our reliance on sound, its influence on the visual and on our sense of place. Participants in the workshop walks learn to use simple sound recording technology in a precise way to create a heightened awareness of sensory perception and to enhance their sense of presentness in the immediate environment.

References and Notes

1. Exhibited at "Cage 100: Opening Spaces for Action," Museum of Contemporary Art, Leipzig, 2012.
2. Commissioned for exhibition *Soundworks*, Institute of Contemporary Art, London, 2012; <www.ica.org.uk/projects/soundworks>.
3. Most recently exhibited at Cage 100 [1].

Manuscript received 2 January 2013.

Yolande Harris is a composer and artist engaged with sound and image in environment and architectural space. Her most recent artistic research projects, Sun Run Sun: On Sonic Navigations (2008–2009) and Score-scapes (2009–2011), explore sound, its image and its role in relating humans and their technologies to the environment.

MOBILE SOUND AND LOCATIVE PRACTICE

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See <jessicathompson.ca/projects> for supplemental files associated with this article.

ABSTRACT

The author discusses her work in relation to site-specific practice, embodied interaction and the practice of walking.

My practice investigates spatial and social conditions within urban environments through interactive artworks situated at the intersection of sound, performance and mobile technologies. Drawing from everyday experience and influences such as body art, locative media, phenomenology and human-computer interaction, my artworks use sound to create reciprocal dialogues between body, artwork and site through exploratory gesture, embodied interaction, improvised choreography and play.

My approach to both sound and media is greatly informed by my experience of walking in urban environments, which I consider a form of personal and spatial encoding. I began working with sound and technology simultaneously out of a desire to articulate the immediacy of walking while carving out a sense of place within the acoustic ecology of the city. Over the past decade, I have navigated these spaces through a gradual progression from headphone-based artworks to interactive pieces that merge the affordances of objects with the expressive potential of the body [1].

I am interested in the ways that sound can shift the parameters of spatial practice from the body's position within physical space to the liminal space articulated by the moving body. Writers such as Miwon Kwon and James Meyer conceive of "site" as a set of parameters that complicate notions of place by including social, institutional or cultural conditions that operate beyond a work's physical location. For example, in *One Place after Another: Site-Specific Art and Locational Identity*, Miwon Kwon argues that "place" now operates "more like an itinerary than a map . . . it can be literal, like a street corner, or virtual, like a theoretical concept" [2]. In *The Functional Site; or, The Transformation of Site-Specificity*, James Meyer defines this space as a "functional site" that sits opposite the geographically specific "literal site." According to Meyer, "The functional site may or may not incorporate a physical place. . . . Instead, it is a process, an operation occurring between sites, a mapping of institutional and textual filiations and the bodies that move between them. . . . It is a temporary thing, a movement, a chain of meanings and imbricated histories: a place marked and swiftly abandoned" [3].

Because functional sites do not "privilege" place, the moving body takes on new significance and authority. While geography is implied by the body's position at any given moment, that position is always changing—the body is the only constant. In my artworks such as *walking machine* (2003) and *Freestyle SoundKit* (2006), movement through space places users between territories, positioning the body of the user as the primary site of reception. Unlike locative artworks that engage by facilitating the peripatetic exploration of specific locations, these pieces may be performed almost anywhere.

Other works investigate the ways that sound can integrate the affor-



Fig. 1. Jessica Thompson, *Triangulation device, Arduino boards, MIDI Shields, GPS modules, headphones*, 2013. (© Jessica Thompson. Photo © Jasper Fung, School of Creative Media, City University of Hong Kong.)

dances of objects with the expressive potential of the body. I am particularly interested in the ways in which sound broadcast through embodied interaction extends the edges of the body not only into public space but also into the space of others and how performative situations can emerge through the creative misuse of ordinary objects. In my works *Soundbike* (2005) and *Swinging Suitcase* (2010), anthropomorphized sound and gesture-based interaction combine to reflect and then confound the relationship between user and artwork, giving voice to the body and creating social situations through broadcast.

Currently, I am investigating the ways in which sound reveals spatial and social conditions within cities and how these conditions can be articulated through networked performance. I am particularly interested in the ways that mobile technologies both situate and displace the body, complicating our relationship to place, territory and community in both physical and virtual spaces. I have returned to walking as part of this research, creating compositions generated between geographically separate spaces. I believe that when the convergence of site, body, object and action is articulated through sound, everyday experience is transformed into a form of practice that moves beyond the confines of discipline. The discourse that emerges through performing from the edge of the body offers tremendous opportunities to ignite the spaces between art and life, through artworks that slip between them (Fig. 1).

References and Notes

1. For more information on the projects mentioned here, please visit <www.jessicathompson.ca>.
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3. J. Meyer, "The Functional Site; or, The Transformation of Site-Specificity," in Erika Suderberg, ed., *Space, Site, Intervention: Situating Installation Art* (Minneapolis, MN: Univ. of Minnesota Press, 2000) p. 25.

Manuscript received 2 January 2013.

Jessica Thompson is a media artist working in sound, performance and mobile technologies. She holds an M.F.A. in Media Study from SUNY at Buffalo. Her work has shown in festivals such as ISEA 2006 (San Jose), the Conflux Festival (New York), Thinking Metropolis (Copenhagen), (in) visible cities (Winnipeg), Beyond/In Western New York (Buffalo), the Deep Wireless Festival (Toronto), NIME 2011 (Oslo) and the School of Creative Media, City University of Hong Kong. She lives in Toronto and is an assistant professor of hybrid media at the University of Waterloo.

RADIOSCOPE: INTO ELECTROMAGNETIC SPACE

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ABSTRACT

The author describes his use of radio waves in public spaces to create interactive sonic compositions in his project, *Radioscope*.

A call for artworks from an area in the Japanese countryside brought me to

the following question: Since we perceive sounds as coming from individual sources that merge and interact with the acoustic space around us, would it be possible to achieve a similar experience by using radio waves in the electromagnetic space? Sound is spatial not only because it traverses and reflects in the three-dimensional space around us; it is also spatial because we perceive it as a temporal phenomenon that takes place in that space.

Radio is often used to transmit individual signals from one point to one or more other points. To establish these communication channels, we use modulation principals such as AM, FM and GSM. Individual transmitters broadcast via their own frequencies, and with a receiver we tune into a specific frequency while filtering away the others.

I wondered what would happen if, instead of using modulation, we directly addressed a certain frequency range within the electromagnetic spectrum by shifting the sound up in frequency. I also wanted to know what would happen if multiple transmitters were to transmit in that same range. I was expecting that the transmitted signals would "mix" in the electromagnetic space much like acoustic sounds mix in the acoustic space. This would be a spatial approach to radio based on a field of transmitters with receiver(s) moving through it.

The loudness of acoustic sound sources decays as distance from them increases because their radiated energy gets spread over a bigger surface in space. Electromagnetic waves behave similarly, but using regular, carrier-based transmission techniques compensates for or avoids this effect. My resulting work, *Radioscope* (Fig. 1), however, does not use a carrier wave. Any received signal within the chosen frequency range becomes audible. The individual strengths of the received signals directly correspond to their loudness. The closer the receiver gets to a transmitter, the louder its signal becomes, and vice versa.

While sound travels at a speed of about 340 m per second, radio waves travel at the speed of light: 300,000 km per second. We perceive an acoustic sound reflecting in space both as a timbral and a temporal phenomenon. Radio waves also reflect in space, but since they are that much faster than sound, we would need enormously large spaces to be able to perceive their reflections as independent from the sources.

The wavelength of a wave depends on its frequency and traveling speed. *Radioscape* uses a relatively long wavelength (175 m = 1.7 MHz) to avoid standing wave patterns coming from, for example, reflections between buildings in a street. At this wavelength, buildings are not only reflectors: They start to become conductors and resonators for the transmitted signals. As a result, the physical environment gets excited by, and responds to, the transmitted radio waves.

In developing this work I learned about different antenna principles. A vertical antenna has an omni-directional sensitivity pattern and relates to the “electric” component of the electromagnetic field. A coil or loop antenna is only sensitive from the sides and relates to the electromagnetic field’s

magnetic component. These two directivity patterns, I realized, correspond to the patterns of two microphones: the omnidirectional and the figure-eight. The mid-side (m-s) stereo recording technique uses exactly these two microphones, and I started to wonder whether it would be possible to realize a stereo receiver with this antenna setup. It would not be a receiver that receives a signal broadcasted in stereo, but a receiver that creates a stereo image resulting from the positions of the individual transmitters. A transmitter on the left of the antenna would be heard on the left, and a transmitter on the right would be heard on the right. Rotating and moving the receiver would change the stereo image directly.

In *Radioscape*, each transmitter transmits its own layer of the meta-composi-

tion. They change slowly and eventually repeat after 4–10 min. The changes within a layer are the slowest. The next level of change is the interaction that occurs when one does not walk but merely moves the receiver. By doing so, one reorients oneself in the field of received signals and finds new perspectives in the environment. The third and last level of change is the result of walking, getting closer to certain transmitters while moving away from others. Certain signals will become audible or louder while other signals decrease or disappear. Listening alters one’s focus and way of interacting. Navigating the city generates a unique sonic order, combinations and timing within the composition.

The *Radioscape* receiver is handheld. Moving the receiver enables one to explore the surrounding space. The scale and the speed of change match the space that the participant’s hand and arm movements describe. The space thus becomes almost tangible, allowing the participant to explore and remember positions and transitions. It is intuitive to navigate and reveals itself easily, while complex enough to require ongoing exploration.

Radioscape takes place in public space. My preferred locations are areas within a city that are diverse and easy to walk in and have streets close to each other so that the participants must frequently choose their directions.

The resonating buildings are an interesting example of a situation in which the real world interacts with an added environment. The transmitted signals do not merely form a parallel reality: The physical space and the electromagnetic space directly influence one another.

When I began to develop *Radioscape*, I was not yet aware of Max Neuhaus’s *Drive in Music*. His statement regarding placing sound in space instead of in time is an important one and applies well to *Radioscape*. It is interesting to see how *Radioscape* builds further upon this early work.

Manuscript received 2 January 2013.

Edwin van der Heide is an artist and researcher in the field of sound, space and interaction. He extends the terms composition and musical language into spatial, interactive and interdisciplinary directions. His work comprises installations, performances and environments. The audience is often positioned in the middle of the work and challenged to actively explore, interact and relate themselves to the artwork.

Fig. 1. *Radioscape* in the city center, Amsterdam, 2004. (Photo © Studio of Edwin van der Heide)



Fig. 1. *The Letters*, locative narrative, Dartington Hall, Devon, U.K. (© E. Whittaker and J. Brocklehurst. Photo © Emma Whittaker.) The onscreen map simultaneously plots the participant's position in the virtual and the real-world location.



LISTENING TO LOCATIVE NARRATIVES: ILLUSION AND THE IMAGINATIVE EXPERIENCE

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See <www.culturededebate.org> for supplemental materials associated with this article.

ABSTRACT

The author discusses her research project *Transition-Felt*, an investigation of the development of locative narratives that informs the app *The Letters*.

In the last 10 years, mobile devices have moved interactive media from the desktop to real-world environments. Affordances of GPS and, more recently, indoor positioning techniques are utilized in new forms of play and theatrical experiences. Pervasive games, participatory theater and locative narratives are transforming streets and waysides into spaces of potential. The research project *Transition-Felt* investigates the development of locative narratives and considers imaginative simulation and the listening experience, drawing upon recent findings in cognitive psychology and neuroscience.

Delivered via smartphone apps, these locative narratives can be thought of as audio dramas, heard in real-world locations. An interesting aspect of the form is the integration of the real-world environment within the listening

experience. Affordances of consumer headphones enable sounds in the environment to bleed into the recorded audio that in turn augments the participant's vision, resulting in cross-modal interactions, unplanned synchronicities and ruptures of the visual and the aural. Auditory streaming experiments demonstrate that perception is not necessarily a stable state, as switching between interpretations can occur when listening to sequences of pure tones. This phenomenon, known as perceptual bi-stability, is analogous to visual illusions such as the Necker cube or Rubin vase. Attentional focus can bias what is perceived, but the listener's inability to control the switching may indicate that instability is a feature of auditory perception [1–3]. The potential to harness perceptual uncertainty by incorporating interactive, semantic and multimodal perceptual illusions suggests that real-world environments can become further enfolded with imaginary spaces.

The Letters is a locative narrative app [4] devised in response to an intriguing archive of travel correspondence exchanged between two lovers in 1925. Mapped over 20 acres of gardens, the story-world has seven virtual locations depicted in binaural soundscapes, including streets in Rome and a snowy walk in Yosemite. GPS is used to trigger sound files, and participants can wander freely or follow narrative threads to build the story (Fig. 1).

The temporal and spatial plotting occurs on a number of levels: the actual time taken to traverse the location,

the story time and time as represented within the virtual location. Each soundscape has a narrative arc that suggests moving through the space and arriving at destinations. The virtual locations are plotted to maximize the visual and auditory connections with the real world; for example, the sounds of the sea are mapped over existing water [5]. Attenuation and silence within soundscapes make apparent the ambient sound occurring in the real-world environment.

Audio strategies for extending the story world into the real world can be seen to occupy a range from simulation to symbolism. In the development of virtual environments, spatial sound is used to mimic the localization cues experienced in real-world environments [6]. In contrast, established techniques in radio drama often simplify the auditory scene by using key sounds sequentially to avoid confusion [7], as the listener's environment, mode and quality of listening is unknown. Sounds are selected to appear *like* the sound sources they represent, using familiar codes, conventions and dialogue that may anchor meaning.

Narrative conventions also invite participants to imagine physical spaces, with the listener's real-world experiences providing the basis for conjuring the imaginary [8]. This mental simulation is not unique to narrative engagement but is continuous with fundamental neurological processes of perception and cognition, where “re-enactment” of our prior sensory interactions with the world enables us

to make predictions about situations, actions, people and internal states [9].

The stance taken by participants of a locative narrative experience ensures that, however naturalistic the soundscape may be, it is arguably perceived as a mediated artifact. As Barry Truax suggests, interpretation of soundscapes can also ask the listener not merely to identify the depicted sounds but to contemplate their signification [10].

It is put forward here that the adoption of a *stance* primed for narrative engagement combined with perceptual ambiguity enables the listener to become a participant within a liminal space. Initiated by audio “props” [11], this guided imaginative experience holds the nascent potential for immersion and a sense of presence, which may be re-figured as Bergson’s intuitive apprehension of phenomena [12]. The recollection of presence can be understood as *Transition-Felt*.

References and Notes

1. S. Denham et al., “Making Sense of Sounds,” *ASA Lay Language Papers* 163, Acoustical Society of America Meeting (2012); <www.acoustics.org/press/163rd/Denham_1pPP1.html>.
2. S. Denham et al., “Characterising Switching Behaviour in Perceptual Multi-Stability,” *Journal of Neuroscience Methods* **210**, No. 1, 79–92 (2012); <[dx.doi.org/10.1016/j.jneumeth.2012.04.004](https://doi.org/10.1016/j.jneumeth.2012.04.004)>.
3. Possible links with neuronal bi-stability and perception of visual and auditory cues were highlighted in discussion with Jane Grant and John Matthias in October 2012.
4. E. Whittaker and J. Brocklehurst, *The Letters*, iOS App, 2013. Materials related to this article are available at <www.culturedebate.org>.
5. Recorded sound appearing to issue from real-world sources is noted in J. Reid et al., “Magic Moments in Situated Mediascapes,” *ACE 2005, ACM SIGCHI*, 15–17 June, Valencia, Spain, 2005.
6. D.R. Begault, *3-D Sound for Virtual Reality* (London: Academic Press, 1994).
7. E. Evans, *Radio, A Guide to Broadcasting Techniques* (Essex, U.K.: Anchor Press, 1977).
8. R. Gerrig, *Experiencing Narrative Worlds: On the Psychological Activities of Reading* (New Haven, CT: Yale Univ. Press, 1993).
9. L.W. Barsalou, “Simulation, Situated Conceptualization, and Prediction,” *Philosophical Transactions of the Royal Society* **364** (2009) pp. 1281–1289.
10. B. Truax, “Sound, Listening and Place: The Aesthetic Dilemma,” *Organised Sound* **17**, No. 3 (2012); <www.sfu.ca/~truax/OS8.html>.
11. K. Walton, *Mimesis as Make-Believe: On the Foundations of Representational Arts* (Cambridge, MA: Harvard Univ. Press, 1990).
12. H. Bergson, *Time & Free Will*, N.M. Paul and W.S. Palmer, trans. (New York: Cosimo, 1950 [1910]).

Manuscript received 2 January 2013.

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SOUND RESOURCES: ENVIRONMENTAL INSTALLATION

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A short video describing the work can be found at <www.vimeo.com/56391839>.

ABSTRACT

The author describes a recent sound installation that addresses an environmental issue as well as an issue with our sonic ecology.

While a Ph.D. candidate in Sydney, I was given the opportunity to create an installation in a small gallery space at the design faculty of the University of Technology in that city. Initially I wanted to create an experience that would reflect on my primary research interest, the use of electronic amplifica-

tion at music concerts, underlining the important role loudspeakers play in contextualizing sound, whether musical or not. In that same period of time, I made a number of trips to the relatively remote Wolgan Valley, northwest of the famous Blue Mountains of New South Wales. The abandoned village of Newnes offers, in addition to many outdoor activities, the remains of early 20th-century coal and shale mining. Shale was mined for the extraction of petroleum in a complex procedure that was overtaken economically by the global oil industry. The industrial complex at Newnes was dismantled and abandoned in the mid-1930s. Now the site shows only the ruinous foundations with an occasional structure still erect. Images from its heyday show the area devoid of bush and trees; nowadays majestic gum trees again have taken over, suggesting human-made industries can be reclaimed by nature in a few generations.

Fig. 1. Jos Mulder, view of the installation *Sound Resources* slowly disappearing in dirt and noise, 2011. (© Jos Mulder)



to make predictions about situations, actions, people and internal states [9].

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References and Notes

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tion at music concerts, underlining the important role loudspeakers play in contextualizing sound, whether musical or not. In that same period of time, I made a number of trips to the relatively remote Wolgan Valley, northwest of the famous Blue Mountains of New South Wales. The abandoned village of Newnes offers, in addition to many outdoor activities, the remains of early 20th-century coal and shale mining. Shale was mined for the extraction of petroleum in a complex procedure that was overtaken economically by the global oil industry. The industrial complex at Newnes was dismantled and abandoned in the mid-1930s. Now the site shows only the ruinous foundations with an occasional structure still erect. Images from its heyday show the area devoid of bush and trees; nowadays majestic gum trees again have taken over, suggesting human-made industries can be reclaimed by nature in a few generations.

Fig. 1. Jos Mulder, view of the installation *Sound Resources* slowly disappearing in dirt and noise, 2011. (© Jos Mulder)



Mining has always been an important Australian industry; currently the continent's economy is maintained by the export of minerals, in large part brown and black coal. The acceleration of exploitation and export to maximize profits from the "boom" fueled by the growing Southeast Asian economies leads to much debate and, to some extent, a divide in Australian society.

The wealth of the resources boom can easily be recognized in a city like Sydney, even though the actual mining, processing and transportation takes place elsewhere, out of sight. For instance, the electricity grid is fed by large, coal-fueled power plants a long way away, close to the actual mines and out of sight, smell and earshot.

My installation piece *Sound Resources* (Fig. 1) was inspired by my environmental concerns and triggered by the abandoned works in the Wolgan Valley and the absence of noise and dirt there, as well as the actual pollution of mining and coalmining in our daily lives. Mining for the production of electricity was particularly in mind—electricity that in addition to many common usages can be used to power multimedia installations in museums and galleries.

In sketches for the installation I proposed a loudspeaker playing alarming sounds while over time chunks of coal would fall onto it, changing its response and over time destroying the speaker. In a later phase of the process, I got rid of the loudspeaker, allowing the falling coal to become the sound source and eliminating the need for sound reproduction technology, producing a motion-sensor-cued system powered by a small solar panel that dropped chunks of coal from a reservoir. The coal fell onto a rail, rolling noisily onto the gallery floor, which was filled with other noisy items: glasses, jars, tins, cans and so on. To allow for a more direct interaction, I placed a bucket with coal on a pedestal, allowing visitors to throw or roll nuggets along a second rail. They had the option to use their hands (i.e. "get their hands dirty") or use supplied BBQ tongs. Over a 3-week period, the gallery space filled up with coal droppings while at intervals creating noisy interruptions to the peaceful university life outside of the gallery. The installation became a pun on two separate levels, firstly in its title, "Sound Resources," referring to coal as both an energy resource and a semiotic resource; and secondly regarding the environment, reflecting on environmental concerns

from political, ecological and also in this case sonic perspectives.

The sounds of mining are absent in most people's lives. Rather than playing them back from the auditory perspective of a recording, I aimed to recreate such sounds in a different environment: as actual sources. Our hearing is very powerful when it comes to environmental cues. Sound carries much more meaning than what we perceive intellectually; that said, the use of loudspeakers diminishes its ecological, "everyday listening" aspects, transferring sound and framing it into an intellectual "real."

Loudspeakers can produce any sound imaginable, and digital technology allows us to create those sounds. Loudspeakers bring these sounds into the sonic environment and into the context of the situation in which a work is on display. In a similar way to a canvas or a TV screen, loudspeakers create a sonic frame that essentially underlines the importance of content over context, while abandoning the potential meaning and complexity of sound's ecological aspects.

Acknowledgment

This installation was realized with the support of UTS DAB-LAB gallery manager Aanya Roennfeldt and Bert Bongers's Interactivation Studio. I would like to extend them my thanks.

Manuscript received 2 January 2013.

Jos Mulder is an academic, a live-sound engineer and, since this project, an artist.

MUSICAL PHONOGRAPHY: UPENDING LISTENING EXPECTATIONS

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See <www.colinwambsgans.com/listen> for supplemental files associated with this article.

ABSTRACT

The author explores capturing and hearing music within a broader sound environment and the cultural and contextual information that this method can convey.

Doing ambient recording I have noticed that taking Max Neuhaus's (or R. Murray Shafer's or Doug Aitken's) instruction to "LISTEN" to our sonic environments forces an encounter with music, as much as with natural or industrial sound. Whether it is played

in a cafe or off a cell phone, music is an increasingly common presence in our public spaces. These sounds rarely have a function beyond pleasant (or annoying) distraction. They are not intended for close listening, despite being organized into structures that listeners are accustomed to following. Yet, whether our intent is to listen or tune out, the music's form prompts our unconscious response.

I frequently find musical sounds arising unexpectedly in my ambient recordings. Rather than consider them distractions from "real"—that is, intended—soundscapes, I want to embrace these found musical sounds as sonic events on the same level as any other sound in a field recording. I have found that capturing music within a broader sound environment forces two comparisons: It gives the ear a framework to hear other sounds in the environment, and it suggests the cultural associations inherent to the music. Although these comparisons are directly due to music in the recordings, the recordings themselves cannot really be called musical; the music in them is too buried. Yet the ear and the memory are still drawn in and guided by its presence [1].

My piece *Batilde, 01* shows this simultaneous, dual effect [2]. When I set up a recorder on Bastille Day in a neighborhood outside of Paris, I was expecting to record an interesting French street and, I hoped, some firecrackers or jets. Inadvertently, I also recorded the distant but easily identifiable sound of someone practicing piano, mostly Bach's "Two-Part Invention, No. 4." Although often interrupted or obscured by other sounds, the music kept implying a coherence to the rest of the soundscape, even when absent. There was a gap between each repetition of the piece; during each, I found myself anticipating the music's return, heightening my listening. Even after the unseen piano player ceased practicing, it seemed like the music would come back.

This recording would have been an interesting object on its own, but I wanted to play with that sense of anticipation. I did this by making my own regular sound event. Every 30 seconds, I compressed the next 30 seconds into the space of 2 seconds, creating a sequence of 32-second phrases of normal playback followed by brief compressed playback. These two very regular, time-based elements—the Bach



Fig. 1. Beauregard House at the Chalmette Battlefield, Louisiana, 2011: In the field recording made here, music came from the steamboat just beyond the levee. (Photo © Colin Wambsgans)

rehearsal and the cycle of compressed playback—then feel instead like irregular time. Our expectations of how sound is organized are especially confounded by this “squeezing” of organized sounds. Hearing music focuses our expectations for the timing of events in the rest of the recording, even when the Bach is no longer audible. Instead of highlighting my digital manipulations, my piece shows the power that the Bach has on our organization of sound. Other individual sounds in the recording—a firecracker or a church bell—seem like they must be happening with a hidden periodic regularity.

The fact that this music is a famous Bach piece also creates cultural associations. Bach’s influence on Western music and the popularity of the piece itself mean that the sounds identified as music will almost certainly pull up some kind of reference in the listener’s mind. This could be anything from “That sounds like classical music” to “I used to play that invention.” If a listener knows this “Two-Part Invention” well, he can fill in the interruptions from memory, except that other prominent, nonmusical sounds continue to grab attention. Because the “Invention” is audible in this public sonic space, it also suggests

a narrative with more questions than answers. Who is this amateur? What has motivated her to practice now? Why is her rehearsal so brief? Since the recording is clearly of an incidental, nonpresentational performance, it does not exist as something strictly “musical” but more as something personal, cultural, associative and imaginative. By forcing the listener to focus on partially obscured music, the piece stresses these various associations of history and questions of performance. The listener wants to actually listen rather than merely hear, but time and again is forced into other considerations, as the music is mediated not only by time compression but also by the environment in which it is set. Other prominent, clearer elements of the soundscape complicate listening to the Bach as much as the Bach complicates listening to the nonmusical elements of the piece.

This tension between obscured musical sound and its associations is something I try to utilize in many of my works. For example, a field recording from the Chalmette Battlefield in Louisiana (Fig. 1) features a distant blues standard filtered through additional environmental sounds with particular

frequencies, like the engine of an oil tanker. My recent soundwalk piece *A River through an Island on the Land* involves participants creating a map of the Los Angeles River from musical sounds played simultaneously. In my pieces written for more traditional instruments, I will often base the written music on a nonmusical source, such as a speech, and place performers in nontraditional performance sites, so that the audience stumbles unintentionally on its own moment of found sound.

References and Notes

1. I have been influenced by Bob Snyder, *Music and Memory: An Introduction* (Cambridge, MA: MIT Press, 2000) and by Seth Kim-Cohen, *In the Blink of an Ear: Toward a Non-Cochlear Sound Art* (New York, NY: Continuum, 2009).

2. This piece, and documentation of others listed later, are accessible at <www.colinwambsgans.com/listen>.

Manuscript received 2 January 2013.

New Orleans native Colin Wambsgans is a composer and sound artist living in Los Angeles, after studying at the California Institute of the Arts with Michael Pisaro and Sarah Roberts. He is interested in exploring the ways humans influence their sound environments, deliberately or not.

SOUND INSTALLATION 24/7: AESTHETICIZING EVERYDAY SOUND AND RHYTHM

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See <www.mitpressjournals.org/toc/bmj/-/23> and <www.audible-sculptures.ca> for supplemental files associated with this article.

ABSTRACT

Featuring a set of microphones inside a dummy head situated within a gallery space, the author's installation 24/7 first records and later replays sounds sourced from within the space, representing past moments in time.

The sound installation 24/7 was created during a 3-week residency at the PS² gallery in Belfast, Northern Ireland, in October 2009 and was later re-exhibited at the ESC im LABOR in Graz, Austria, in April 2011. Sound was continuously recorded in the gallery by a dummy head—a fake human head with microphones embedded in its ears. The recorded sound was then replayed on various pairs of headphones in the same space, with different time delays applied to each pair of headphones. On each of the headphones, the audience could listen to a different moment in the gallery's acoustic past. In the Graz version of the installation, at any point in time visitors could listen to the gallery as it had previously sounded 3 seconds earlier, 2 minutes earlier, 12 hours earlier, or 1 week earlier. The delay times for each pair of headphones were marked by a timeline on the gallery wall (Fig. 1) and also reflected in the exhibition's spatial layout. I set up the space so that the distance from the dummy head to a given set of headphones (as well as the comfort of the available seating) was proportional to the delay time experienced.

Fig. 1. Florian Hollerweger, 24/7, sound installation, PS² gallery, Belfast, Northern Ireland, 2009. (© Florian Hollerweger)



Aestheticization of Everyday Sound

The development of sound art is closely associated with a “musicalization” [1] of everyday sound in the 20th century. This process is also at work in the installation 24/7, which merely replays the sounds of the environment. The installation provides the listener with not so much a pre-defined musical form as an instrument to perform on. Once listeners overcome any expectation of instant gratification by music they might have come to associate with headphone listening, the absence of any pre-produced sounds challenges them to simultaneously adopt a perceiving and a performing attitude.

Everyday Rhythm

The sound artist arguably functions as a “rhythmanalyst” in Henri Lefebvre's sense, equipped with an “attentive ear” and “capable of listening to a tea house, a street, a town as one listens to a symphony, an opera” [2]. Like many other works of sound art, 24/7 echoes the polyrhythms of everyday life as they manifest themselves in the sound environment.

The layout of 24/7 invites visitors to first pick up the pair of headphones featuring the shortest delay of 2 seconds. At this time scale, any audible action on behalf of the visitor is experienced as an immediate echo. Visitors frequently try to challenge each other's perceptions by performing sounds in the immediate proximity of the microphones while one person wears the headphones.

Delays of a few minutes yield a different reaction. Listeners who have already spent some time in the gallery will be confronted with an acoustic mirror, but this time one that cannot immediately be addressed through performative action.

At delay times of several hours, the

experience shifts from soundmaking toward listening. Visitors listen to sound from a point in time that probably occurred before their visit to the gallery, which even might have been closed at the time. Sounds from the street outside have greater significance, and any voices heard are likely those of strangers. Listeners now start to engage with the installation on a different level. One listener in Belfast recited some poetry to the dummy head for future audiences to enjoy.

Sound material resulting from a week earlier, although temporally more distant, would probably be more familiar to the listener, because the existent time of day would match that of the recording. Some visitors from the Belfast opening night returned to the gallery a week later to revisit their experience.

Acknowledgments

Thanks to Peter Mutschler and Reni Hofmüller for providing opportunities to exhibit 24/7. The installation has been pursued as part of a Ph.D. at the Sonic Arts Research Centre, Queen's University Belfast, Northern Ireland, funded by a SPUR (Special Programme for University Research) studentship and supervised by Pedro Rebelo and Michael Alcorn.

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2. Henri Lefebvre, *Rhythmanalysis* (London: Continuum, 2004).

Manuscript received 1 January 2013.

Florian Hollerweger studied sound engineering at the Institute of Electronic Music and Acoustics in Graz, Austria, and later pursued a Ph.D. at the Sonic Arts Research Centre in Belfast, Northern Ireland. He has been lecturing at the New Zealand School of Music in Wellington and currently works as an audio software developer.

Fragments of Extinction: Acoustic Biodiversity of Primary Rainforest Ecosystems

David Monacchi

BACKGROUND

In 1998, while conducting a field recording campaign on Italian natural soundscapes, I had the intuition that the biophony [1] of untouched forest ecosystems should exhibit a more structured behavior, maximizing efficiency within diversity. I realized that, if properly reproduced, soundscape recordings of these ecosystems could be powerful means for raising awareness of acoustic biodiversity and its heritage [2], now being destroyed by rapid deforestation and climate change. When in 2002, with the help of Greenpeace, I traveled to the equatorial Amazon to record in an undisturbed area of old-growth rainforest, my hypothesis was immediately confirmed by finding extremely balanced acoustic systems produced by hundreds of species of insects, amphibians, birds and mammals neatly vocalizing within stunningly regular circadian cycles. Since then, I have been pursuing research and integration between the scientific inquiry of these soundscapes' configurations and the ways in which their aesthetic features can be explored, interplayed with and rendered for the public.

Aware that intensive field work was essential (Fig. 1), I traveled to the world's largest remaining areas of primary rainforest [3] along the equator (where, given the equal length between days and nights, life cycles—and thus sonic behaviors—are evolutionarily tuned to extremely regular patterns) and recorded 24-hour sound portraits of various habitats within what are considered to be the oldest and most diverse ecosystems on Earth. If we consider that the most recent International Union for Conservation of Nature (IUCN) [4] projections indicate that half of the original species (the great majority of them not even known to science) will be extinct by the end of this century, we also understand the urgency of recording sound examples of these diverse and unique, yet fragile, ecosystems: the remnants of nature's original "organized soundscapes."

FIELD RESEARCH

During my trips I have given great attention to the recording process. As compared to other scientific approaches, which mostly focus on a single species' sonic languages and behavior, the recording strategies I adopted called for a broader ecological perspective, involving the collection of as many components as possible of a complex soundscape. Within this approach, the spatial information of a given acoustic environment becomes a key element in understanding the complex-

ity of its organization and making it available to audiences. In high canopy forests, sounds come from every direction, including above (e.g. birds and monkeys) and below (e.g. amphibians and insects) the listening position. The human brain detects this three-dimensional (3D) information in its entirety through several subparameters that agree with our composite natural perception of direction, depth and dimension of sound sources. In order to record all these spatial attributes in the field, I employed "space-inclusive" and "space-preservative" standards and experimental mic techniques [5], enabling myself to fully reproduce these ecosystems over periphonic loud-speaker arrays. The investigation of long temporal sections (over 24 hours of continuous recording) in such remote and dangerous habitats forced me to develop recording strategies suitable to extreme conditions (humidity up to 99%, sudden rainstorms, absence of electric current) and self-sufficient systems for hazardous situations, capable of adjusting the sonic perspective to on-ground, mid-floor and canopy species. Taking into account all these concerns while making the most out of cutting-edge technology was a process of years of research, which resulted in vivid sound portraits of this endangered biological heritage, now available for posterity.

ABSTRACT

This paper describes the conceptual origins and development of the author's ongoing environmental sound-art project *Fragments of Extinction*, which explores the eco-acoustic complexity of the remaining intact equatorial forests. Crossing boundaries between bioacoustics, acoustic ecology, electroacoustic technology and music composition, the project aims to reveal the ordered structures of nature's sonic habitats, define a possible model of compositional integration and make the outcome accessible to audiences to foster awareness of the current "sixth mass extinction."

Fig. 1. The author recording Bai-Hokou saline, Dzanga-Sangha, 2008. (Photo © David Monacchi)



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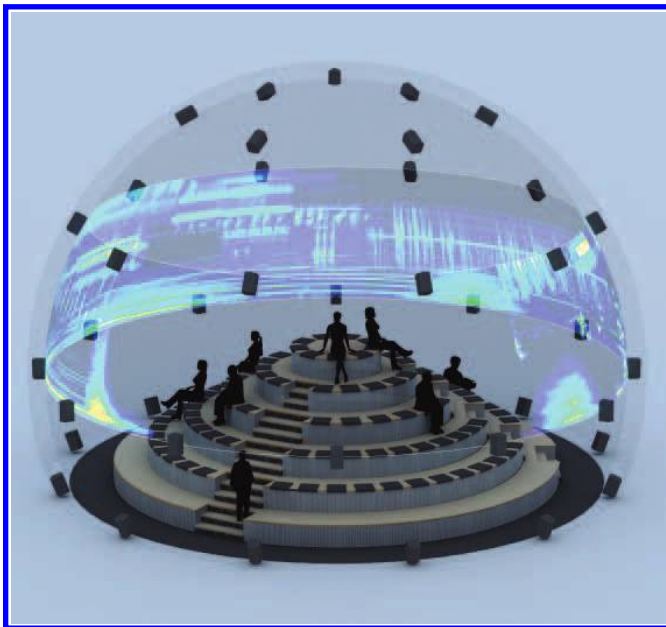


Fig. 2. The author's patented Bio-Acoustic Theatre, 12m diameter fixed version, 2013. © David Monacchi

INTEGRATING THE ORGANIZED SOUNDSCAPE

I used extensively detailed electroacoustic lab analyses with visual investigation tools to enter the framework of these soundscapes and to demonstrate their balanced organization, which is intuitively understood by a musician's ear. While intraspecific calls (individuals of the same species vocalizing from different territories) are traceable in recordings collected with space-preservative mic techniques, interspecific niche segregation dynamics only become evident through spectrogram analyses. Following a bio-acoustic "niche hypothesis" [1], my research primarily aims to reveal the aesthetic significance of typology/frequency/temporal sonic niches and their complex interactions within these untouched, therefore highly coordinated, natural systems.

Considering the possible artistic rendering of ecological processes, I was guided by two questions: Is it possible to learn from a primary ecosystem and to compose within the same laws that have shaped these ancient acoustic environments? Is it possible to deferently use compositional tools to reveal and enhance existing configurations of species? While exploring nature and trying to decode its sonic strategies, I developed a compositional approach to complement sound environments with performance, which I termed "eco-acoustic composition" [5]. One example—among others [6]—is the piece *Integrated Ecosystem* [7]. Here, a proportional and chronological time-lapse of a 9-hour continuous recording, followed by an exploration of the sonological properties of audible and

inaudible biophonies, is complemented by an electroacoustic performer's hand actions, with invisible sensors driving digital sound synthesis. The performer works strictly within available temporal and frequential acoustic niches left open by the other species' sonic "languages."

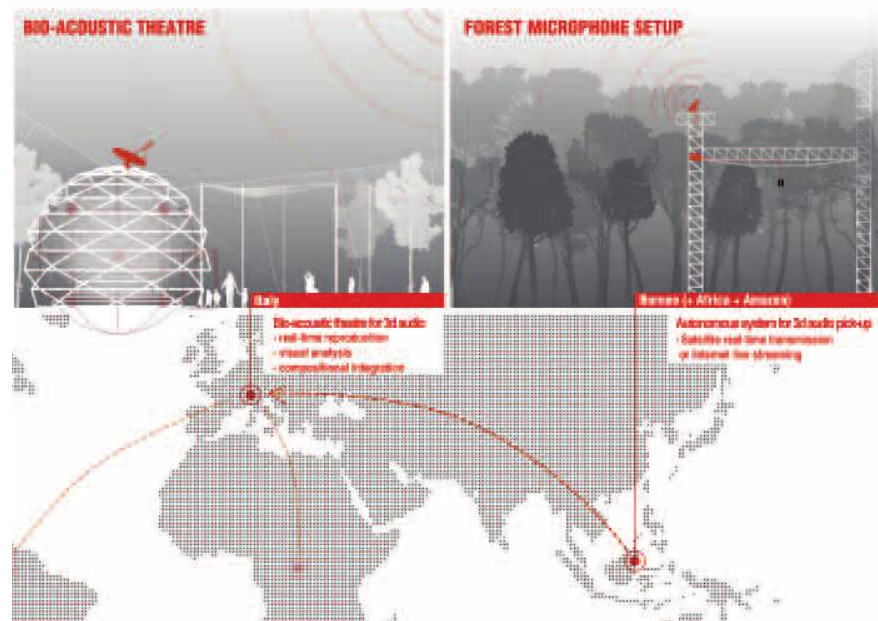
THE BIO-ACOUSTIC THEATRE

The aesthetic experience proposed by *Fragments of Extinction* [8] required a specific space to preserve the sonic characteristics (acoustic perspective and dimension of virtual sound sources) of these dense and diverse ecosystems. I en-

gineered the Bio-Acoustic Theatre (Fig. 2), an immersive facility [9] capable of reproducing periphonic 360° audio and visually rendering the real-time spectrogram of the soundscape as it unfolds. The theater, a scalable geodesic setup, consists of an array of 13 to 65 quasi-equally spaced loudspeakers, an array of projectors for circular display, and a seating system to optimize the placement of the audience toward the center of the venue for the best 3D sound illusion. Its shell is designed to maximize external noise reduction and internal sound energy absorption needed for sound intimacy and the periphonic sound reconstruction.

Inside the theater, the public is exposed to a sequence of three different sonic experiences in which the original soundscape undergoes increasing creative interventions: (1) *sound documentaries* (unaltered, continuous habitat recordings), (2) *transformations* (sonic time-lapses and electroacoustic explorations) and (3) *eco-acoustic compositions* (musical interactions with recorded/streamed ecosystems). A significant option, already implemented and suitable to all parts of the program, is live streaming from one of three chosen equatorial forests, realized through Internet or satellite transmission (Fig. 3). Although real-time feeds do not always express optimized soundscapes, the simultaneous immersion in an intimate habitat expressing its live dynamics arouses a different inclination to listening, and aims to make the audience aware that it

Fig. 3. Illustration of the real-time transmission to the Bio-Acoustic Theatre from three areas of primary rainforest where extensive field research was done (Amazon: Amazonas' Rio Juaoperi Xixuau, 2002; Congo Basin: Central African Republic's Dzanga-Sangha Dense Forest Reserve, 2008, 2010; Borneo: Brunei's Ulu Temburong Reserve, 2012, 2013). © David Monacchi



is witnessing an ancient, but disappearing, biome.

The theater program thus combines scientifically accurate soundscapes with musical integrations, proposing a progression of immersive, didactical and artistic experiences. The moving spectrogram analysis, projected on a giant screen and visible to the audience, is an analytical canvas on which the electro-acoustic performer observes the habitat's structure and its niches' configuration, and compatibly inserts ephemeral sensor-driven sound elements, building a powerful metaphor of the way music (our species' deepest sonic expression) can interplay within a composite live ecosystem, while trying to find a balanced relationship with it.

Acknowledgments

Special thanks to Marilena Fatigante, Diane Roehm and Joel Chadabe for proofing and suggestions, and to Giuseppe Marino for collaboration on illustrations.

References and Notes

1. Bernie Krause, *Into a Wild Sanctuary* (Berkeley, CA: Heyday, 1993).
2. R. Murray Schafer, *The Tuning of the World* (New York: Knopf, 1977).
3. For a thorough report, see David Monacchi, "Notes from Africa," Ear to the Earth Festival, New York (2009): <www.earthtotheearth.org/articles/090502_notesfromafrica.html>.
4. "IUCN Red List of Threatened Species": <www.iucnredlist.org/about/red-list-overview>.
5. David Monacchi, "Recording and Representation in Eco-Acoustic Composition," in J. Rudi, ed., *Soundscape in the Arts* (Oslo: NOTAM, 2011) pp. 227–250.
6. David Monacchi, *Eco-Acoustic Compositions*, CD and booklet, EMF Media (2008).
7. The piece was the subject of analysis by Katharine Norman, "Listening Together, Making Place," *Organised Sound* 17, No. 3, 257–260 (2012).
8. Since 2003, the project has been adapted to a wide spectrum of situations and venues around the world, including contemporary music and sound-art festivals, science and natural history museums, contemporary art and environmental communication contexts. At present, the project also is being implemented for the World Expo 2015—Milan, which will provide one platform for the biodiversity crisis discourse, hopefully contributing to immediate inter-governmental tropical forest conservation policies.

9. Rossini S.P.A.C.E. (Soundscape Projection Ambisonic Control Engine), engineered by David Monacchi and Eugenio Giordani, is the first periphonic sound facility built in Italy. It operates as control room/mixing studio for the project.

Manuscript received 2 January 2013.

David Monacchi is a researcher, performer and eco-acoustic composer. He has been developing his multidisciplinary project Fragments of Extinction for nearly 15 years, conducting field research in the world's last remaining areas of primary equatorial rainforest. The recipient of multiple awards throughout Europe and North America, Monacchi is pioneering a new compositional approach based on 3D soundscape recordings of ecosystems to foster discourse on the biodiversity crisis through music and sound-art installations. A Fulbright fellow at UC Berkeley, he has taught at the University of Macerata and is now professor of Electroacoustic Music at the Conservatorio of Pesaro. He has released 65 CDs as a recording engineer, performer and composer, including: Prima Amazonia (Wild Sanctuary) and Eco-Acoustic Compositions (EMF Media).

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Sounds in Your Pocket: Composing Live Soundscapes with an App

*Rob van Rijswijk and
Jeroen Strijbos*

Walking through a city an attentive listener will notice how the sounds are never quite the same. Traffic zooms by at various pitches that weave together in a texture overlaying everything else. As people mill about, snatches of conversation, the ebb and flow of voices, can be heard. Perhaps birds or dogs make themselves heard as well. There may be the distant roar of a plane flying overhead. Sometimes a bus lets out air in a hissing burst. Sirens wail down the street. Music blasts from a shop front, from passing cars. Around a corner the overall texture may shift considerably. The reverberb of the interwoven sounds changes, possibly becoming deeper or harsher.

The variability of urban sounds and the sonic richness of well-chosen spots have been the focus of sound walks conducted by people who (wholeheartedly or more loosely) subscribe to views that came out of the acoustic ecology movement. Each environment is an integrated system of sounds that can be appreciated on a musical level. Walking “by the ears” one becomes enmeshed into a larger sonic structure—a composition or an improvisation. The esthetic experience is defined by the mind imposing order on the sound events that strike the ears.

Now imagine walking through this selfsame city and streets and hearing the sounds around change their character with each step. A sonic aura grows around them, intensifies, then subsides. An undeniably musical drone or a layer of subtly shifting chords overlays the permanent basic texture. From one spot to the next the sounds assume new aspects: The noise of traffic on a nearby road is cloaked in distortion or somehow seems to echo in a reverberant dome of varying size that apparently expands, then contracts. Some of these sounds do not belong to the place, but do harmonize with its sonic manifestations. One’s perception and experience of the area, regardless of how mundane or exceptional it is, changes with the modification of its sounds. It makes the impression of an organized whole that goes through different permutations depending on the route taken through the area. Again, the sounds form a composition with elements of improvisation. We have taken the sonic experience one step further from the awareness of environmental sounds in a sound walk to a personalized cinematic experience.

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That personalized experience is what we aim for in our sound processing app *Walk With Me* [1], originally developed in 2011 and written for iPhones fitted with headphones. *Walk With Me* blurs the boundaries between installation and composition. On the one hand, it is site specific, and predetermined occurrences, such as the live processing of sounds picked up by the microphone of the smartphone, are written into the software. The choice of the various spots, however, has been made with composers’ ears; and as composers we have added layers of sounds that resonate with the sonic properties of various points in a specific environment. Each of the areas we have devised pieces for is in this sense a composition, a software-coded score that is realized by people who use the app on their iPhones as they walk there.

When we prepare a piece for *Walk With Me*, we usually select an area because we find the sounds it generates exhilarating. The next step is to map out the locations that sound most promising and inspiring to us. Each is fixed with a geo-tagged marker and is linked to a certain mode of signal processing that gets more intense as app users get closer to the spot in question. Weaving their way through these spots, users create varying sequences and patterns. We relinquish our control, leaving it to them to decide on their “final” version of the piece, which is in essence aleatoric. Consequently, each listener has the opportunity to experience the surroundings that are the source of the basic material in a novel way.

COMPOSITION AND INSTALLATION ROLLED INTO ONE

Walk With Me marks a further development in our collaborative output as composers and sound artists. There is a clear link to our work as theater composers, where we enhance the action onstage with music. On the other hand, when we started making autonomous works (i.e. not for theater or dance productions), we decided to present the music in the form of installations—they are the instruments we compose for. Making installations, we have to take space into consideration. Each space we work in has unique effects on the visual and acoustic elements of our designs and the way they work. We may have to adapt the sonic characteristics of a piece to the amount

ABSTRACT

The authors present their musical smartphone app that uses GPS data to trigger specific sound events relative to spots within an area predetermined by the artists. Moving through the area, users listen to these events via headphones, completing the soundscape composition. The article outlines the effects and the workings of the app, which combines elements of composition and installation, and which the artists have so far adapted to a number of different areas.

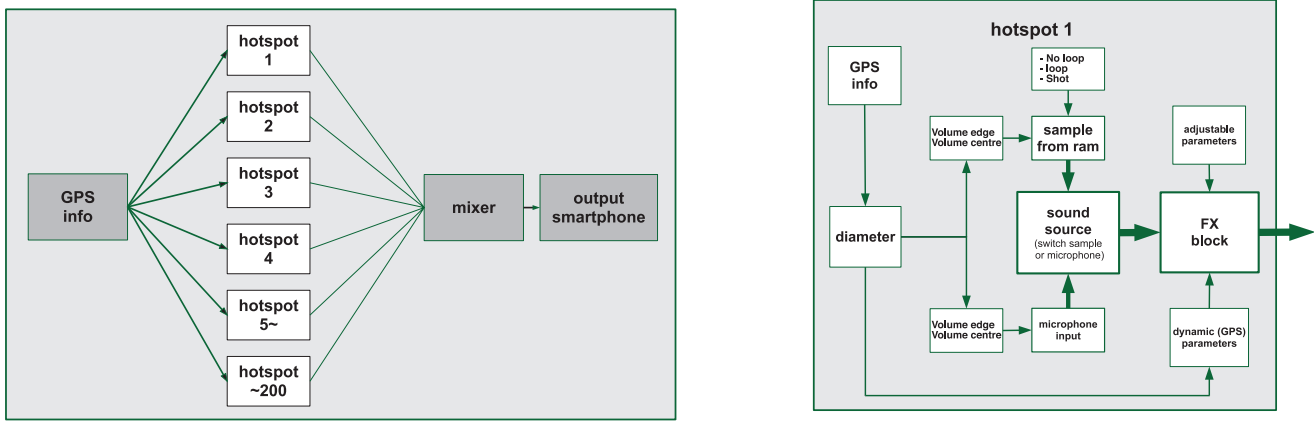


Fig. 1. Sample block diagrams showing the modifications to sound input from the user's environment. (© Rob van Rijswijk and Jeroen Strijbos)

of reverb and the favored pitches of a room in which an installation is placed. Moreover, we want the audience to move in relation to the installation to enhance their awareness of what is happening musically and visually and of the way their changing position alters the sound and, with that, enhance their perception of the work as a whole. Most of these works have been devised to make the audience move around a space from spot to spot where they can experience sonic events [2].

Walk With Me avoids the need for designing an object to be placed in an enclosed space. In essence the environment is an open-air installation. Each environment has its own changeable acoustic properties, which we can incorporate into our composition. What we especially like about this is that we can now effectively work with musique concrète elements and that we can do this live. For each spot we can write a command for the smartphone microphone to be switched on or not. When it is on, the sound input is routed through a complex of modifications (Fig. 1).

What a user will hear, on top of the ambient composition that we have created for the entire area, is both the environmental sound itself and a live-processed version of it. We may also add extraneous sounds, composed specifically for that spot—the hoot of an owl or faint swirls of piano playing. Sometimes we use sounds or effects to tweak people's impressions of a spot. We may bring an intimate sound into a wide-open space or make an enclosed space sound voluminous by adding reverb.

Each spot has its sphere of influence. This gets weaker as a user moves away from its center, reflected by a weakening in the modification of the concrete

sounds and of the volume. Because various spheres can overlap, so do their effects. The resulting layered sounds can be quite complex. The fact that all added music fragments are interrelated through the mode of the ambient composition means that they will not clash but are always in consonance with one another—however different their sound characteristics may be. The app is a matrix of possible routes for the listener. Space is an integral component: the po-

sition of the user within it is a vantage point. What he or she sees and hears there affects choices about how long to remain there and where to go next (Fig. 2).

NONLINEAR AND ADAPTIVE

We consciously opt for relatively “simple” melodies and harmonic structures. Esthetically we subscribe to what one might call a “new modality”: we feel a kinship

Fig. 2. Geo-tagged markers and sound locations indicated on a dummy map of the *Walk With Me* area, showing the overlapping spheres of influence of various musical effects. (© Rob van Rijswijk and Jeroen Strijbos)



with composers who distance themselves from serial music, atonality and the “new complexity.” This doesn’t mean that our compositions lack complexity or depth. We just look for these characteristics in other aspects of music: in timbre, in the interplay and the layering of various components, in interaction with live musicians and the environment in which we stage our pieces. In our compositions and installations we aim at extended lengths of time, in which we do not necessarily have to control everything and anything that happens.

By its nature, *Walk With Me* is a non-linear, adaptive musical piece that operates in a similar fashion to a gaming environment. We experiment with software and hardware; with ways to combine concrete, environmental sounds with straightforwardly musical elements; with ways to process both in real time. Having graduated in music technology with a specialization in electronic and computer composition and applied composition, we have always worked with software, hardware and loudspeakers. These are part and parcel of how we devise, process and present our music, and as such they are essential to it. However, we want the technology to be invisible, or at least sufficiently transparent so as not to distract people from an intimate experience of the augmented aural reality that we create.

Walk With Me has already had various offshoots. We plowed some of the principles of the piece back into *Cross Avenue* (2012), a composition for New York-based string quartet ETHEL [3]. We are currently working on a 2.0 version of the

app, scheduled to be premiered at the festival Sonica in Glasgow in October 2013. This will adapt the music to the time of day and to the season in which it is played. Another recent development is that *Walk With Me* has become part of projects in which other composers write for the app. One of these is an exchange between five European cities. Composers who live in each of these cities are invited to write for four or five walks through them. This marks the starting point for making the app available worldwide to composers on an open source basis and creating a community of people who write for the app and share the results among each other.

References and Notes

1. See <www.walkwithme.net>. The app was programmed by Niels Boogaards of Elephant Candy.

2. *SoundSpots* (2007) was devised for two sets of loudspeakers placed in a darkened rectangular room: eight regular speakers (four in the corners and four halfway along the walls) and eight speaker cones mounted in perspex domes hung from the ceiling (four in a rectangle and four in a diamond shape). The hanging speakers act as spherical reflectors, projecting sound downwards in such a way that it is only audible when people are standing directly underneath them. The surrounding speakers play a looped electronic composition that functions as an aural backdrop to fragmented monologues coming from the hanging speakers. Walking between the spots, people thread their way through different storylines to which the sonic backdrop adds suspense and an emotional tinge.

Whispers (2009) is an installation piece using five straight ceramic trumpets of different lengths placed in the middle of a room. The length of the tubes and the material act as filters for the sounds, mostly whispered monologues in various languages, emanating from the trumpets. Loudspeakers along the walls bathe these voices in music, a mixture of throbbing chords and electronically processed recordings of whispering. Our composition *Vox* (2010), written for two sopranos and live electronics, in which we use samples of voices and singing traditions from all

over the world, more prominently emphasizes the concept of sound in a richly resonant space. This piece is intended for spaces with ample reverb, such as churches—high vaulted ceilings provide the right acoustics to add an atmosphere of ritualistic mystique.

3. We worked on *Cross Avenue* with ETHEL when we were in New York to make a version of *Walk With Me* in Central Park. In this piece, the four musicians are each placed with a speaker on a pedestal at the mid-point of each of the four walls of a room. A separate set of four speakers is placed with one speaker in each corner. The sounds played by the musicians are relayed to the center of the space, where we process them live and feed them to the speaker sets. The result is an ever-shifting complex of sounds that differs in quality depending on the location of a listener in the room. Walking around while it is being played changes people’s reception and perception of the music. As in *Walk With Me*, the listeners make their own individual version of the composition and complete it by their movements.

Manuscript received 2 January 2012.

Dutch composers Rob van Rijswijk (1971) and Jeroen Strijbos (1970) both graduated with honors from the Utrecht School of the Arts in the Netherlands, specializing in Electronic & Computer Composition. The hallmark of Strijbos and Van Rijswijk’s collective body of work is a combination of electroacoustic composition and spatial elements, design and innovative music technology. The composers seek out zones where different disciplines meet and intersect. Their 2013 book Composition, Time and Space can be ordered at <www.strijbosvanrijswijk.com>. Their work has been awarded an honorary mention for the PRIX Ton Bruynèl 2010 and First Music prize by The Prins Bernhard Cultural Foundation Netherlands 2012, and is performed and exhibited in Amsterdam, London, Berlin, Istanbul, New York, San Francisco, Shanghai, Paris and Montreal.

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Move That Sound There: Exploring Sound in Space with a Markerless Gestural Interface

Yuan-Yi Fan and
David Minnen

We designed and prototyped a software application that allows users to control 3D sound rendering for spatial composition with intuitive gestural input (Fig. 1). Our interface is made feasible by the availability of low-cost depth sensors and real-time vision algorithms. With the free-space gestural interface, users are able to explore the relationship between sound and space in a convenient and natural fashion. For example, 3D hand tracking allows sound designers to draw spatial trajectories and to loop a sound source in space, while specific hand shapes mapped to common functions allow users to execute other tasks during the interaction. We envision that such gestural interfaces can help prototype 3D sound effects for spatial compositions used in theme parks, interactive exhibits and cinematic experiences.

The use of gesture control for sound spatialization dates back to 1951 when Pierre Schaeffer developed a system (*potentiomètre d'espace*) that allowed users to route a pre-recorded audio signal through multiple speakers [1,2]. Recent technol-

ogy advancements in audio processing give the composer the ability to explore spatial composition techniques [3] via software spatialization systems such as Zirkonium [4] and Sound Element Spatializer [5]. Similarly, advances in motion tracking and spatially aware environments provide the performer with continuous control based on gestural input. Users can navigate and manipulate virtual objects using the hand tracking capabilities of interactive systems such as the gestural interface designed by Oblong Industries [6] and the immersive environment in the Allosphere [7].

The intent of the *Move That Sound There* project is to explore the use of a markerless gestural interface built around the Kinect for live performance [8] and sound spatialization. We are interested in a new interface for sound spatialization and an interface design that promotes discoverability and a positive user experience.

The *Move That Sound There* project consists of a software application built using Oblong's g-speak API, along with a low-cost depth camera, OpenAL, a host PC and a display. The software renders a 3D virtual environment with a passive lis-

ABSTRACT

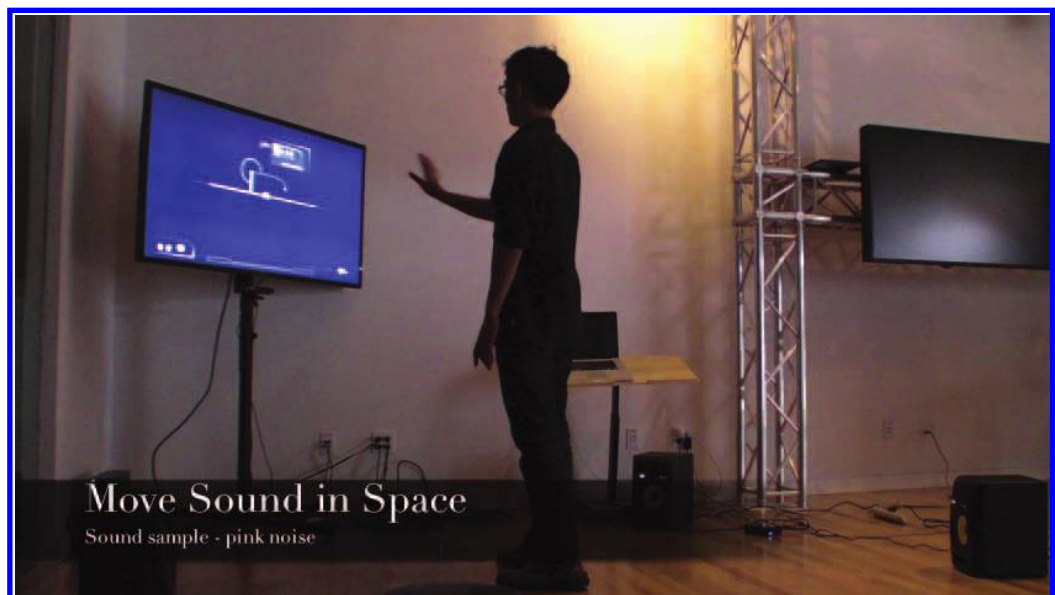
The authors describe an artistic exploration of sound in space enabled by real-time computer vision algorithms that provide hand shape and 3D hand-tracking information.

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Fig. 1. *Move That Sound There*, consisting of a software application, low-cost depth camera, host PC and display, enables users to control 3D sound rendering with intuitive gestures. (Photo © Oblong Industries Inc.)



tener positioned at the origin of a quadrant grid. When a gesture is recognized, a visual widget shows context-sensitive instructions, audio status, additional functionality and 3D position information. The underlying perceptual system recognizes both hands at the same time and continuously detects hand shape and 3D position. The depth camera searches the depth map for 3D extrema that likely correspond to moving appendages, or hands. The tracking module efficiently associates existing tracks with new observations by solving a linear assignment problem, and hand shape classification makes use of a random decision forest trained on a corpus of more than 500,000 labeled hand shapes collected from 52 subjects.

In developing our interface, we explored the use of pose-based “gesture buttons” and “earcons” [9] in order to improve the user’s experience of our interface. Gesture buttons map specific hand shapes to pre-designated functions such as *play*, *loop* or *stop*, which provide users with both continuous and discrete control options. An earcon provides a distinctive audible cue that confirms the successful recognition of a gestural command. We found this particularly useful when the visual communication channel was already occupied with information on the display.

Feedback and discoverability (which refers to a user’s ability to figure out which functions are supported and how they are invoked) present two common barriers to learning a new gestural interface. We have attempted to address these interaction barriers by associating each gestural recognition event with an ear-

con and by rendering graphical widgets that depict available gestures and their associated function based on the current context. The use of earcons in our system received positive reviews, particularly from first-time users who appreciated the immediate feedback that indicates successful gesture recognition and confirmation that they were performing the gestures correctly.

We envision two future directions for our application that may engage the user at a different level. The first direction, inspired by the early multimodal work *Put That There* [10], is to allow users to directly manipulate sound objects in virtual space by moving sound sources in real time using a markerless gestural interface. The ability to loop multiple sound objects in different user-defined trajectories can also facilitate the process of prototyping and evaluating trajectory-based 3D sound effects. The second direction aims to engage the electronic composer, DJ and VJ communities by providing a plug-in for commercial software such as Ableton and Resolume. The gestural interface can become an option for spatial mixing in live settings. Lastly, composing in stereo is still different from composing in a 3D field. With the spatialization software and carefully chosen speaker positions, users can better explore composing soundscapes in real space.

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Manuscript received 2 January 2013.

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David Minnen is a machine learning and computer vision specialist who received his Ph.D. from Georgia Institute of Technology in 2008. His research includes temporal pattern discovery and real-time gesture recognition for interactive systems. Currently, Minnen is developing disaggregation algorithms for analyzing smart meter data to help drive energy monitoring and conservation efforts.

Flexible Audio Speakers for Composition and Art Practice

Jess Rowland

My current work explores how sound exists physically in the body, materially in space and as percept, all at once. As an artist, musician and scientist, I have been interested in disrupting the boundaries that separate our notions of the physical and the experiential, the present and virtual, of sight and sound. I am specifically interested in sound technology as a way to approach these dynamics more deeply: Are there alternative models of sound production that can lead to a different understanding of how audition and vision, physical material and the phenomenological realm, can be construed to create our experience? This question led me to the development of flat flexible speaker arrays—distributed, stochastic, continuous, multimodal, with potentially unlimited channels—and to the creation of artwork using these arrays as a material [1].

My work has much in common with that of other contemporary sound artists who explore the technology of sound production as a way to reveal the magic of sound in the world. My work drew inspiration from artists such as Paul DiMarinis [2], who creates installation work that carefully manipulates fire (e.g. *Firebirds*) and water (e.g. *A Light Rain* in collaboration with Rebecca Cummins) to generate the sounds of voices and music that lead viewers to a new sense of awe about the nature of their personal experience of sound, and Christina Kubisch, whose *Electrical Walks* use induction and specially designed headphones to allow users to discover sound from spatially distributed electromagnetic sources [3]. In each case, these works playfully confound our everyday notion of sound production, expand our awareness of the mystery of sound and, by extension, change how we relate on a fundamental level to auditory experience and our own awareness.

My work explores similar themes: These flat flexible speaker arrays confront the listener with an unexpected physical form of sound creation. Here, however, the material form of sound production acts as a vehicle to explore, question and confound specific boundaries between modalities of experience, especially the boundary between visual art and music.

FLAT SPEAKERS AS ART MATERIAL

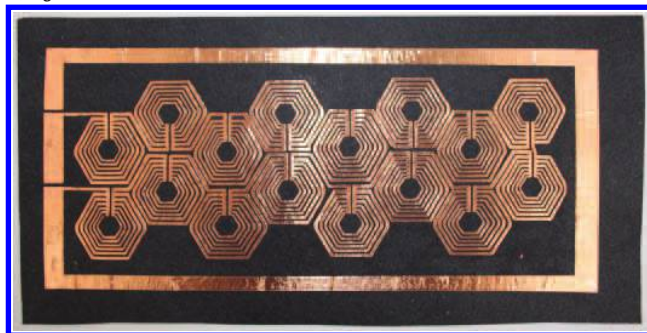
I primarily think of these flexible speakers as an art material. Rather than materials that only tangentially exhibit

sound-making qualities (such as traditional speakers or objects with speakers attached), I want to create material that is sound itself—to place sound in the foreground of material, rather than as a byproduct. The central notion is that a listener, a viewer, one who interacts, can approach sound directly as it is manifest physically and visually. This process is constrained—and made possible—by the physical laws that govern electrical sound production.

I create the flexible audio arrays using flat conductive materials that carry audio signals. The electromagnetic fields generated by these flat and flexible circuits then interact with a permanent magnet to generate sound, much like traditional speakers. I use conductive materials suitable for flexion such as conductive inks and thin foils. Flexible surfaces consist of magnetic strips, paper, foams, plastics such as clear acetate, and other lightweight materials that allow small rare-earth magnets or magnetic particles to be attached or embedded. I shape the copper foil circuitry primarily by machine cutting or by printing processes. Figure 1 shows a typical machine-cut array using copper foil adhered to paper.

Maximizing the boundary between the magnet and the circuit design is optimal for the strongest audio response. With this in mind, regular tiling of the magnetic material, such as Archimedean tiling of triangles or squares (as in Fig. 2) creates an efficient dense sheet of copper foil arrays on a clear acetate backing.

Fig. 1. Jess Rowland, flat hexagonally patterned speaker array using copper foil on construction paper, 4 × 8 inches, 2012. (© Jess Rowland)



The author presents a creative and technical practice using flat flexible audio speaker surface arrays. These arrays can be formed to various environments, offer diverse design possibilities and allow for user interaction. This practice provides an alternative to traditional models of sound reproduction by considering how visual and physical material could be construed as sound itself. Taken as art material, these surface array systems open up unique possibilities for acoustic spaces, composition and sound interactivity.

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See <www.jessrowland.com/art/electronicpaper-speakers/interactivity/> and <https://vimeo.com/67969655> for supplemental files associated with this article.

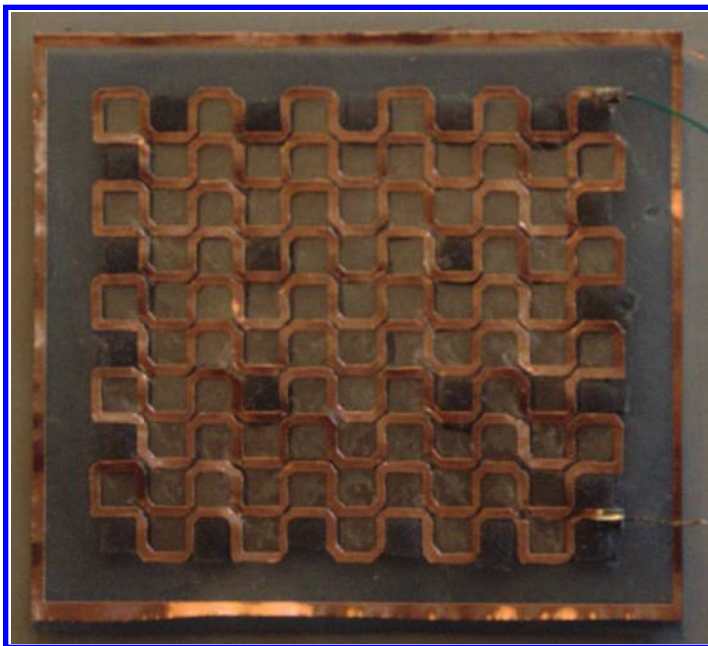


Fig. 2. Jess Rowland, flat speaker array with square tiling, using copper foil and flat square neodymium magnets on acetate, 4 × 4 inches, 2012. (© Jess Rowland)

I also wanted this material to be transparent, in the sense that nothing about the process is hidden; there is no black box (or, more appropriate to today's consumer electronics, *white* box). The technology is immediate; the disconnect so common to our contemporary experience between the material and the user is minimized. The technology used here is fundamental and legible. Nothing about the physics of this situation would be unfamiliar to an engineer from a hundred years ago. It is also materially light, unobtrusive and mostly recyclable.

Other researchers have developed paper circuitry from an engineering and design perspective. Most notably, Hannah Perner-Wilson has pioneered DIY paper speakers [4]. In the same spirit as her work, the technology explored here can be implemented by anyone with some basic supplies available at a local art store, rather than requiring industrial processes or expensive materials.

SOUND GLOVES AND GESTURE

If, rather than thinking of sound reproduction as a form of optimization for consumption, we think of it as a sufficient condition for the goal of engaging awareness, then these arrays can allow for alternate forms of interactivity, explorations of sound and composition.

By mounting the magnet that activates the speaker on gloves worn by the listener, I created an active experience in which gestures control sounds from the speaker array. These "sound gloves" consist of everyday gloves with a permanent neodymium rare-earth magnet attached (Fig. 3). Since there is no wiring involved

in the gloves themselves, users have full freedom of movement to explore the arrays. Sound is generated in proportion to the proximity of the user's hand to the array.

Sound gloves have been explored in other contexts, such as the *Lady's Glove* instruments made by sound artist Laetitia Sonami, which are used for performance and rely on sensors [5]. But the gloves presented here offer a different approach: Without data measurement or information control, this process provides an unmediated alternative to sensor technology. As an intentionally lo-fi alternative, the process can also

guide users to interaction points where the electromagnetic field is maximized, opening up possibilities for haptic and tactile feedback without the mediation of a control system.

This exploration coincides with the current interest of musical theorists in reexploring the role of the body and gesture in technologies of music making. Inspired by theories of embodied cognition, theorists such as Marc Leman have been interested in re-placing the body at the center as an essential mediator between the musical intention and our extended technologies [6]. Rather than employing technology that hides the relation between our physical experience in the world and the technological tools we use, here, gesture, movement and the body can once again be at the center of the dialogue about sound production.

COMPOSITIONAL FIELDS

With flexible speaker arrays, surfaces can be built up with multiple channels of sound output. Each sound channel can contain a different sound signal. When a person using a sound glove interacts with the surface, it becomes possible for different glove placement or different speeds or directions of movement of the gloved hand to generate different sound patterns. With more than one person exploring such a surface at the same time, the complexity of possible interactions increases exponentially.

This kind of interaction allows for a nondetermined compositional prac-

Fig. 3. A sound glove with neodymium magnet attached. (© Jess Rowland)



tice—compositional fields in which initial conditions are set up by the artist (e.g. the choice of the sound signals that can be discovered, the visual design that gives rise to their physical presence, the way those sound signals can change through time and the potential for the field to change its properties through interaction with people and the environment)—but the form of the piece is brought into being by those interacting with the piece. The interaction takes place at the level of human gesture, without demanding any special technique. There is no beginning or ending to the organization of the sound, no predetermined form. There is only a field of possibilities that emerges from the person, or people, interacting with the piece.

As with much interactive art and aleatoric composition, the composer here has relinquished the traditional role as an authority. However, this particular practice provides a unique perspective on the place of the composer's intention: Certain compositional properties are retained—the choice of predetermined sound material and the spatial layout. As with most audio speakers, any sound material whatsoever can be played through this system. I like to use recordings from Number Stations (intermittent shortwave radio broadcasts believed to be coded spy transmissions), reflecting the fact that the work itself presents a secret code waiting to be revealed by the listener [7].

Figure 4 presents a four-channel system that blends elements of sound installation and visual art to produce an interactive sound environment that can be used to drive a compositional field. Note that the geometry of the electromagnetic field production has been intentionally obscured by artistic concerns. Efficiency and optimization have been thrown out the window. If form follows function here, then the function must be to explore and wander.

GRAPHIC NOTATION

This work could be equally read as a peculiarly active form of visual graphical notation, which allows but does not require sound. Like a score, it can be approached without requiring further action, although the intimation of action remains potent in its markings.

Graphic notation (i.e. the use of non-traditional musical notation) is alive and well and expanding its range to include contemporary composers and artists from many backgrounds [8]. Like most graphic notation, the visual markings in my work are meant to convey directions



Fig. 4. Jess Rowland, *Circuit Drawing*, a four-channel speaker system, copper foil on marbled paper, 24 × 18 inches, 2013. (© Jess Rowland)

for music making that could not be adequately or appropriately transcribed through traditional music notation. But unlike most graphic notation, the relationship between the physical marks and the gesture has been transformed. In this case, the sound is physically *in* the markings. The place of gesture happens *on* the markings. The relation between the physical and the sound has been confounded. One might reasonably ask, then: Is it more appropriate to think of this system of markings as a musical instrument?

In Fig. 5, the size of the image has expanded to that of a body (4 × 2 ft). This piece, *Majikethise*, is a four-channel speaker that allows for interactivity with a sound glove or similar device. It consists of copper foil, as well as magnet wire, recycled plastic industrial circuit sheets used in computer keyboards, aluminum tape and other mixed media on PVC and acetate sheets. Is this piece an audio speaker? Graphic notation? Music composition? Visual art? Musical instrument?

This questioning of boundaries fits into a stream of thought in contemporary music practices. For example, Bigo et al. at the Institut de Recherche et Coordination Acoustique/Musique (IRCAM) developed a paper composition system in which drawing with a specialized pen on notation paper would generate corresponding sounds (played through a computer) [9]. Intended as a compositional tool, it could also be thought of as an instrument itself and evokes the possibility of expanded visual design. Instrument builders are also exploring this blurring of modalities: Adrian Freed, as one example, recently created an instrument with touch sensors attached directly to the diaphragm of the speaker, which plays music in response to those sensors—co-locating the gesture, the tactile experience and the sound production at the same locus [10]. Or consider instruments that play with scale to dissolve spatial, visual and auditory boundaries, such as Ellen Fullman's *Long String Instrument* [11] or Tim Hawkinson's *Uberorgan* [12].



Fig. 5.
Jess Rowland,
***Majikethise*, a**
four-channel
speaker artwork,
copper foil,
magnet wire
and computer
keyboard
circuitry on
PVC, acetate
and paper,
4 × 2 ft, 2013. (©
Jess Rowland)

LOOKING FORWARD, LOOKING BACKWARD

As a blurring of contexts, techniques and modalities, I hope my work raises more questions than it answers. Where is the authorship in this work—at the design or physical medium of the flat speaker? The sound input? The interactivity of the participant or musician? Can contemporary composers be repositioned within this dynamic network so that their place as creators is not compromised but rather given a different perspective?

Moving forward, I would like to scale

these works: What would a room, a building, a garden or a city block be like with this kind of work? Or what of a sparse network of arrays? Most importantly, how can I bring the goal of creating material that literally is sound closer to fruition? This question can be explored in a number of ways—by developing new materials, such as magnetic pastes (perhaps polarized neodymium particles in an acrylic base) or by reconsidering and experimenting with other conductive materials, such as the detritus of industry: cell-phone speakers, thin plastics used in electronics or the substrates for

these materials. I have recently created speakers by embedding these sound materials in sculptural sheets of dried glue, for example.

Our technologies can either isolate us from or bring us closer to meaningful, physical experience of sound. Falling between the cracks of all these artistic labels—art, science, performance, composition—I choose technologies that bring me closer.

Acknowledgments

The author wishes to acknowledge the generous support and guidance of Adrian Freed, Research Director of the Center for New Music and Audio Technology (CNMAT), as well as the kind support of CNMAT.

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Manuscript received 2 January 2013.

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Instruments of Tension: Gramophones, Springs and the Performance of Place

*Jay Needham with
Eric Leonardson*

Robert Falcon Scott took two Victor gramophones to Antarctica as a part of the ill-fated 1910 Terra Nova expedition. Photographer Herbert Ponting created an image that depicts one of the expedition's dogs standing next to one of the gramophones as if listening (Fig. 1). The image offers a curious set of entry points for analysis and creative reflection. Performed as a bit of comic relief on the ice and as an homage to/riff on *His Master's Voice*, Ponting's picture reveals a number of relationships, extending the role this image has as an historic exploration artifact. The image portrays several intervals of time simultaneously. One such interval is the initial exposure on film, perhaps a fraction of a second. Another interval represented is the domain of musical time occurring on the platter and in the air. An additional interval is the perceived time that we accord the dog in the image. The latter illustrates the continued desire we as humans have to communicate with other animals, in this case using the Victor Talking Machine in an effort to establish a communicative link. The image is a telling expression of how music helped to maintain a specific kind of mission time. In this way, the gramophone was a cultural sextant for those who explored and those who wandered off-leash.

The traveling of these sound machines into the wilds was possible because of the continued innovation of mechanical clock technologies. A gramophone is a tension instrument not unlike the chronometer. Each instrument stores and releases tension, but each is designed to unwind and perform time for a different perceptive outcome. The layers of accumulated time in the Ponting image influenced my concepts around the framing and performing of *Chronography: animal*. The piece is a live electroacoustic work that unwinds layers of time; it is conceived as a bridge to connect practices of improvised music and sound art as an evocation of place. In this piece, we hear sounds from Antarctica accompanied by the sounds of manufactured objects that were used in the exploration of that continent.

We depart from the Ponting image and draw from our eco-minded interests in the arts and sciences, specifically acoustic ecology, improvised music and instrument creation. The piece is based primarily on field recordings I gathered in Antarctica

in 2009. While listening to the recordings, we were drawn to those that had a certain richness, evoking a sense of scale and immersion that audibly described Antarctica. If *Chronography: animal* describes a dramaturgy of place, the Antarctic field recordings are placeholders: fragments and audible evidence of a time, but a broken record nevertheless.

For this work, I repurposed two antique brass gramophone horns and an aged clock mechanism as amplified instruments (Fig. 2). The brass horns are technical and historic signifiers that reference a music from the past and symbolize the two machines that accompanied Scott on the expedition. They are simultaneously ear and horn, receptor and transmitter. In present-day use, they serve as instruments that are bowed, percussed and scraped to evoke a sense of time and place. Retasking the horn as an instrument—ear, stethoscope, protomicrophone—we project sounds into the air. In reverse, it helps focus sounds to our ears.

Co-author Leonardson's Springboard [1] is also featured in *Chronography: animal* (Fig. 3). The instrument, built in 1994, is an heuristic device for making sound. The Springboard

ABSTRACT

The authors discuss *Chronography: animal*, a live electroacoustic work based on sound recordings Needham gathered in Antarctica in 2009, along with related works.

Fig. 1. Dog listening to the gramophone, Antarctica, Herbert Ponting, 1911. (Photo © Alexander Turnbull Library, Wellington, New Zealand)



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Fig. 2. Jay Needham and Eric Leonardson performing *Chronography: animal*, world premiere at the 46th Internationale Ferienkurse für Neue Musik, Darmstadt, Germany. (Photo © Katharina Szmidt)

works, both literally and figuratively. It is simultaneously the instrument for producing the creative act and a product of a creative act (a heuristic process in itself). The bowed coil spring is a tension instrument that mechanically stores energy and, like an electric battery, contains the potential for work. Leonardson's performance on the Springboard complements the Antarctic field recordings in an acousmatic context by offering

associative figures and cinematic atmospheres. The performance techniques he applies to both the Springboard and gramophone horns evoke animal vocalizations, wind and rain, and other familiar yet strangely different sounds.

Portions of *Chronography: animal* are also performed on an amplified springwound mechanical clockwork. Long ago removed from its case, and without hour and minute hands, the faded brass mech-

anism is a curiously open assembly of gears and springs. When wound, it ticks steadily, reliably counting until the clock spring relaxes and the process of transferring one's own human energy into the tension of the spring is again required. This ticking is a lingering echo of the Longitude Act of 1714. England's John Harrison [2] received funding through the Longitude Act to expand on his clock designs and create the innovative Grasshopper Escapement. At that time, accurate and safe transoceanic exploration required the most precise of clocks for charting distance according to one's home hour. In Harrison's age, the critical maintenance of time allowed one to actually reach the known limits of a territory and navigate beyond the range of human perception and physical endurance. My repurposed clockwork follows the design of Harrison's Grasshopper Escapement (Fig. 4). The small, sharp-wheeled assembly is the most delicate part of the instrument; it also emits the most interesting sounds, especially when pressed, sped up or slowed. My playing of the Grasshopper Escapement is, in part, a reflection on the practical necessity of timekeeping, while also a physical way to manipulate the audible timbre of the clockwork. In effect, I make sound instrumentally that is simultaneously associated with the bending of metronomic time.

Various ecologies of sound have contributed to an ongoing dialog about the

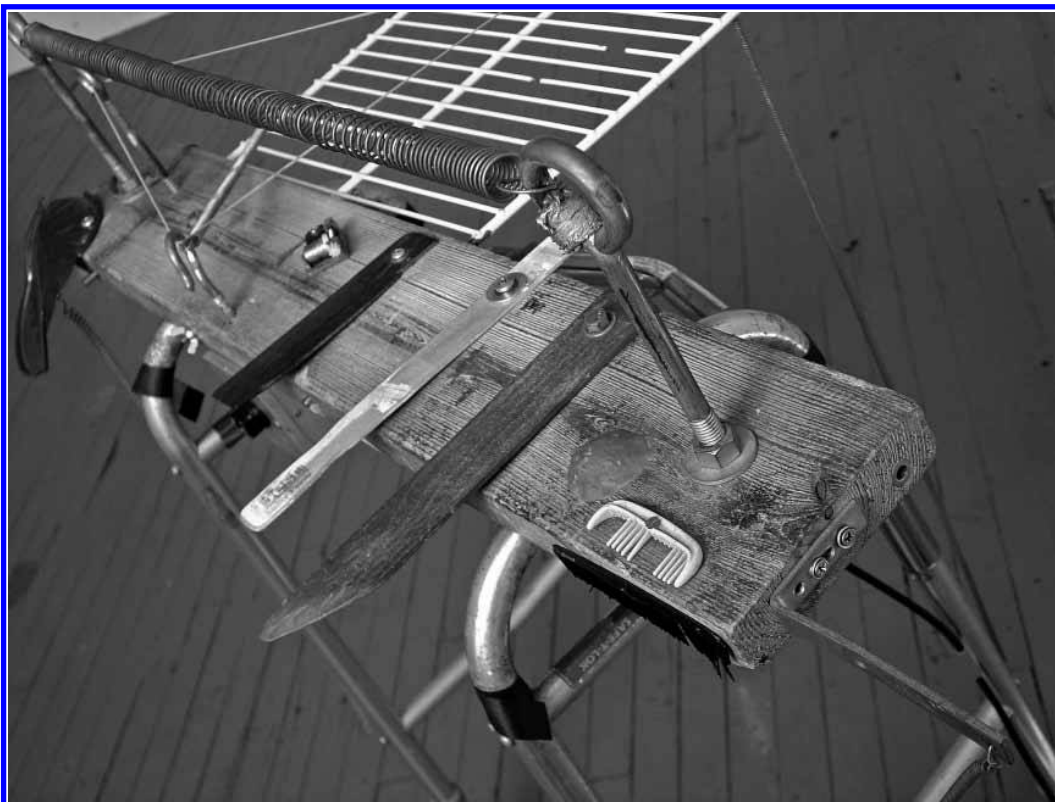


Fig. 3. Springboard. (Photo © Eric Leonardson)



Fig. 4. Escapement detail. (Photo © Jay Needham)

social dimensions of a soundscape and the roles that interpretation and artistic intent play in the creation and presentation of an eco-minded work. The fluid boundaries that pertain to this practice and study often defy classic conceptions that are customarily assigned to artistic mediums. Perhaps it is sound's inability to be categorized and placed within one genre that makes the field so uniquely

transdisciplinary and open to new interpretation. Creating sound from the reworking of manufactured objects speaks to aspects of craft and functionality, but also involves playing and performing with pieces of history in both literal and figurative terms. While Ponting's image served as an initial historic inspiration and temporal backdrop, the field recordings aid both performers and audience

alike. The added gramophone horns, clockwork and Springboard culminate in a performed acoustic history—a work for sound that describes Antarctica from a number of audible and chronometric vantage points. This approach has inspired us to author multivalent sound works informed by the interrelation of histories, conceived of in relation to place and experienced as something old and yet unknown.

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Manuscript received 2 January 2013.

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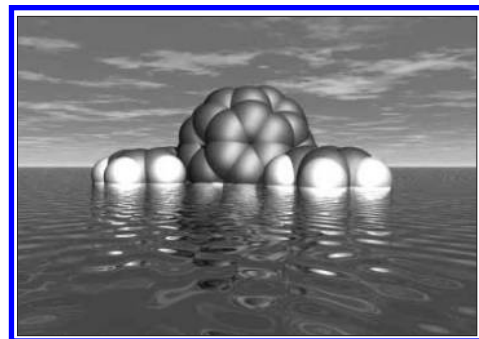
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Guest Editor: *Sundar Sarukkai*

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Environment 2.0: Through Cracks in the Pavement

Guest Editor: *Drew Hemment*

In urban environments we are separated from the consequences of our actions as surely as the tarmac of the road cuts us off from the earth beneath. But between the cracks in the pavement, another world flourishes—local activism, recycling, environmental collectives, permaculture, urban gardening. Leonardo solicits texts that document the works of artists, researchers, and scholars involved in the exploration of sustainability in urban environments.

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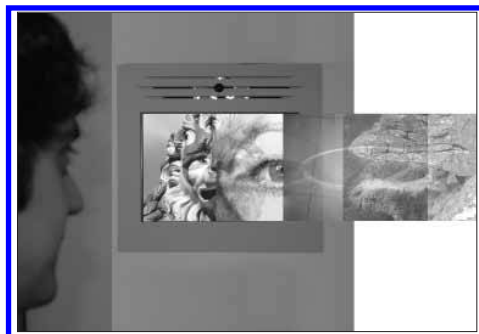
Guest Editor: *Robert Root-Bernstein*

What is the value of artistic practices, techniques, inventions, aesthetics and knowledge for the working scientist? What is the value of scientific practices, techniques, inventions, aesthetics and knowledge for the artist? When does art become science and science, art? Or are these categories useless at their boundaries and intersections? Artists, scientists, artist-scientists and researchers of all sorts are invited to explore such questions in the pages of Leonardo.

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Rakes, Live Deaths and Modified Cassette Players: Three Contemporary Sound Artists from Colombia

Ricardo Arias

As both a term and a practice, "sound art" has become increasingly prominent since the late 1990s. The label has been embraced by artists, curators and critics, and the number of museum and gallery exhibits dedicated to (or prominently featuring) sound art has grown exponentially in recent years. While showcasing a new generation of audio artists, many of these exhibitions have also traced a genealogy of sound art that stretches back to the emergence of the art form in the 1960s and have thus given the current boom an historical footing.

—Christoph Cox [1]

The span of years since the dawn of the new millennium has witnessed a remarkable increase in shows, exhibitions and programmes devoted to a hybrid, elusive and not-too-clear form of creative expression which has come to be known as "sound art."

—Daniela Cascella [2]

As Cascella observes in the above epigraph, sound art indeed seems to be blossoming worldwide in the new millennium. Critical and scholarly attention to this artistic practice and, more broadly, to sound as an object of study, are also proliferating [3].

In trying to understand this burst of activity in sound art, it is imperative to start broadening our field of vision to include what is being done beyond Europe, North America and Japan in order to have a truly global perspective on the issue [4]. It is my intent with this paper to contribute in this respect by giving a glimpse of what is being done in my current place of residence, Colombia.

SOUND ART PRACTICE IN COLOMBIA

Sound art activity in Colombia has abounded in the last decade, as evidenced by the considerable number of shows focusing on sound works by Colombian artists in recent years [5].

Some of the artists involved in these shows, such as Roberto García, Juan Reyes, Mauricio Bejarano, Alba Fernanda Triana and I, have been working with sound for quite some time, and while our work has been categorized as experimental or electroacoustic music, we are now considered to be sound artists [6]. Such rebranding has had an effect on the work and on the way the artists view it, prompting exploration of areas entered only occasionally in the past, such as sound instal-

lation and sculpture [7]. A second group of sound artists, active in the Colombian art scene today, that began working in the 1990s, such as Ana María Romano, Rodrigo Restrepo and Daniel Prieto, have been able to move more swiftly between categories. The generation of those who became active in the new millennium, such as David Vélez, Leonel Vásquez, Ícaro Zorbar, Juan Sebastián Suanca and Carlos Bonil, does not seem to be troubled by being perceived as sound artists. They simply embrace sound as another material at their disposal to realize their artistic projects.

This gradual shift in terminology from music—be it experimental, electronic or electroacoustic—toward sound art that has occurred in the last 2 decades echoes the opposition between *music* and *noise* that Christoph Cox puts forth in developing an ontology of sound [8]. This agreement between practice and theoretical discourse suggests that we may indeed be experiencing a significant paradigm shift in our awareness and use of sound. This predicament leads us to think that at this point in the history of Western Culture, an art practice with sound, "sound art," that is different from music is indeed coming into its own and may need to rely no longer on existing categories and traditions but on a renewed appraisal of sound itself to justify its existence.

RODRIGO RESTREPO, ÍCARO ZORBAR AND LEONEL VÁSQUEZ

The three artists whose work I present here belong to the second and third generational groups outlined above. I have chosen these particular artists, Rodrigo Restrepo (b. Bogotá, 1977), Leonel Vásquez (Bogotá, 1981) and Ícaro Zorbar (Bogotá, 1977), because each of them represents a distinct point in the continuum between music and sound art. Each of them also has a distinct approach to their use of technology and a very personal conception of space and time.

Restrepo is a musician and composer by training but has gradually drifted away from conventional musical practices into hybrid, interdisciplinary ways of conceiving and presenting his work. Zorbar holds degrees in film, television and fine arts and considers sound an important element among the many media he uses to realize his ideas. Leonel Vásquez, also an artist by training, has deliberately and decidedly chosen

ABSTRACT

Sound art activity in Colombia has proliferated in the last decade, as evidenced by the considerable number of shows focusing on sound works by Colombian artists in recent years. The author presents three artists—Rodrigo Restrepo, Leonel Vásquez and Ícaro Zorbar—each of whom represents a distinct point in the continuum between music and sound art. The artists' individual and distinct approaches to the use of technology and their very personal conceptions of space and time are discussed.

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See the Webliography at the end of this article for links to videos of works discussed here.



Fig. 1. Rodrigo Restrepo, *Habitáfono*, Teatro Delia Zapata, Bogotá, 2005. (© Rodrigo Restrepo)

to carry out his research projects and creative output through the medium of sound.

Toward the Sonorous: Rodrigo Restrepo

Restrepo views his own work as a wide, open-ended endeavor that goes beyond traditional ideas of music. In the early stages of his career, Restrepo's practice with sound developed through two parallel paths: (1) his work in a traditional manner as a composer of "tape" pieces carefully crafted in the studio and resulting in fixed compositions meant for reproduction through loudspeakers (through his work with loudspeakers he became aware of the compositional importance of the spatial dimension of sound) and (2) his work in free improvisation, which afforded an opportunity to work directly with acoustic sound sources, exploring them in relation to his body and his physical gestures and not worrying as much about method or final results.

As he worked on these two musical practices, Restrepo gradually started to realize that "music, or *the musical*, was but one aspect of a much wider universe that offered him even greater creative possibilities: that of *sound*, or *the sonorous*" [9]. He thus came to an understanding of his work not just as music or art but in terms of the general attribute of *creativity*.

In trying to define my work I have tended not to worry too much about the name or label I should assign to it. *Musician, pro-*

grammer, composer and artist are all incomplete and problematic terms. The same holds true for the terms used to describe particular works, such as *sound art, music, performance, installation, or sculpture*. Consequently I prefer to think of myself as someone who exercises his creativity, which is a factor common to all the categories just mentioned [10].

One of Restrepo's works that first signaled a shift away from traditional musical practices—or more generally away from a strictly performative mode of

presenting sound—was the *Habitáfono* (Sound Room) (2005) (Fig. 1), "a multi-timbral instrument (a sound sculpture), a stage the size of a small room" [11].

The experience of creating the *Habitáfono*, says Restrepo, "brought me ever closer, yet not fully consciously, to the realm of 'sound art,' in which the spatial dimension of the work gains a greater importance in relation to its temporal dimension" [12]. The space that Restrepo discovered in the realm of sound art was not the same "loudspeaker space" (or acousmatic, simulated space) that he had explored in his electroacoustic pieces. This new space is the actual space that the sculpture proposes in relation to the body of the performer. The experience of space facilitated by the *Habitáfono* can be understood through Campesato, who cites Bleser and Salter's four modes of experiencing space and posits them as appropriate for understanding the use of space in sound art:

One can experience space in four modes: "social, as an arena for community cohesion; navigational, as local objects and geometries that combine into a spatial geometry; aesthetic, as an enhanced aesthetic texture; and musical, as an artistic extension of instruments" [13].

Restrepo has continued to develop his work, taking advantage of the possibilities opened up to him by the notion of sound art and adopting the computer as his main technological aid. More recent works include interactive sculptural structures (*Girófono*, 2011) (Fig. 2) and interfaces for the performative control

Fig. 2. Rodrigo Restrepo, *Girófono*, "Densidades: Arte Sonoro en Colombia" exhibition, Universidad de Los Andes, Bogotá, 2011. (© Rodrigo Restrepo)





Fig. 3. Ícaro Zorbar, *Swan Lake* (Assisted Installation #5), 2006. (© Icaro Zorbar)

of live audio signal processing (*Raking*, 2012) (see Webliography at the end of this article for video documentation of both of these pieces).

Ícaro Zorbar's Sentimental Machinery

Ícaro Zorbar is, in his own words, “a Colombian artist who works with machines, songs, sounds and projections” [14]. From this short statement, it is clear that sound is a very important aspect of Zorbar’s work. He, however, does not think of himself as a sound artist: “Sound always represents 50% of the work and the visual aspects (be they sculptural or videographic) the other 50%” [15]. Most of his works are performative and have a “finite,” often narrative, temporality. Some of his works require his presence and his intervention in order to be activated. He calls them “assisted installations.” In Zorbar’s own words:

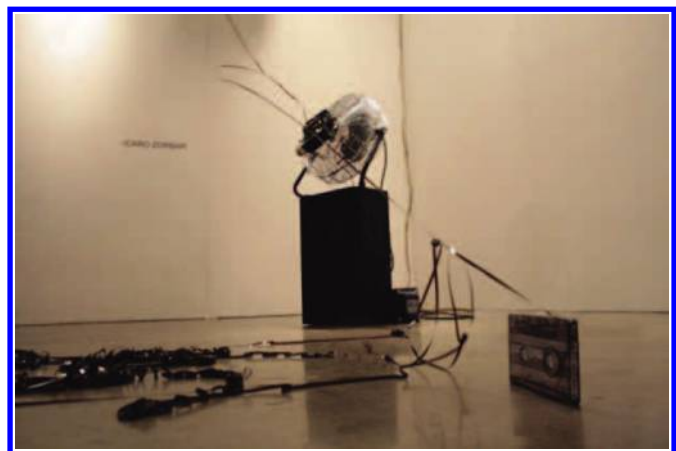
I have chosen to refer to some of my works, those which exhibit a particular temporal quality and that require my presence in order to function, as “assisted installations.” In these installations I have to pay close attention to things like the duration of a song, or I have to wind up a music box, find the exact place where I have to drop the needle on a record, or change, rewind or thread a cassette tape [16].

Swan Lake (Assisted Installation #5) from 2006 (Fig. 3) (see Webliography) is one such assisted installation consisting of a number of music box internal mechanisms placed over a speaker cabinet for

acoustic amplification, and provides some further clues about various aspects of Zorbar’s work. The duration of the sound aspect of the work is determined by the time it takes the “assistant” to wind up all the music box mechanisms and the time it takes for them to unwind. In this case Zorbar uses mechanical, analog technology, which is a signature element of his artistic practice. Zorbar states: “I like to discover how things work. In this respect, analog technology is more interesting to me because it is a technology the functioning of which can be discerned through simple observation” [17].

Swan Lake is installed in a deliberately unpretentious, precarious and fragile manner. Fragility and its expression through a very particular use of analog machinery is yet another characteristic of Zorbar’s work and it is at the service of the artist’s ultimate expressive intentions.

Fig. 4. Ícaro Zorbar, *Ventilador* (Assisted Installation #6), 2007. (© Icaro Zorbar)



I love the idea of fragility. I think it is something that characterizes human nature. So I work with machines, sounds and projections, in circumstances that evoke interpersonal relations. I try to unfold and underscore the fragility inherent to certain interpersonal connections in which I find a constant tension [18].

Another work in the series of assisted installations, *Ventilador* (Ventilator) (Assisted Installation #6) (Fig. 4) (see Webliography), consists of a spatial arrangement of various elements: a loudspeaker, a swinging fan, a modified cassette player and an audio cassette. A final aspect of Zorbar’s work is much more evident in this piece than in the previous one: The sound material, a song in this case, is crucial to the expressive effect of the installation. The character of the song is clearly pathological and acts as what Salomé Voegelin has called “sonic memory material” [19], and it completes the sentimental character suggested by the fragility and instability expressed by the way the elements of the piece are arranged. The music acts as a “pathetic trigger” [20], accomplishing, in my view, a sentimental engagement on the part of the viewer.

Live Deaths and Silent Screams: Leonel Vásquez

Leonel Vásquez develops his creative process “from the vantage point of doing and thinking with sound” [21], and this process can take the form of “sculptures, installations, sonic architectures, actions and videos” [22]. His activities include teaching and researching, always in and around the experience of sound: “I experiment with sound as a malleable material, as the form and content of sensory experience” [23]. His work not only involves a critical reflection on the technological means of sound production and reproduction but also places a great deal of emphasis on listening, “not only as an instrument of perception but as a prob-

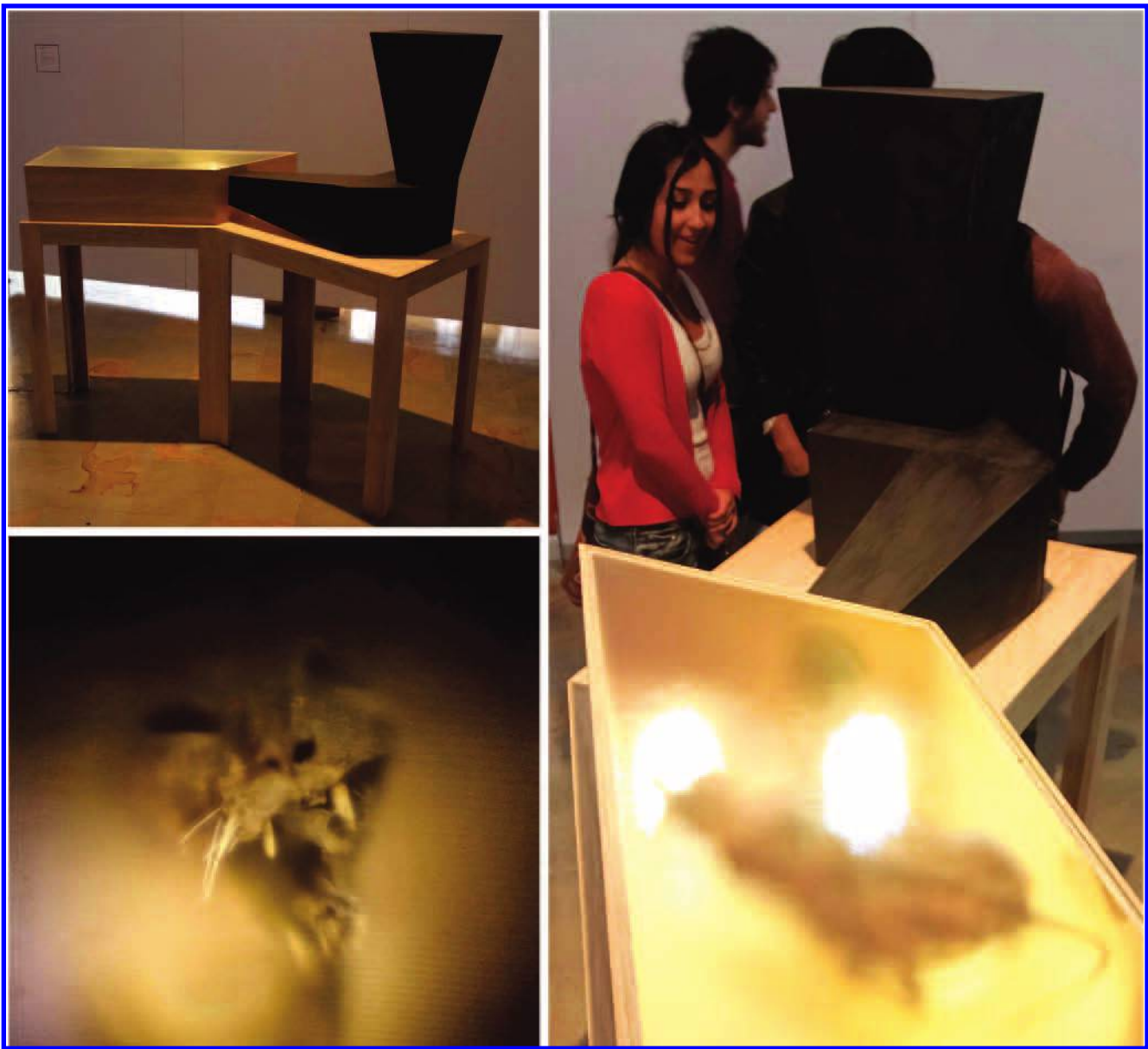


Fig. 5. Leonel Vásquez, *El Grito (The Scream)*, 2011. (© Leonel Vásquez)

lem of the relation between subjects, spaces, objects, and the environment in general” [24]. His concern with the individual/personal and collective/social dimensions of sound makes Vásquez’s work more political than that of Restrepo or Zorbar, without being simplistic or pamphleteering. His conception of sound involves the emotions, as does Zorbar’s, but is less concerned with the cultural representations of these emotions than with their experiencing and exteriorization. Vásquez conceives of sound and silence as manifestations of vital forces.

I am interested in thinking about the potentialities of sound to configure the expressive components of a space, of bodies, of a series of gestures, so as to attain the poetic conformation of a territory that invites us to experiment with

that which produces tears, screams, silences: human emotions [25].

El Grito (The Scream) (2011) is a sculptural piece, or rather a unique piece of furniture that expresses the artist’s concerns quite eloquently through an implied use of sound (the piece is silent). The object consists of a table that contains a naturally mummified body of a cat that cannot be clearly discerned through the opaque piece of glass used as the tabletop. There is a black structure attached to the table that invites the viewer to take a peek, at which point he/she is confronted with the cat’s face frozen in the midst of a terrifying cry (Fig. 5).

Another piece from 2011 that contains strong affective elements and political connotations, titled *Muertes Vivas (Live*

Deaths), “is an installation/action that takes place within a constructed acoustic space contained inside the gallery space” [26]. The artist/performer activates with his breath and for a very long time an instrument that is at once a container (a box) and a flute. This box is filled with the bones of an unknown person or persons [27]. The realization of the piece takes the form of a performance that seeks, through this peculiar sound-producing object and its intensely focused and prolonged ritualistic performance, both to enact a symbolic reunification between the living and the anonymous dead and to provide the dead with a dignified and proper place of rest in the “underworld” [28] (Fig. 6) (see Webliography).

CONCLUSION

The works of the three artists discussed here are not by any means representative of prevailing trends or “styles” in Colombian sound art. A wider survey reveals, as it does in most other parts of the world, a richly varied range of artistic approaches to sound.

The three artists discussed use different and varied technologies according to the conceptual requirements of each particular work. Their technological choices and solutions are subservient to their ideas.

Another interesting aspect of the works of Restrepo, Zorbar and Vásquez is the recurrent use of finite and performative strategies to present their pieces, even when they are conceived sculpturally or as installations: Restrepo builds and performs instrumental objects/systems that are also sculptures or installations; Zorbar has coined the term “assisted installations” to refer to his hybrid performative constructions; and Vásquez speaks of “installation/action” when de-

scribing his piece *Live Deaths*. This is a peculiar trait if one considers that autonomous and continuous installations are often considered to be the clearest expression of sound art. Restrepo’s, Zorbar’s and Vásquez’s works all conform to the “canonical” position that broadly defines sound art as closely related to installation art or to an “expanded concept of sculpture” [29] and at the same time counter this notion’s twin idea that “sound art has been released from the traditional musical act of performing” [30]. Mexican composer and sound artist Manuel Rocha Iturbide ascribes a slightly more inclusive field of activity to sound art, which might be well suited to characterize the artists discussed here, when he states that, for him, “sound art refers to, above all: sound sculpture, sound installation, and intermedia works in which sound is the main element (excluding dance and theater) such as sound performance” [31].

In short, the artists presented in this essay are producing sound artworks that stem from very idiosyncratic concerns,

in ways that do not conform strictly to canonical forms of the practice. Whether this is a particularity of sound art made in Colombia or, more broadly, in Latin America is yet to be explored.

References and Notes

1. Christoph Cox, “Sound Art and the Sonic Unconscious,” *Organised Sound* 14 (2009) pp. 19–26.
2. Daniela Cascella, “Watch This Sound” (2007): <www.contemporary-magazines.com/profile91_1.htm> (Retrieved 20 December 2012).
3. Sound is rapidly gaining importance for instance in anthropology. See Louise Mentjes, Ana María Ochoa, Thomas Porcello and David W. Samuels, “Soundscapes: Toward a Sounded Anthropology,” *The Annual Review of Anthropology* 38 (2010) pp. 329–345: <www.annualreviews.org/doi/abs/10.1146/annurev-anthro-022510-132230?journalCode=anthro> (Retrieved 15 December 2012). See also *Sound Studies*, an interdisciplinary field of study in the human sciences: Jonathan Sterne, ed., *The Sound Studies Reader* (New York, NY: Routledge, 2012).
4. Most of the literature that is taken into account in the discussion about the definition and history of sound art often fails to include references to work, both artistic and scholarly, originating in the rest of the world. It is telling, for example, that Engström and Stjerna, in their efforts to “attain an understanding for how cultural discourses are created and through this obtain perspectives on how artistic fields

Fig. 6. Leonel Vásquez, *Muertes Vivas* (Live Deaths), 2011. (© Leonel Vásquez)



of activities are defined depending on academic traditions and spheres of written media" neglected to include the Spanish language (or Chinese, for that matter) in their search for the phrase "sound art." See Andreas Engström and Åsa Stjerna, "Sound Art or Klangkunst? A Reading of the German and English Literature on Sound Art," *Organised Sound* 14 (2009) pp. 11–18.

5. In the past 2 years alone there have been at least three major sound art exhibitions and a series of smaller shows exclusively featuring Colombian artists. The following is a partial list of events that took place mostly in Bogotá (there has been a great deal of sound art activity in Medellín as well): In June 2010, LA Galería presented a show entitled "Dropouts," featuring sound works by Juan Reyes and Leonel Vásquez <www.la-galeria.com.co/exposiciones/dropouts/index.html>; in September 2010, two major exhibitions took place that surveyed the current state of sound art in Colombia: "Sonare: Arte Sonoro," curated by Mauricio Bejarano and presented by MAMBO (Bogotá Museum of Modern Art), exhibited sound installations and sculptures by 14 artists, while "Vociferous: Sound Works by 21 Contemporary Colombian Artists," which I curated and which was presented by Diapason in Brooklyn, NY, featured mostly multichannel sound pieces: <www.diapasongallery.org/recent_installations.html>. In 2011 I curated "Densidades: Arte Sonoro en Colombia," presented at the Julio Mario Santo Domingo exhibition space at Universidad de Los Andes in Bogotá and including sound installations and sculptures (both sonorous and silent), videos and acoustic pieces by 31 Colombian artists. More recently, in August and September 2012, Mauricio Bejarano curated a smaller exhibition at Espacio Alterno Gallery in Bogotá, entitled "Obras Blancas, silencios elocuentes," featuring sound objects by seven artists.

6. In my 1998 essay "From the Margins of the Periphery: Music and Technology at the Outskirts of the West—A Personal View," I referred to this generation of artists simply as electronic or electroacoustic musicians and did not even consider labeling them as "sound artists." See Ricardo Arias, "From the Margins of the Periphery: Music and Technology at the Outskirts of the West—A Personal View," *Leonardo Music Journal* 8 (1998) pp. 49–54.

7. These are the artists from the transitional generation that Australian composer Chris Mann possibly had in mind when he said, in response to N.B. Aldrich's question "What is sound art?": "I always thought 'sound art' was a career move . . . a branding exercise." See N.B. Aldrich, *What is Sound Art?*

(2003): <www.emf.org/emfinstitute/aldrich/mann.html> (Retrieved 20 December 2012).

8. "At its best, 'sound art' opens up or calls attention to an auditory unconscious, a *transcendental* or *virtual* domain of sound that has steadily come to prominence over the course of the twentieth century. In contrast with music, speech and signal, I will call this domain *noise*, though we will see that the reach of this term extends far beyond that of its ordinary usage." Christoph Cox, "Sound Art and the Sonic Unconscious," *Organised Sound* 14 (2009) p. 19.

9. Personal communication with the author, 21 December 2012.

10. See [9].

11. See [9].

12. See [9].

13. Lilian Campesato, "A Metamorphosis of the Muses: Referential and Contextual Aspects in Sound Art," *Organised Sound* 14 (2009) p. 30.

14. From Ícaro Zorbar's web site: <icarozorbar.com/bio>.

15. Personal communication with the author, 28 December 2012.

16. Document from an exhibition of Zorbar's work at Lugar a Dudas gallery in Cali, Colombia, August–September 2011: <www.lugaradudas.org/publicaciones/la.../icaro_zorbar.pdf> (Retrieved 15 December 2012, author's translation).

17. See [16].

18. See [16].

19. Salomé Voegelin, "Sonic Memory Material as 'Pathetic Trigger,'" *Organised Sound* 11 (2006) pp. 13–18.

20. Voegelin [19].

21. Personal communication with the author, 29 December 2012.

22. See [21].

23. See [21].

24. See [21].

25. See [21].

26. See [21].

27. The bones were found in the cemetery of a neuropsychiatric hospital in Vásquez's home town of Sibaté, Colombia. There is a mass grave in this cemetery containing the rest of the hospital's deceased patients, the contents of which are in the open air (personal communication with the author, 29 December 2012). This gruesome circumstantial detail is meaningful in the Colombian context in at least two ways: On the one hand it gives a clue as to how life lost value at certain times and places in this society; and it is an indirect but evident reference to the many mass graves that have appeared throughout the country in the course of the armed conflict that has steadily unfolded for at least the past 60 years.

28. See also Leonel Vásquez, "Muertes Vivas: sobre los cuerpos vivos y muertos que no se dejan morir," Master's Thesis, 2010; published on-line at: <elvasquez.blogspot.com/2010/06/muertes-vivas.html> (Retrieved 18 May 2013).

29. Engström and Stjerna [4].

30. Engström and Stjerna [4].

31. "El arte sonoro es sobre todo: escultura sonora, instalación sonora y obras intermedia en las que el sonido es el elemento principal (que no sean danza ni teatro), como en el performance sonoro" (my translation). Manuel Rocha Iturbide, "Qué es el arte sonoro?": <www.artesonoro.net/soundartwritings.html> (accessed 18 May 2013).

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Rodrigo Restrepo, *Girófono* (2011), <vimeo.com/69818477>.

Rodrigo Restrepo, *Raking* (2011): <vimeo.com/56924647>.

Ícaro Zorbar, *Swan Lake (Assisted Installation #5)* (2006): <www.youtube.com/watch?v=HTNUT2baTTE>.

Ícaro Zorbar, *Ventilador (Assisted Installation #6)*: <www.youtube.com/watch?v=R-muCky6y7k>.

Leonel Vásquez, *Muertes Vivas (Live Deaths)*: (2011) <vimeo.com/21234956>.

Manuscript received 2 January 2013.

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Recomposing the City: A Survey of Recent Sound Art in Belfast

Gascia Ouzounian

In the global arena, Belfast is most frequently recognized as the epicenter of the Troubles, the name given to the decades-long armed conflict in which local communities were pitted against one another, with divisions formed along a combination of political, religious, socioeconomic and geographical lines. Loyalist or unionist communities, who are predominantly Protestant, maintain allegiance with the United Kingdom and typically identify as British. Republican or nationalist communities, who are predominantly Roman Catholic, seek the reunification of Northern Ireland with Ireland and typically identify as Irish. It is possible for a contemporary citizen of Northern Ireland to hold two passports—British and Irish—even as the country remains constitutionally part of the United Kingdom.

The violence that characterized the Troubles has profoundly diminished since the signing of the Good Friday agreement, the 1998 treaty that established Northern Ireland's current governmental structure and signaled a sustained truce. Still, there remain signs of sectarian divide within Belfast, which is otherwise described as a "post-conflict" city. As recently as December 2012, tensions flared as conservative and radical elements within the Loyalist community protested a decision by the local city council to fly the British flag at Belfast City Hall only on designated days instead of the entire year. As some of these protests became violent, counterprotesters staged a 1,000-person "peace rally" at City Hall. Organized by local artist Paul Currie, this gathering invited demonstrators to make any kind of noise for a few minutes, suggesting, "The peaceful silent majority needs to be heard too" [1]. The chaotic soundscape that ensued—a boisterous melange of hand-clapping, shouts, hollers, horn blowing, drumming and laughter—served as a stark contrast to the sounds most frequently associated with public gatherings in Belfast: the fife-and-drum tunes of Protestant marching bands that wind their way through the city during marching season each year, regarded by some as a demonstration of cultural pride, and by others as a triumphalist and threatening gesture.

Within this larger context of a steady but imperfect peace, Belfast has also been home to a virtual cultural Renaissance over the last decade. For a city whose population falls under 650,000, there are a remarkable number of art institutions and initiatives. These include established institutions such as Crescent Arts Centre, Waterfront Hall and Ulster Museum; alternative and artist-run spaces such as Black Box Belfast, Catalyst Arts, Platform Arts and PS2; contemporary art galleries such as Golden Thread Gallery and Fenderesky Gallery; and grassroots initiatives such as Delawab, Household Belfast

and Quiet Music Night, all of which have operated out of the homes of artists and curators. Numerous festivals, including the Belfast Festival at Queen's, Cathedral Quarter Arts Festival and Sonorities Festival of Contemporary Music likewise provide national and international forums for contemporary performance and art.

The presence of sound art within this scene has become increasingly prominent, owing in part to the establishment of the Sonic Arts Research Centre at Queen's University Belfast in 2005, which, along with the University of Ulster, is a principal site for research and creation in sonic arts in Belfast. There is also a growing understanding of the relevance of sonic arts within the wider arts community in the region. In 2010, the Turner Prize, the most prestigious award given to British artists, was awarded to a sound artist for the first time in the award's history. Susan Philipsz, a Glasgow-born artist, was recognized for such works as *Lowlands* (2010), a sound installation that featured a layered, multichannel version of the artist singing a 16th-century Scottish lament. The decision to award the prize to a sound artist was predictably controversial. One detractor wrote, "Never before in the 26-year history of the Turner Prize has it been won by an artist who had nothing to show for her £25,000 prize money but sounds fabricated by her own voice" [2]. A BBC article quoted a conservative

ABSTRACT

This article introduces examples of recent sound art in Belfast, a city that has undergone radical transformation over the past decade and is home to a burgeoning community of sound artists. The text investigates the ways in which sonic art can redraw boundaries in a city historically marked by myriad political, socioeconomic, religious and sectarian divisions. The article focuses on sound works that reimagine a "post-conflict" Belfast. These include site-specific sound installations in urban and public spaces, soundwalks, sculptures, locative and online works, and experimental sonic performances that draw upon traditional Irish song and music.

Fig. 1. Pedro Rebelo, Rui Chaves, Matilde Meireles, Aonghus McEvoy and Max Stein, *Belfast Sound Map*, interactive website, 2012. Screenshot of *Belfast Sound Map* showing Kevin McCullagh's recording "Beechmount RPG Avenue." (© Rebelo, Chaves, Meireles, McEvoy, Stein)



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See the References and Notes section for links to supplemental files associated with this article.

art group that announced, “the award should not go to a ‘singer.’ . . . ‘It’s just someone singing in an empty room. It’s not art. It’s music’” [3]. Conversely, supporters embraced the decision as a boon for sound art, with one prominent critic characterizing the win as “a shot in the arm for sound art” [4]. The same critic explained, “you can even study courses in sound art at a handful of art colleges around the country. So the momentum’s already there. The high-profile win for Susan Philipsz might just build this up to the tipping point needed for sound art to really take off” [5]. Whether positive or negative, the decision brought signifi-

cant attention to sound art in the region, and served as an educational moment. One reporter introduced Philipsz’s work by explaining it was “[art] so intangible it can’t even be seen” [6].

This article introduces recent sound art works created in and for Belfast, giving special attention to works that reimagine the city, offering alternatives to the dominant images of a “post-conflict” Belfast. I am especially interested in discovering the ways in which sound—a medium characterized by impermanence and invisibility—can bypass or even bridge the normal barriers, whether physical, social, political or cultural, that exist in this city.

Many of the artists whose works are mentioned here are under 35, a sign that the nascent scene will continue to develop. Some were born and raised in Belfast, while others have relocated here in order to pursue education and work opportunities. All, however, share the common purpose to contribute in unique ways to the cultural life of a city whose image can, and is, being redrawn through art, even art so intangible it can’t even be seen.

In both metaphorical and actual ways, the projects mentioned here can be said to “recompose the city”: They position the city not as an object or collection of objects, but instead as a resonant idea that is cocreated by, and shared among, its inhabitants, visitors and, most especially, its listeners. Through these sound works the city can be newly understood as a collectively generated, unstable and unfixed, imagined and experienced, lived and living composition: one that can be continuously heard and sounded—and, when filtered through the dynamic matrix of sound, art and environment (physical, social, cultural and political)—recombined, reoriented and re-composed.

Fig. 2. Fionnuala Fagan and Isobel Anderson, *Sailortown* multimedia installation, 2012. Detail showing the listening station for Isobel Anderson’s song “The Ghost of Sailortown.” (Photo © Fionnuala Fagan)



Fig. 3. Detail of *Sailortown* showing the listening station for Isobel Anderson’s song “Mary’s Song.” (Photo © Fionnuala Fagan)



SOUNDS AND STORIES OF THE CITY

On 20 April 2012, the Metropolitan Arts Centre (MAC), an £18-million building, opened its doors in Belfast with the aim of becoming the region’s premiere interdisciplinary arts center. The first Artist-in-Residence program at the MAC was a sound art program that featured the work of researchers from the Sonic Arts Research Centre, and one of the MAC’s first exhibits, *Sounds of the City*, featured the work of sonic artists Pedro Rebelo, Rui Chaves, Matilde Meireles and Aonghus McEvoy. Over a 4-month period this group developed five sound art projects, working in partnership with participants from the Tar Isteach and Dee Street community centers [7]. Among these projects were *The Walk Home*, a sound installation in the MAC’s corridors wherein the sounds of visitors’ footsteps merged with “the sound of footsteps merged with thousands of shipyard workers returning home,” described by the artists as “an iconic aspect of Belfast’s aural identity”; *Call for Work*, in which factory horns evoking Belfast’s industrial past—created in collaboration with community participants who recalled these ubiquitous soundmarks—were installed in the gallery; and the *Belfast Sound Map*, an interactive, online platform that allows users to upload field recordings as well as com-



Fig. 4. Details of *Sailortown* showing the listening station for Fionnuala’s song “The Harbour Lights.” (Photo © Fionnuala Fagan)

mentary about the Belfast soundscape [8]. The latter, designed in collaboration with Max Stein, co-creator with Julian Stein of the *Montreal Sound Map* (2008), features several dozen recordings that visitors can browse by searching their location on a virtual interface powered by Google Maps [9,10].

Listening to the recordings featured on *Belfast Sound Map*, it is striking to note the extent to which a city’s unique character and identity can be described in sound, whether through local accents and speech patterns, the sounds of everyday business and leisure activities, traffic and transportation, or natural and environmental soundscapes. Perhaps inadvertently, the project has entered the realms of acoustic ecology as well as social commentary. One user, Kevin McCullagh, has updated a 1:45 recording titled “Bog Meadows,” which he describes as “the sound of what remains of the bog meadows in West Belfast, a nature reserve that is being encroached upon by the ravages of commercialism and expanding urbanization.” The same user has also posted “Beechmount (RPG) Avenue,” a 2:12 recording accompanied by a photograph of a mural that depicts a soldier in the Palestine Liberation Organization and a soldier in the Irish Republican Army joining forces above the caption “One Struggle” (Fig. 1). In his description of this recording, McCullagh quotes a local resident as saying, “I dreaded the mural on the side of my house being repainted as it inevitably meant a visit from the RUC [Royal Ulster Constabulary] in the dead of night. I would be

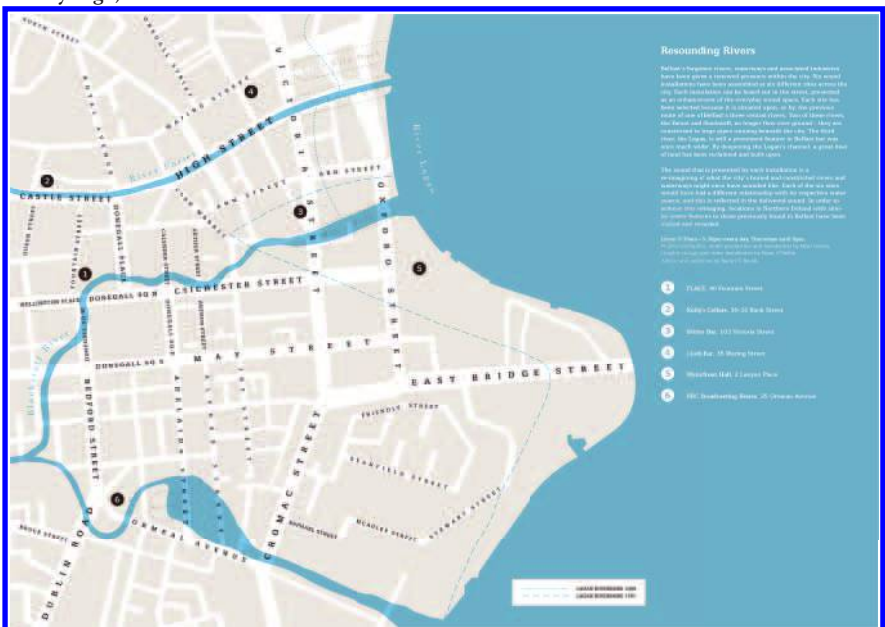
woken by the low rumble of land rovers and the house shaking from the impact of the paint bombs.” The recording is described as “an approximation” of this resident’s “sound memory,” leading the visitor to *Belfast Sound Map* to imagine the complex sociopolitical histories that inflected these particular sounds and their hearing.

As an offshoot of the *Sounds of the City* program, two local sound artists who are also both singer-songwriters, Fionnuala Fagan and Isobel Anderson, proposed a sister exhibition, *Stories of the City* (7–20

May 2012). For this exhibition Fagan and Anderson developed the project *Sailortown* in collaboration with members of a local community that has been particularly impacted by urbanization in Belfast [11]. Once a bustling dockside village of thousands located inside central Belfast, Sailortown was, for over a century, home to seamen, merchants and industrial workers who manned the city’s mills and shipyards. Urban development and modernization projects in the 1960s led to a controversial decision to demolish the town in order to make way for the M2 motorway. Residents were promised relocation, but developers failed to deliver on this promise. Surviving members of the community continue to be connected through the Sailortown Regeneration Group, a community development organization whose mission includes archiving the cultural and architectural history of the vanished town. Upon approaching this group, Fagan and Anderson discovered that they were not entirely welcoming of outside interest. Fagan writes:

The community agreed to meet with us on the premise of exchange—they would share the stories of Sailortown and we would then document their words and experiences, using song and installation. I had expected the community to be excited by the prospect of this, but in actual fact, they were quite suspicious of our motives—mainly as a result of their previous negative experience of artists. . . . During our initial meetings, it became clear that the Sailortown community saw us as prospective users [12].

Fig. 5. Ryan O’Reilly, map designed for *Resounding Rivers*, a site-specific audio installation and multimedia exhibition by Matt Green, 2010. (Map © Ryan O’Reilly, Rinky Design <rinky.org>)



Still, the artists continued to meet with the Sailortown community over a period of several months and ultimately found that, “through listening, sympathizing and repeatedly expressing our genuine interest in their stories and in the history of [Sailortown], we finally began to break down some barriers” [13] (Fig. 2).

For the *Sailortown* exhibition, Fagan and Anderson turned their interviews with Sailortown community participants into verbatim songs that comprised the words and stories relayed to them by the participants. They performed these songs at the MAC, and installed recordings along a series of “song shrines,” listening stations that also featured objects loaned to them by the participants (Figs 3 and 4).

Upon hearing their stories turned into song and sound art, the Sailortown community participants expressed surprise and appreciation, not expecting that the exhibition would reflect their experiences so effectively. One participant commented, “[The exhibition] blew me away. I didn’t realize my story was so interesting” [14]. The artists were similarly impacted by the project. Anderson tells me:

Living as a student in South Belfast, you rarely spend much time outside of those streets and student social circles. I feel incredibly lucky to have been given the opportunity to hear the Sailortown community’s stories of this area of Belfast. Otherwise, the M2 would still just look like the M2. The docks would still be a concrete expanse with a couple of industrial sized ships and the streets that remain would just be car parks and offices under flyovers, between barbed wire fences. Now, this area is Sailortown. That feels like an amazing privilege [15].

In a poignant way, *Sailortown* provided an opportunity for a community tied together by a shared experience of dispossession to communicate with an audience that had either been unaware, or else was willfully ignorant of, their plight. For many community participants, the simple act of “being listened to” and “being heard” was in itself a powerful experience, contrasting sharply with the silence and invisibility that had characterized Sailortown’s presence within the larger Belfast community for decades. In this way, methods that are inherent to sonic arts—listening, hearing, translation, interpretation and recording—can be understood as providing a route towards cultural exchange that confounds traditional barriers, in this case barriers that included socioeconomic, cultural and historical ones.



Fig. 6. Matt Green, *Resounding Rivers*, site-specific audio installation and multimedia exhibition, 2010. Poster announcing *Resounding Rivers* in Belfast’s city center. (Poster © Ryan O’Reilly, Rinky Design <rinky.org>. Photo © Matt Green.)

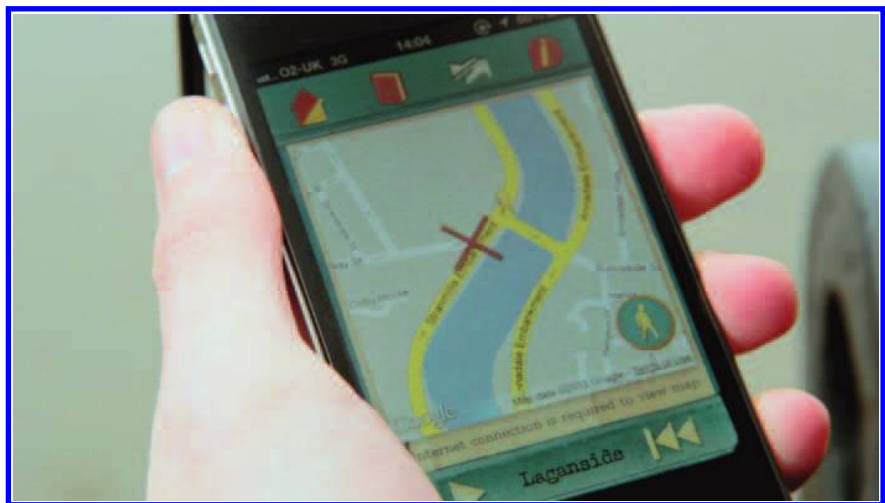


Fig. 7. John D’Arcy, *Laganside*, location-activated sound poetry app, 2012, in use on iPhone. (Image © John D’Arcy)

WATERWORKS

From 6 May to 5 June 2010, PLACE, the Architecture and Built Environment Centre for Northern Ireland, hosted a large-scale exhibition that similarly aimed to uncover elements of Belfast’s lost or forgotten history using sound. *Resounding Rivers* (2010) was a site-specific sound installation by Belfast-based sound artist Matt Green, who installed loudspeakers in six public spaces within Belfast’s city center. The loudspeakers projected soundscape compositions created by Green that evoked the sounds of rivers that once flowed through those

urban sites, but that literally had been driven underground through processes of industrialization and modernization. These “hidden rivers”—the Blackstaff and Farset Rivers, and portions of the Lagan River (which continues to run along the length of the city, but which has been significantly curtailed)—today flow underground in a series of massive pipes. Green discovered this little-advertised fact while studying old maps of Belfast, which showed rivers in places where buildings now stand. For Green, this discovery represented the sheer force of urbanization and the forgetting that can



Fig. 8. Listener with John D'Arcy's location-activated sound poetry app, *Laganside* (2012) near Belfast's Waterfront Hall. (Photo © John D'Arcy)

Fig. 9. Caroline Pugh, *Photo Ballads*, multimedia performance, 2012. An image of audience members taken via pinhole camera is projected onto a screen in the premiere of *Photo Ballads* at Black Box Belfast, 25 October 2012. (© Caroline Pugh. Photo © Simon Howell.)



sometimes accompany it. He told a local reporter, "Something as powerful as a river and it can just be put aside and forgotten. . . . You'd never know without reading these books or looking at the map that there was a river under your feet" [16].

For *Resounding Rivers* Green installed loudspeakers outside a variety of venues: three popular pubs, the Waterfront Hall, the BBC Broadcasting House and PLACE. The graphic designer Ryan O'Reilly devised a map for visitors that showed where each installation was located and included short descriptions of how the recorded sounds related to each site (Fig. 5):

BBC Broadcasting House

When the Blackstaff River was diverted in the late 1600s it was brought to coursing along Ormeau Avenue and directly over the land on which the BBC now stands. Here, the River was bound in order to form Joy's Mill dam which powered the nearby Joy's Paper Mill. In the 1800s the dam was replaced by a circular reservoir, used to store and distribute fresh water.

Sound to be heard: The flow of small rivers, and the water wheel and mill race of Wellbrook Beetling Mill, Co. Tyrone [17].

For the 4 weeks during which *Resounding Rivers* was exhibited (Fig. 6), Belfast audiences had the opportunity to hear Green's elaborate waterscapes merge with the sounds of everyday city life, and contemplate a process the artist describes as "the past flowing into the present" [18].

The Lagan River, which today has replaced the Farsset River as Belfast's most important river, has inspired a number of artists to create site-specific sound works. In 2010, Rui Chaves, a Belfast-based sound artist, presented *walkwithme*, a soundwalk and performance that took place along a popular stretch of the Lagan. For this work, Chaves invited small groups of listeners to join him while walking for approximately twenty minutes along the river. The participants wore headphones and, using MP3 players, listened to a prerecorded soundscape created by Chaves, who led the group through the site while simultaneously performing actions along the river. The journey was an intimate one that recalled a love letter by a forlorn wanderer; at one point listeners could hear Chaves saying, "I imagine you, loving me/I imagine us, having a swim in the ocean/I imagine playing you all my favourite records/I imagine hearing you breathe. . . ." [19] Chaves arranged prerecorded sounds such that they would merge in uncanny ways with real sounds



Fig. 10. *Photo Ballads*, Caroline Pugh performing with tape recorder and electronics at the premiere of *Photo Ballads* at Black Box Belfast, 25 October 2012. (© Caroline Pugh. Photo © Simon Howell.)

Fig. 11. Phil Hession performing with custom-designed record lathe in *My heart is always trembling, afraid I might give in*, multimedia performance and installation by Phil Hession, 2012. (© Phil Hession. Photo © Simon Mills.)



and real events, heightening mundane occurrences and creating an altered, sound-augmented reality. For the brief moments of the event, the stretch of the Lagan footpath—an everyday haunt favored by joggers, cyclists and rowers—was transformed into a lyrical, poetic realm.

More recently, Belfast-based singer-songwriter and sound artist John D'Arcy launched *Laganside* (2012), which he describes as “a mobile sonic poetry experience at Belfast’s River Lagan” [20] (Fig. 7). This location-activated sound work, which functions as an app for smartphones, was inspired by the epic poem “Laganside” (2006) by Northern Irish poet and critic Alan Gillis. A listener with the app can freely roam the length of the Lagan and hear electroacoustic compositions by D’Arcy that complement a reading of “Laganside” as well as poems by Belfast-based poets Andrew Jamison, Ben Maier and Sinead Morrissey. The app invites the user to “Immerse yourself in augmented, real and surreal soundscapes that reveal themselves at key spots along the River Lagan. Listen to these musical backdrops as accompaniment to the reading of ‘Laganside’ to experience the poem in new ways” [21] (Fig. 8).

One user describes his experience of *Laganside* as a powerful reminder of the striking transformations that have defined Belfast in recent years:

The meandering cadence of the poem, which describes a man’s walk along the regenerated riverfront with his “better half,” gradually builds towards an understated yet profound climax. “*Leaving me to find our way back to the streets, knowing I’ll never leave here, or come back again.*” Fighting back the lump in my throat, the words resonated so strongly. From the grit and filth of the late eighties Belfast has surpassed itself, moving so fast the city is at times hard to recognise. The Laganside area is the embodiment of Belfast’s decline and regeneration; a city which never fails to impress and disappoint in equal measure [22].

SOUND ART AND TRADITIONAL MUSIC

One of the distinguishing features of recent sound art in Belfast lies in its intersection with traditional music. There exists a rich history of traditional song in the region, transmitted orally from generation to generation and kept alive in the public sphere through trad sessions in local pubs, radio and television programs, competitions and concerts. In merging the language of traditional music with that of contemporary art, several artists have creatively incorporated new



Fig. 12. Phil Hession performing with custom-designed polygraph device in *My heart is always trembling, afraid I might give in*, 2012. (© Phil Hession. Photo © Simon Mills.)

and arcane technologies in their work. At the 2012 Belfast Festival, the Belfast-based vocalist and sound artist Caroline Pugh (Fig. 9) premiered *Photo Ballads* (2012), a multimedia work in which she photographed audiences using a pinhole camera and sang traditional songs inflected by experimental and improvised music techniques for the duration that it took for each photo to develop [23]. A BBC critic described *Photo Ballads* in terms of the “heavily postmodernist” approach Pugh undertook “warping [the traditional song ‘Lord Randall’] beyond recognition by way of looping via tape recorder” and “reproducing/re-imagining melodies and tales otherwise swallowed by the passing of time” [24] (Fig. 10).

The Belfast-based vocalist and artist Phil Hession has similarly repurposed existing technologies in creating sound art that reconfigures traditional Irish song. In Hession’s *My heart is always trembling, afraid I might give in* (2012), the artist recorded the street ballad “The Rocks of Bawn” using different recording devices: a custom designed record lathe outfitted with a large crank, an SLR camera and a polygraph machine (Fig. 11). The devices were themselves amplified and

recorded, and these recordings were broadcast in performance while Hession sang the tune live, his performance further manipulated by sound engineer Christian Cherene (Fig. 12) [25].

In re-interpreting traditional songs using such experimental techniques, artists like Pugh and Hession take genuine risks. Unlike the contemporary art world, the local traditional music community does not necessarily privilege or reward originality or innovation. Rather, there are pressures to conserve traditional song within “authentic” musical settings, as the tradition has historically evolved through repetition and imitation rather than invention. Úna Monaghan, a Belfast-born traditional harpist and concertina player, composer and sound engineer, writes:

Traditional musicians had no desire to depart too far from the normal tune types. New music was written, but it always adhered to the structures already in place of specific types of dance music, songs, or airs. Composers wanted their music to be noticed for its beauty, not its originality or innovation [26].

Thus, the works of Pugh, Hession and other artists who extend the language of

traditional music into the realm of contemporary sound art commit multiple cultural transgressions, creating works that rewrite a musical tradition steeped in conservation, while simultaneously introducing older traditions into contemporary genres that are typically preoccupied with newness.

In 2012, Úna Monaghan collaborated with Belfast-based Irish traditional music scholar, sociologist and fiddler Martin Dowling to create *Owenvarragh: A Belfast Circus on the Star Factory*, a multimedia realization of John Cage’s 1979 composition ____ *Circus on* _____. Cage’s score, previously realized only by the composer himself, invites the interpreter to create a performance from the contents of a book. Through a labor-intensive process, the interpreter creates a tape part from the different sounds and places mentioned in a book, compiles new texts for live recitation by performing complex chance procedures on the original text, and chooses “relevant music” to include in the performance. Monaghan and Dowling’s version was based on Belfast-based novelist Ciaran Carson’s 1998 book *The Star Factory*, considered an ode to Belfast [27]. It was

presented in the Sonic Lab, a two-story auditorium in the Sonic Arts Research Centre equipped with an acoustically transparent floor and an elaborate multichannel audio system. *Owenvarragh* featured a tape part Monaghan created from hundreds of original field recordings, digital projections of images that related to the novel, Carson as reciter, and an ensemble of five musicians including Monaghan and Dowling, who performed traditional Irish music at moments of their choosing. A review of the event described it as

an aural recreation of the soundscape of Belfast during a particular period in time, imbued with the cadences of Carson's poetry and the music and song of past and present generations floating like ghosts through the ether. It was at times like being in a multi-dimensional hologram, close to an out-of-body experience [28].

Monaghan tells me that her connection to the city held particular meaning for her in preparing this project, and that the feedback she received from audiences drew out the emotional valence of contemplating place through sound:

A lot of feedback I got [on *Owenvarragh*] was about how the project struck chords of memory, reminiscence, familiarity with people. Sometimes of sounds they wouldn't think to listen to, but when presented in the context of the project were very moving, and evoked vivid memories or stories or personal experiences, or reminders of aspects of the city that were no longer available to be experienced (either to them, or in general), but that they hadn't noticed slipping away [29].

For Dowling, working on *Owenvarragh* changed his understanding "of the nature of [Belfast] and all places." He writes:

Carson's work shows how places are nothing more than places of the imagination. They may be modernised, their infrastructures (both physical and cultural) preserved and renewed, but they remain in a sense impoverished without active imaginings and re-imaginings. Carson is a master of this imagination of place. Cage gave us a vehicle for re-imagining Ciaran's imagination of Belfast in *The Star Factory*. A prose narrative became poetry, and its recitation noisy, musical, and visually enhanced. We experienced Ciaran's imagination of Belfast in a new way [30].

CONCLUSION

Sound art has particular resonance in Belfast, a city that has historically been marked by conflict and division and that has recently undergone rapid and radi-

cal transformation. The sound works discussed in this article have reflected this transformation in meaningful ways: by inviting people to document and observe the changing soundscape of the city; by performing acts of historical recovery; by communicating the experiences of marginalized communities and exposing socioeconomic, political and cultural barriers; by providing opportunities for people to form new relationships to everyday sites through creative acts of listening; and by bridging the divide between timeworn and contemporary musical and artistic traditions. In different ways, each of these projects enriches Belfast through its "active imaginings and re-imaginings" of place, employing sound as a medium that can preserve, mark, transform and reconfigure place, and, in doing so, exposing the city as a resonant, shared idea that can be composed, and recomposed, through sound.

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(Demolishing) Concrete Music

Simon Polson

At least 125 people were shot trying to cross the Berlin Wall, which was for them an instrument of torture and death. For countless others in Europe and around the world, the Wall, which represented the Soviet grip on the people of Eastern Europe, was an instrument of division and oppression. For two composers, the Berlin Wall was a musical instrument. This article addresses two pieces of sound art, by Terry Fox and Anthony Hood, respectively, which use the acoustic and physical properties of the Berlin Wall as structural motifs in their construction: they are pieces of *musique concrète*, literally made from the sounds of concrete. Although not intended to be, they are also the sounds of history and thus historical sources. The study of history has traditionally assigned greater value to written sources than aural sources. This, however, is to the detriment of history's capacity to appeal to our senses and imagination. As Woolf notes, the current hierarchy of visual and written communication over the aural and spoken impinges directly on "historical consciousness" [1].

Studying Terry Fox's *Berlin Wall Scored for Sound* and Anthony Hood's *Ein Stück von der Mauer* ("A Piece of the Wall") offers an insight into the way history has accidentally found itself preserved in sound art and soundscape. Here, the composers' intentions to create a personal record of a moment in time instead created a record that sounds for all people.

BERLIN WALL SCORED FOR SOUND

Terry Fox (1943–2008) was a recipient of a Deutscher Akademischer Austauschdienst grant throughout 1980–1981 and lived in a studio in the Künstlerhaus Bethanien, and later on the Mariannenplatz in the northeastern corner of Kreuzberg, West Berlin. Fox wrote that, from the top of his building, "I could look down into the Wall and follow its course for a long way in both directions. I could see how it bisected streets, squares and even houses" [2].

The idea of *Berlin Wall Scored for Sound* originated, in Fox's words, as "a sound map . . . a kind of aural geography," by which Fox might familiarize himself with his new surroundings [3]. Fox traced the trajectory of the Wall on a large map of Berlin and divided its course into sections according to their position relative to the four corners of West Berlin. (The same was done to the zigzagging perimeter of East Berlin, although that border only intersected the Wall on its western side.) Fox then drew straight lines to connect the vertices of West and East Berlin, upon which crisscrossed the topography of the Wall itself. Each individual line was then disassociated from the

map, and Fox added further sets of two parallel lines on either side of each, creating the appearance of a musical staff. From the map, the length of the Wall was precisely measured in centimeters; these measurements were transposed into seconds, and the distance of the Wall became measured in time [4]. The physical properties of the Wall, its trajectory and the distance of its course through Berlin thus became the material principals of the object score *Berlin Wall Scored for Sound*. It is reasonable to consider *Berlin Wall Scored for Sound* an "object" as well as a composition, because Fox reproduced the object score often but made only one recording. I know of at least six original editions of *Berlin Wall Scored for Sound* in contemporary art galleries around the world, each reassembled in various ways and each with a different suggestion for sonic construction [5].

Perhaps the exercise for Fox rested just as much on the idea of the score as on its actual realization—if not more so; *Berlin Wall Scored for Sound*, conceived at the beginning of the 1980s, may well have initially been intended as a piece of visual art before it became a work of sound art. It was not until the end of that decade that Fox's only complete recording of the work (which he titled *Berlino*) was released on Apollo Records [6]. The object score of *Berlino*, a single linear organization of *Berlin Wall Scored for Sound* [7], illustrates how Fox divided the contours of the Wall and, according to their shapes, assigned them one of six letters (B, where Fox deemed the contour "chaotic"; C, "straight"; D, "canal"; E, "curved or crooked"; F, "lake"; X, "Horsehead Nebula") [8]; the repetition of the sounds in the sequence and their duration is determined by the changing conformation of the Wall. Importantly, these terms only differentiate between the six sounds, as Fox did not specify what the sounds should be or even give any indication about their aural quality beyond these ambiguous words. A different organization of the object score *Berlin Wall Scored for Sound* exists wherein the Wall is reassembled not in a single continuous line but with sections presented on individual staves, the shapes of which are then inverted or presented in their retrograde form, inviting the musically inclined viewer to recall the treatment of thematic material by composers of the Second Viennese School [9]. *Berlino* is a continuing sequence of acoustic sounds chosen from fragments of audio-tape and incorporates soundscapes from Berlin, including a British military helicopter that, Fox wrote, "made almost daily passes along the Wall," and the sounds of a thunderstorm and church bells along the Mariannenplatz. Fox's intended "aural

ABSTRACT

The article addresses two pieces of sound art that incorporate field recordings from the site of the Berlin Wall, during the deconstruction of its concrete presence in East Germany. The author examines two pieces as a case study for the consideration of the historical potential of soundscapes and proposes that the developing genre possesses the capability to preserve the sound of history, in ways that are not possible with written sources. The potential problems associated with the works' reevaluation as historical sources and further works that would benefit from similar reconsideration are discussed.

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geography” inadvertently preserved “aural history”: Of the six sounds featured in Fox’s own recording of *Berlin Wall Scored for Sound*, these two local soundscapes are of interest to this research.

EIN STÜCK VON DER MAUER

Experimental and computer music in Australia owes much of its development to Sydney-based composer and educator Anthony Hood [10], whose performances with Australian electronic ensembles “watt” and OHM had been integral to the establishment of sound art in Australia. Like Fox, Hood’s work encompassed considerations of transformation and spatialization, but whereas Fox worked across a variety of media, Hood’s focus has centered solely on sound since the composer was aged 14.

Over New Year’s Eve 1989–1990, Hood traveled to Berlin, where the Wall once stood as one of the most enduring gestures of Cold War hostility. It had been predicted earlier that year that contrary to Ronald Reagan’s famous demand, the Wall would stand for “another hundred years” [11].

Of his experience in Berlin, Hood recalls:

I went over to Berlin for New Year’s Eve 1989. . . . The big party was around the Brandenburg Gate on both the east and west sides and I ended up with some people on the east side (including drinking with some East German border guards at one point). It was a pretty crazy night—people drinking and dancing on top of the Berlin Wall, where a few weeks earlier they would have been shot. I took my Sony professional Walkman with me and made recordings that night. Over the following few days the West Berliners started chipping away at the Wall, trying to souvenir pieces as it became obvious that it was going to come down [12].

Some years later Hood transformed his recordings into the work he titled *Ein Stück von der Mauer* (“A Piece of the Wall”). Unlike Fox’s work, Hood’s *Ein Stück von der Mauer* was intended from the beginning as a piece of sound art, conceived, according to the composer, “to be received over radio or internet or done as an installation” [13].

Given the age at which he began experimenting with the genre, it is no surprise that Hood’s *Ein Stück von der Mauer* should demonstrate the central principles of electronic music articulated in those mid-20th-century treatises by Pierre Schaeffer and his contemporaries [14]. Prominent among Schaeffer’s ideas is the concept of the *acousmatique* sound (that is, a “reduced listening” of sound divorced from the context in which it is

generated and thereby stripped of implicit meaning) with which Schaeffer experimented in his *musique concrète* collages of sound. By the composer’s design, *Ein Stück von der Mauer* is an example of reduced listening, as each of the sounds that compose the collage is deliberately isolated from the context in which it originated. Without explicitly saying so, Hood’s own commentary on the piece hints at a kind of “reduced listening”: he writes, “I decided just to do a mix of the material capturing the sound I heard at the time; especially the percussive sound of people chipping at the wall I thought was pretty amazing” [15]. The same can be said of the material in Fox’s *Berlin Wall Scored for Sound*, much of which was drawn from private recordings of soundscapes and studio activity wherein the artist was experimenting with acoustics [16].

What Hood calls the “material” of his collage also includes the indistinguishable distant sounds of Berliners’ conversation, obscured by their distance from the listener. Only one man’s voice is especially prominent (at 0’1.1”) and even then, only one word is comprehensible: “mauer” (“wall”). Two girls approach from the distance, singing with brisk amateurism the 1930s German sailor song *Wir lagen von Madagaskar*. Their singing is interrupted at 2’52.4” by the discordant sounds of an organ grinder, a sudden intrusion on the track’s left channel. At 3’29.92” there occurs a sudden, jolting shift: The tune played by the organ grinder reaches a disjointed half-cadence and is itself interrupted by a dense soundscape of church and city bells ringing out across Berlin. With time, the bells slowly fade to the sound of the girls again, and of the Berliners’ conversation and the one prominent, anonymous male voice from the beginning. All the while, the collage is unified by the ongoing, percussive high-pitch of sickle hammers chipping at concrete.

In an article discussing the Berlin Wall, an allusion to “unity” might seem out of place, even foreign. Its inclusion is deliberate, however, for the opportunity it provides to comment on the self-referential structural features in both Fox’s and Hood’s works. The score illustrates a curious feature of *Ein Stück von der Mauer*: Structurally, the sound collage is a palindrome. The interruption of musical instruments toward the work’s central point (“C”) is bordered on either side by the sounds of conversation (“A”) and singing (“B”), which are heard in reverse order on their repeat: The piece exhibits a deliberately palindromic A-B-C-B-A form. It is for this reason that the

sounds made by the Wall itself can serve as a unifying feature: Gesturally, like the Wall that Hood experienced, the piece rises and falls: the church bells toll and a moment in time is announced, and the Wall—and the collage—begins to fall on itself. (Hood’s use of chiming bells here to represent the fall of the Wall is not an isolated one: The same aural signifier for German reunification is used in Reinhard Mey’s 1990 track *Mein Berlin* [17].) Hood’s palindromic collage stands as an intriguing contrast with Fox’s *Berlino*, wherein soundscapes repeat without end, consigned to the oppression of the work’s infinite structure. Even with its duration of 19’09”, *Berlino* does not come to an end but, rather, the track simply stops sounding. These are the sounds of the Wall that would stand for “another hundred years”; Fox wrote of his piece that it is “endless, forming a loop, like the Wall it describes” [18].

THE DIACHRONIC POTENTIAL OF SOUND ART

I propose that these pieces of sound art need not only to be received as “art.” Featuring as they do primary source field recordings and soundscapes from significant moments in time, the works possess a historical, as well as cultural, value. Unlike Schaeffer’s work, the historical implications of both Fox’s and Hood’s pieces problematize the composers’ suggestion that these sounds were recorded for their aural aesthetic alone. Sound of this significance cannot be “reduced”; the value of these sounds to the composer and the audience alike surely hinges on the social and historical importance of their context, not on their content alone. By their titles as well as their subject material (and indeed, their subject matter, since both composers titled their works with allusions to the Berlin Wall), the soundscapes in *Berlino* and field recordings in *Ein Stück von der Mauer* are records of history as much as they are recordings of sound. If the reader allows for the study of history to encompass a reconstruction of events and not just the study of events in a sequence, Fox’s soundscapes and Hood’s sound collage contribute aurally to the reconstruction of the historical narrative. Hood recalls that he decided against composing an overtly “political” piece [19]; structurally and materially, however, it was impossible that the artists avoid politics or history, altogether. Likewise, the sounds of a military helicopter gain extra-aural significance in a work whose title refers to Berlin, where their presence, the composer notes, was an al-

most daily reminder of the greater German context at the time. Aural historians are keen to lament the difficulty in reconstructing the sounds of the past [20]: The discipline of history has long privileged the visual record (writing, paintings and, more recently, photographs) over other means. Their discipline suggests that our only hints at how events in the past may have sounded exist in written descriptions. Yet with the advent of accessible technology (such as tape recorders), there is now a variety of forms that the historical record may adopt. The written word has lost the monopoly it historically has held on history: The sounds of history are preserved in this music.

The leap from soundscape to historical source may seem a tenuous one, but one should remember that the composers only edit these soundscapes and collages. Lyotard privileged avant-garde composers, as witnesses to and recorders of history, over philosophers [21]. These works are primary source recordings first if not foremost, and indeed, history has always been subordinate to the artistry of its form (consider the epic poems of Homer, for example, which, like Fox and Hood's works, were not intentional historical documents but are studied as such now, if only for want of further sources).

Problematically, then, these historical sound collages are records of biography as much as they are of history, for it is the inescapable fact of historical authorship that they are not objective records of history but rather records of the composers' own history. The author is no more distant from the work than the singer in that Reinhard Mey track, *Mein Berlin* ("My Berlin"), earlier mentioned. Here we encounter the fundamental problem of historiography. Consider the two possibilities of the meaning in the sentence above of the word "records": Herodotus made a "record" of history by writing it down; earwitnesses Fox and Hood "recorded" history literally with a microphone and a tape recorder. Whatever the historiographical problems scholars encounter when they read Herodotus, the musicologist encounters equivalents when we realize we are hearing recorded history in these works of art. We are not hearing the sounds of the Berlin Wall. Rather, we listen to Fox or Hood, who hear the sounds of the Wall. To the historiographer, these works are as much bi-

ography as history; to the musicologist, as much history as music.

There is every chance the reader will consider this article and its intersectional approach to field recording, sound art and history restricted in its theory, possibly even applicable only to the two pieces of sound art referenced herein. Perhaps this is an enthusiastic, albeit accidental, reflection on my own response to the concept, content and form of *Berlin Wall Scored for Sound* and *Ein Stück von der Mauer*. But these works are not isolated examples of documented history being the subject, or content, of noise music and of sound art. The contrast in form between the two pieces discussed herein—one of which is only partly, and then accidentally made of history, and one that is entirely historically made—is a telling example of how broad our access to aural history can be, if we allow it to be, and how readily it can be preserved in artworks whose medium is sound. My intention has been to present a case study by which we can interpret and analyze these other works and to caution against assumptions of objective historicity: Chief among other examples is Australian composer David Lumsdaine's electronic poem *Big Meeting*, an hour-long epic reconstructed from field recordings taken during the Durham County Miners' Union annual meeting in the lead-up to the collapse of that and other British miners' unions under the Thatcher government. Those sound recordings, once for personal merit, now sound for all people; that music, like this, is a comment on history, made from the sounds of that history itself.

References and Notes

1. D.R. Woolf, "Speech, Text and Time: The Sense of Hearing and the Sense of the Past in Renaissance England," *Albion* 18, No. 2 (1986) p. 160.
2. Terry Fox, *Terry Fox: Works with Sound*, Bernd Schulz, ed. (Heidelberg: Kehrer, 1999) p. 78. The exhibit, held in 1998, took place in Saarbrücken.
3. Fox [2] p. 78.
4. Fox [2] p. 78.
5. The scores are kept by the Utah Museum of Contemporary Art, the Galerie Löhr (Mönchengladbach, Germany), Kupferstichkabinett, (Berlin, Germany), and the Berkeley Art Museum (Berkeley, CA, U.S.A.). To the best of my knowledge, the remaining scores are in private collections. Very fine reproductions of some of these scores may be found in the catalogue of the Eighth Biennale of Sydney. See René Block, et al., *The Readymade Boomerang: Certain Relations in 20th Century Art* (Sydney: Eighth Biennale of Sydney, 1990) p. 154.

6. The record is *Bertino/Rallentando* (Apollo Records AR 088807) and was released in 1988. *Segment of the Berlin Wall, Scored for Sound* was released in 1984 on a compilation cassette of experimental music by Sticking De Appel. The track has a duration of 4:34.

7. I am grateful to Genevieve Cottraux at the Berkeley Art Museum for her generosity and time supplying the image.

8. Fox [2] p. 78.

9. *The Berlin Wall Scored for Sound*, pencil on paper, 79.5 × 77 cm, private collection. A reproduction of this score may be found in Block et al. [5]. Further reproductions of the work may be found online at <www.medienkunstnetz.de/works/berlin-wall/>.

10. The work discussed here could be titled "Part one": Hood notes that he has a considerable amount of unused material—recorded in the then East German cities of Leipzig and Dresden—and has intentions of extending the soundscape in the future.

11. This observation is drawn from the article "Berlin Wall Anniversary: Key Dates in the History of Germany's Wall," *The Telegraph*, 9 November 2009.

12. Anthony Hood, email communication with author, 13 August 2013.

13. Hood [12].

14. Pierre Schaeffer, *La musique concrète* (Paris: Presses Universitaires de France, 1967).

15. Hood [12].

16. Fox [2] p. 78; also Terry Fox, *Ataraxia: Works with Sound* (Edition 5 Press/Plate Lunch 3-922689-91-3, 1998, liner notes).

17. Reinhard Mey's track *Farben* was released by GMB H&CO on compact disc in 1990 (KG B0000089LS) and distributed by EMI Music, Germany.

18. Fox [2] p. 78.

19. Hood [12].

20. See for example the excellent collection of essays in Mark M. Smith, ed., *Hearing History: A Reader* (Athens, GA: Univ. of Georgia Press, 2004).

21. The observation is Bennett's. See David Bennett, "Lyotard, Post-politics and Riotous Music," *New Formations* 66, No. 1 (2009) p. 46.

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ANNOUNCING

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From Ear to Site: On Discreet Sound

Daniele Balit

RAGE AGAINST THE MACHINE

Sound has the ability to induce unsettling sensations such as disorientation, nausea or dizziness. Even so, it can be astonishing to see an entire audience driven into a violent rage, as I witnessed during Florian Hecker's concert at the Centre Pompidou in February 2012.

The empty stage and the illuminated auditorium made it clear from the beginning that Hecker was attempting to deny his listeners a conventional experience. However, his fast, cutting sounds triggered a rather unpredictable series of responses, bringing the room to a situation of total anarchy within a few minutes. At first, someone stood up flapping and screaming to have the volume lowered. This then sparked a further series of protests, some against a console controlled offstage by Hecker, while others were directed at the protesters themselves. A member of the audience burst onto the stage, firmly raising his middle finger at the artist. Another man soon followed—perhaps feeling the need for a more drastic action—and promptly tore down the PA system. The concert was finally brought to a standstill and the situation then reported to the police.

Among several possible readings of this episode, one could say that such revolt signified a powerful and abrupt moment of disobedience on the part of the listener. It can be read as a breaking point in the history of sonic experimentation, where the passive role often imposed on the audience by the composer had finally become subverted.

Hecker is known for manipulating sounds to act on a psychoacoustic level. Indeed, despite the fact that the Pompidou's audience impulsively demanded a decrease in volume, it would seem that their general intolerance was founded less on quantity (to the level of sound) than on quality (to the type of sounds). In my experience, these unsettling sensations were different from having the whole body exposed to high levels of sound, as for instance in the case of noise music. This was more about a breaching of intimacy. Hecker's piercing sounds provoked a violation of a particular space inside the head that is rather difficult to locate and thus to protect. The Pompidou riot was a revolt of the audience against such an intrusion of the composer, a way to deny access to their private, psychic space.

Sonic culture is a new yet very demanding area. It may require ear cleaning exercises (R. Murray Schafer), deep listening practice (Pauline Oliveros), sustained and active listening (Hecker) or "to adjust one's nervous system and vibrate with the frequencies of the environment" (La Monte Young) [1]. Such approaches somehow exert an authority on the audience; they claim to supervise the listening experience.

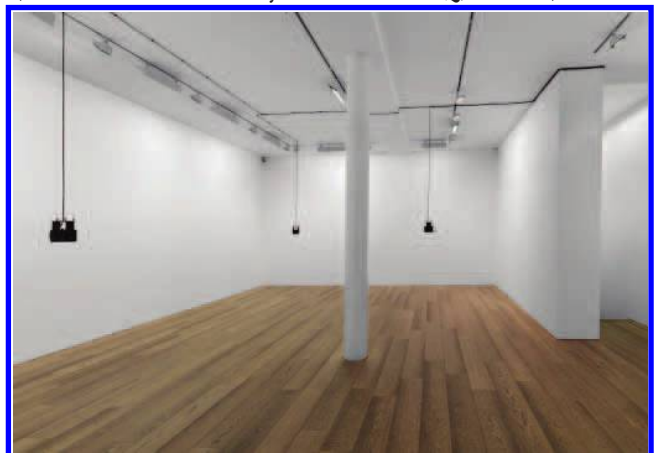
Yet surprisingly enough, no less a figure of reference than John Cage was quite critical of the idea of regulating the listener's attention: "It is like bringing the audience to school," commented Cage on Young's transcendental music. "But when you finish your studies and you enter in life you don't find in it the perfection you were trying to obtain" [2].

Dissociating himself from one of the most influential models on sonic practices, Cage rejected Young's essentialism as "dualistic." Such critique, even today, takes a novel position in the debate on sound, a debate that seems more often preoccupied with the hierarchies between the visual and the aural than with those that govern the internal processes of sound making. Undermining dualisms between subject and object, composer and listener, art and everyday life, was at the core of the Cagean project and should thus be recognized among the factors at the origin of a new sound aesthetics.

THE THIRD EAR

Psychoacoustics is one of the new distinctive areas surveyed by sonic practices. Since Young's minimalism opened up an unexplored microscopic dimension of sound, the "third ear," to borrow Maryanne Amacher's term, has been central for composers and sound artists. Hecker figures as someone who has recently expanded psychoacoustic research by making it a tool

Fig. 1. Florian Hecker, *Chimerization*, installation view, exhibition at Sadie Coles HQ, London, 23 November 2012–19 January 2013. (© Florian Hecker. Courtesy of Sadie Coles HQ, London.)



ABSTRACT

The notion of discreet sound arises through the encounter of the sonic avant-garde with the post-studio methods of the field of sculpture: a distinctive, situational aesthetics that aspires to relocate, and sometimes to disperse, the listening experience within the varied spaces of everyday life. In sound art, however, there seems a predominant interest in the sounding object as an experience delivered to the audience through indoor modalities. By comparing these two tendencies, this article observes some of the implications for the ways in which we think about the site and modes specific to listening practices.

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See <www.mitpressjournals.org/toc/lmj/-/23> for supplemental files associated with this issue.



Fig. 2. Florian Hecker, *Chimerization*, processed production still, 2012. The image, processed with a SIFT flow algorithm, depicts the anechoic booth used for the vocal recordings for *Chimerization* during a residency of the artist at the MIT/List Visual Arts Center, Cambridge, MA. (© Florian Hecker. Courtesy of Sadie Coles HQ, London.)

for conceptual investigation, as well as dissecting its perceptual scope through artificial processes often readapted from scientific fields.

For *Chimerization*, an immersive sound work premiered at DOCUMENTA 13 in Kassel, 2012, Hecker appropriated the notion of “auditory chimera” from medical research on cochlear implants (Fig. 1). The process of synthetically extracting and transferring properties between different perceived sounds served Hecker as a means to disrupt the way in which we detect voice. His “text sound

piece” therefore induces some continuous modulations in the way we recognize language, in an attempt to blur the differences between natural and synthetic vocal processes [3].

To emphasize the artificiality of these processes, Hecker recorded the voices that recite the textual material inside anechoic booths—an isolated and alienating situation that served as means to affect speech (Fig. 2). In this case, rather than the site for a contemplative Cagean experience, the anechoic chamber becomes a laboratory for the alteration of

sound. By eradicating echoes through the sound-absorbent materials of the booth, Hecker is basically silencing the essential relation between sound and space, cutting all ties with nature.

It is interesting to compare *Chimerization* with a work that originated from a similar interest in the physiology of the ear, yet developed in a different, if not opposite, direction: *Organ of Corti*, a device conceived by the duo Liminal (formed by architect Frances Crow and sound artist David Prior) and awarded with the PRS for Music Foundation’s New Music Award in 2010 [4] (Fig. 3). As with the phenomenon of the auditory chimera that inspired Hecker, Liminal’s project similarly refers to the way in which sonic frequencies are distributed and remapped across the surface of the inner ear. Yet unlike Hecker’s installation, the emphasis moves to the relation that this process entertains with space, since *Organ of Corti* essentially reproduces the “tonotopic mapping” phenomena, which happen inside the ear, on an architectural scale.

Rather than producing and controlling a sonic environment, as in Hecker’s case, *Organ of Corti* acts through a “passive” process, as an acoustic filter of the noise of the environment, responding only to the alternating range in frequency across space. This effect is achieved through the use of metamaterials, in this instance “sonic crystals”—artificial materials structured on a microscopic level to manipulate sound or light waves in specific patterns. While Hecker’s work was about



Fig. 3. Liminal’s *Organ of Corti* outside St. Paul’s Cathedral, London, July 2011. (© Liminal. Photo © Chris Kennedy)



Fig. 4. Michael Asher, untitled installation for the Gladys K. Montgomery Art Center Gallery at Pomona College, Claremont, California, 13 February–8 March 1970. View out of the gallery toward the street from a small triangular area. Photo taken with daylight. (© the Asher Trust. Courtesy of the Asher Trust. Photo courtesy of the Frank J. Thomas Archives.)

artificially interrupting the relationship between sound and space, *Organ of Corti* is about reorganizing found sounds and “framing them in a new way” [5]. Liminal’s approach insists on the contextual nature of sound as mirroring the structure of things, rather than affirming its own structure.

FIELD SITUATIONS

If we take a step backward, this morphological association of sound and space can be historically identified as the catalyst for the encounter between visual and aural languages. Some of Michael Asher’s early works, for instance, focused on the relationship between acoustics and architecture. His installation at Pomona College in California (1970) is one example in which he radically modified the configuration of the gallery. Asher removed the entrance door, lowered the ceiling and built some extra walls, creating a corridor for the intensification of the sounds coming from outside the gallery (Figs 4 and 5).

By such contextual and structural action on the auditory space, Asher somehow caused the gallery to function as a metamaterial, but by acting on the macrostructures of the gallery rather than by employing the microscopic patterns of sonic crystals. The Pomona installation furthermore parallels the idea of a passive device, not dissimilar to *Organ of Corti*. Both devices process a soundscape,

recontextualizing, rather than generating, sound.

Yet the distinctive aspect of Asher’s project is the way in which the auditory experience constitutes a vehicle for a critique of institutional norms (a main preoccupation of his career). The Pomona installation is an attempt to dilute the hierarchies between the visitor and the art object into a decentralized, topographical aural experience. Moreover, by opening a sonic corridor connecting

the outside world to the inside of the gallery, the work dismisses the norms of the modernist institution that perpetuate the quarantine of the artistic experience and transforms the gallery into an instrument that resonates with the sounds of the everyday—a way for Asher to relocate the artistic agency within the extramural [6].

A NEW HOME FOR MUSIC

The course taken by Asher in Pomona is one that fully embraces Cagean aesthetics, even though there are no accounts of direct influence. Asher’s installation transposes into the gallery context several of the principles upon which Cage structured his opposition to the musical tradition, namely, the rejection of the composition as object; its expansion beyond the walls of the auditorium; the dispersal of the performance space across the “field situation”; and the aim to free the artistic experience from predetermination and authorial control.

If we look at the evolution of sound aesthetics, however, it seems that its main trajectories lead elsewhere. Exploded, imploded or chimerized, the sonic object remains ascribed to a framework that actually conserves the chain of hierarchies expressed by the subject-object relation (and the Pompidou riot demonstrates how this bond can be perceived as imprisoning).

From Young’s immersive environments to the neo-modernist and sensory-based approach to sound [7], from concrete to electroacoustic morphing, the act of listening seems to have been reconducted,

Fig. 5. Michael Asher, axonometric drawing of the installation for the Gladys K. Montgomery Art Center Gallery at Pomona College, Claremont, California, 13 February–8 March 1970. Thicker line indicates configuration of the space within the gallery. (Drawing by Lawrence Kenny. © the Asher Trust. Courtesy of the Asher Trust.)

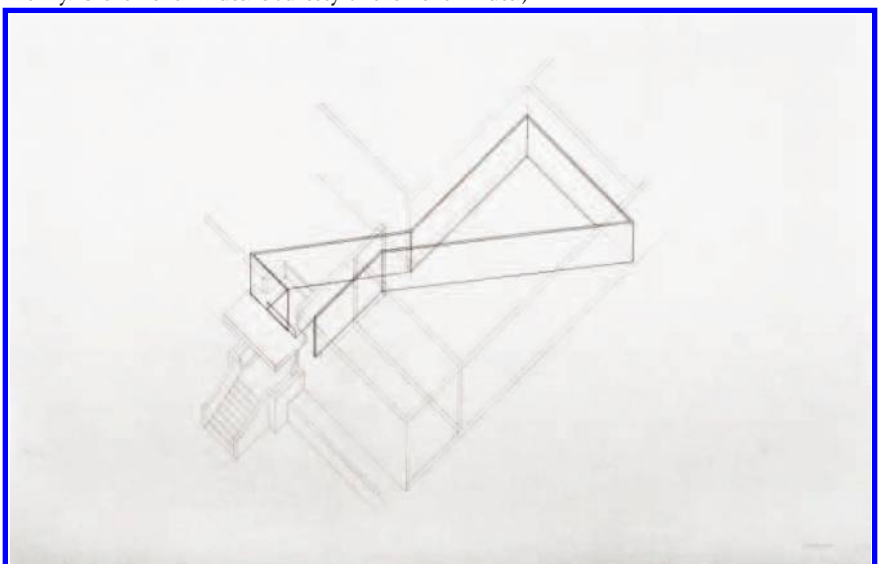




Fig. 6. Susan Philipsz, *Surround Me—A Song Cycle for the City of London*, Artangel commission, London, 9 October 2010–2 January 2011. (© Susan Philipsz. Photo: Nick Ash, Courtesy of Susan Philipsz, Galerie Isabella Bortolozzi, Berlin)

FROM SPACE TO PLACE

“A place has a character; a space doesn’t have a character,” said Neuhaus, in relation to his “place works,” which were mainly devised for outdoor situations. “So calling them ‘sound spaces’ didn’t make sense. They are about building a place, a new place from my imagination, out of a specific place” [10]. The passage from space to place seems also to be a significant concern in more recent sound-based practices, notably those of Susan Philipsz (Fig. 6) and Janet Cardiff. By remodeling places through aural tools, both Philipsz and Cardiff create some experiential misreadings: confounding inner and outer worlds, producing shifts between what is perceived and what is imagined; between the visible and the invisible. Although these artists often operate outside the gallery space, it is interesting to register how they have both received firm institutional backing [11].

An ecological system within art is inherently affected by contradictions. When speaking about the risks in the cohabitation of art with life, philosopher Jacques Rancière warns of a loss of autonomy, of diluting art’s *difference* in the everyday [12]. However, just as Erik Satie defended the nonmusicality of his furniture music, the discreet practice acts on the possibility of integrating this paradox into its format. This perhaps explains why Neuhaus decided to locate his famous *Times Square* sound installation (1977–1992, 2002–present) in one of the noisiest places in the world (Figs 7 and 8).

The somewhat radical position taken up by Neuhaus indeed fully accepted the

or rather maintained, in the intramural context. The notion of the soundscape itself has turned into an objectified experience, captured and transcoded into indoor formulas, despite R. Murray Schafer’s claim for the recontextualization of our listening practice beyond the walls of the auditorium [8].

Yet Cage’s project concerns itself more with an “ecological music” rather than with an acoustic ecology—a notion he adopted privileging the original meaning of the Greek term *oikos* (home), as he sought to enable music to inhabit the world.

Considering how the sonic field has generally dismissed the extramural hypothesis, the individual trajectories of artists such as Asher or, to cite another significant example, Max Neuhaus, are distinctive in the way they have located the tools to pursue a post-Cagean musical project within a post-minimalist sculptural practice—Asher fairly intermittently, as mentioned above, whereas Neuhaus did so with a more dedicated and extended engagement.

Both of these artists moved away from minimalism’s purely phenomenological, gallery-focused approach towards a situational aesthetics (where the term “situation” stands for an expanded notion of site)—a shift in the field of aural practices that I propose as “discreet sound”: namely, attempts to expand the artistic

territory through critical *in situ* interventions, contextual works, infiltrations and other forms of intrusion within the social fabric, often resulting in less visible and non-object-based outcomes. Rather than affirming the artistic presence, the primary focus of these strategies is to generate new forms of interrogation within “ordinary” reality, as an aural practice subsumed within a context-oriented, aesthetic program [9].

Fig. 7. Max Neuhaus installing *Times Square*, 1977. (© Estate of Max Neuhaus. Courtesy Butler Library, Columbia University.)



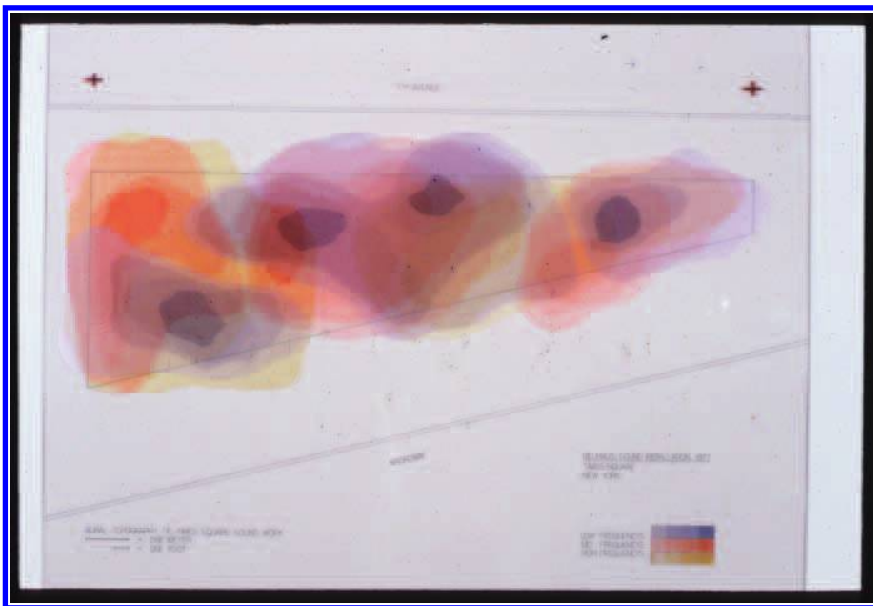


Fig. 8. Max Neuhaus, *Aural Topography of Times Square Sound Work*, drawing on paper, 1977. (© Estate of Max Neuhaus. Courtesy Butler Library, Columbia University.)

possibility of the nonexistence of music. His works in public space were not necessarily required to be experienced and identified as art. Likewise, in his *Sirens* project (1978–1989), he was at ease in dismissing the artistic context, devoting himself to patenting an improved signal for emergency vehicles (Fig. 9). Here Neuhaus trespassed into the field of urban sound design, mirroring the hybridization of disciplines that in later years would become characteristic to Liminal’s research.

And yet just as *Organ of Corti* won an

award in the category of music, Neuhaus’s work fundamentally remains rooted in artistic discourse. If this were not the case, then it would have been unlikely for *Times Square* to have gathered the financial and institutional support necessary to reactivate such a complex public artwork and then to maintain it as a permanent installation. It is precisely this ambiguity, the impossibility of setting a fixed definition for this form of artistic agency, that marks discreet aesthetics. Referring again to Rancière, it is the unstable condition between art and

Fig. 9. Max Neuhaus testing for his *Sirens* project, 1978–1989. (© Estate of Max Neuhaus. Courtesy Butler Library, Columbia University.)



non-art that allows an “aesthetic regime” to occur, causing the reconfiguration of the real.

Unlike the sensory plenitude and sonic *continuum* often pledged by sound art, the project for discreet sound acts in a fragmented fashion. While remaining distinct from ordinary life, it interferes with and syncopates the rhythm of natural occurrences.

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7. Christoph Cox, “Return to Form: On Neo-Modernist Sound Art,” *Artforum* 42 (November 2003) p. 67.
8. See on these issues: Michael Fowler, “On Listening in a Future City,” *Grey Room*, No. 42 (Winter 2011) pp. 22–45.
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11. Philipsz for example won the 2010 Turner Prize with *Lowlands*, a site-based sound work installed beneath bridges in Glasgow.
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Manuscript received 2 January 2013.

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Translating Transformations: Object-Based Sound Installations

Ethan Rose

In the past century, electronic music has positioned sound away from the visibly performing body and within the exclusive realm of the auditory. Through the process of recording, the sonic event can be both temporally and spatially dislocated from its visible counterpart, and this has greatly impacted the relationship between music and performance. Many critics and musicologists have explored the ways in which this condition of reproducibility affects the live performance of electronic music. Instead of investigating the specificities of the traditions of performance in regard to the stage, I am interested in exploring the ways in which the performance of electronic or studio-based composition plays out in the less-traditional art form of sound installation.

The specific sort of sound installation I discuss here has not, to my knowledge, been categorized. I am not particularly interested in the idea of assigning categories, but for the sake of discourse, I will describe this type of installation as an *object-based sound installation*. I would typify the works that fall under this heading as those that engage an audience by actuating a visibly present object. My intention is to describe how these object-based sound installations exist in a linkage between sight, sound and body in dialogue with the history of electronic music and more specifically the ways in which these installations translate the transformative powers of the sound studio into visibly embodied articulations. In order to convey this idea, I begin by broadly outlining a brief history of listening in the West; then, in the second half of this paper, I outline specific examples of installations that engage this history through the nature and form of their content.

THE DISTILLATION OF LISTENING

Over the course of the past decade, a number of texts have emerged that investigate and historicize contemporary modes of listening. I am thinking specifically of Jonathan Sterne's *Audible Past* [1] and Emily Thompson's *Soundscape of Modernity* [2]. These authors, among others, point to modernity's rationalization of the senses and the subsequent impact on listening, technology and the West's understanding of the sonic. Historically, one can trace this rationalization of the senses to antiquity, when Greek philosophers separated the senses into five discrete categories [3]. This concept was reinvigorated in the Renaissance through the philosophy of Descartes and his contemporaries, who conceived of these perceptions as mechanisms of the body from which the mind can gather an understanding of the world [4]. In the modern era, the

technology of sound recording, transmission and synthesis can be understood as emerging from the historic distillation of listening as a discrete category of perceptual experience. As Sterne states: "During the Enlightenment and afterward, the sense of hearing became an object of contemplation. It was measured, objectified, isolated, and simulated" [5].

Along with other cultural factors, this objective understanding of sound through the lens of Western science and philosophy contributed to the birth of absolute music in the Romantic era. Absolute music was considered to be autonomous, internalized and separate from the worldly and was positioned in opposition to program music, which was considered to be narrative and therefore of the world. It is important to note that these cultural constructs of musical form both enabled and were enabled by the concept of listening as a separate sense. The rationalization of perception laid the groundwork for an understanding of listening that transcends the visible world through the gateway of sonic purity. In this regard, the absoluteness of music is interwoven with the idea of listening as a distinct perceptual experience.

Coinciding with this concept of absolute music, and similarly related to a rationalization of the human body, was the development of automated musical instruments. These instruments mimicked and extended the actions of the human body through the use of mechanical technology. Automated instruments date back to antiquity but rose in popularity in the late 19th century as new developments in technology and production increased [6]. These instruments removed the performer from the performance of music, replacing the instrumentalist with a mechanical, material object, and in the process circumnavigated the performer's mediation between the composer and the heard composition. The automated instruments also manifested an exacting clockwork performance, one that could be reproduced again and again without the intervention of human interpretation or error.

The same cultural circumstance that gave rise to both the performerless reproducibility of automated instruments and the aural-centrism of absolute music led to the possibility of recorded sound. It is crucial to note that electronic music and the sound studio emerge from this history as *the* ideal, absolute, rationalized "nonplace" that focuses attention away from the other senses and into the domain of the ear. It is within the hermetic seal of the recording studio that the idealized hegemony of the heard is made manifest through the technology of sonic reproduction.

ABSTRACT

This paper defines the *object-based sound installation* as a distinct category of sound art that emerges from the intersection of live musical performance and the sonic possibilities of the recording studio. In order to contextualize this emergent category, connections are drawn among the rationalization of the senses, automated musical instruments, the lineage of recorded sound and the notion of absolute music. This interwoven history provides the necessary backdrop for the interpretation of three major works by Steven Reich, Alvin Lucier and Zimoun. These respective pieces are described in order to elucidate the ways in which object-based sound installations introduce embodied visibility into the transformative gestures of sound reproduction.

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See <www.zimoun.net/80-prepared-dc-motors-cotton-balls.html and <https://vimeo.com/40287244> for supplemental files associated with this article.

The recording studio yielded a sensation of command over nature in new and powerful ways. More specifically, the studio allowed for the manipulation of the most fundamental building blocks of how we experience sound. The composer is able not only to synthesize content away from the world but also to change the sonic event through transformations of space and time. These manipulations unfold in ways that appear to transcend our corporeal limitations, outfitting the studio practitioner with tools that simulate a material control over nature. For instance, with the advent of recorded sound, we are able to start and stop events in time in unnatural and physically impossible ways. Time can be reversed, slowed down, sped up, cut up and reordered. Similarly, physically impossible spatial environments can be created through the use of reverb and echo; alternatively, by adjusting volume between sources, the simulation of unworldly relational proximities can be established. In many ways, these transformations can be understood as fantastic extensions of our corporeal selves in pursuit of a pure sonic reality that transcends the physical world. Absolute music is thus inextricably intertwined with the fabric of the sound studio.

A formal investigation of transcendence of the worldly can be plainly recognized in Pierre Schaeffer's *musique concrète* of the 1940s. Through the use of the studio techniques outlined above, Schaeffer worked to create a philosophy of music that functions as a complete dislocation of listening from the other senses. Schaeffer's *objets sonores* (sound objects) were meant to be heard not as referential signifiers but instead as sounds unto themselves, divorced from the context of visual meanings [7]. *Musique concrète* moved the act of composition into the studio and in so doing complicated the traditions of music, especially in regard to its performance. Schaeffer and his contemporaries were confronted by the fact that works created in the idealized neutrality of the recording studio were difficult to situate outside of the studio environment. To "perform" these works often simply involved placing speakers on a stage in place of human performers. The speakers acted as visually static objects that exactly reproduced the previous actions of the composer.

In an effort to extract listening from the other senses, modernity distilled the concept of absolute music into the idealized form of absolute sound. Polemically prescribing a distinct success or failure of this inclination seems less important

than addressing the sustained impact of the questions that it raises. Recording technology and the modernist approach to absolute listening have created a diverse range of response within the disciplines of music and sound art. In the second half of this paper I explore what I understand as a distinct reaction to this history: the emergence of object-based sound installations meant to translate the tools of the recording studio into a visible, bodily presence. I do not advocate these works as *the* solution to the modernist problem but rather note their delineation of a specific set of questions with which to investigate the conditions of sound-making in relation to the experience of contemporary listening.

PENDULUM MUSIC

For the first example, consider Steve Reich's *Pendulum Music* (Fig. 1), composed in 1968. Reich's score describes the piece as follows:

2, 3, 4, or more microphones are suspended from the ceiling by their cables so that all hang the same distance from the floor and are all free to swing with a pendular motion. Each microphone's cable is plugged into an amplifier which is connected to a speaker. Each microphone hangs a few inches directly above or next to its speaker [8].

The performance begins with the performers each taking a mic and pulling it back like a swing; all then release each one in unison. The performers then carefully turn up each amplifier just to the point at which feedback occurs when a mic swings directly over or next to its speaker. Thus, a series of feedback pulses are heard that may all occur in unison depending on the gradually changing phase relations of the different mic pendulums.

Performers then sit down to watch and listen to the process along with the audience. The piece is ended sometime after all the mics have come to rest and are feeding back a continuous tone, as performers have pulled out the power cords of the amplifiers [9].

This piece is clearly not an installation as such. It is a composed score that calls for a series of specific actions from a group of human performers to a seated audience. However, I wish to start with this composition because it can be easily understood as a work that combines the tools of the sound studio with the conventions of performance in a way that leads toward the idea of object-based sound installations. Also, the performers appear almost inconsequential to the

work; as the score explains, they trigger the piece and then retire to the audience as the work unfolds.

In this performance, what we see is inextricably tied to what we hear. Reich takes a single condition of sound technology (feedback) and combines it with a single condition of physical motion (the swinging pendulum). Either of these conditions would be extremely familiar to most anyone who has ever seen a mechanical clock or attended an amplified concert. Through an intentional didacticism, the two culturally prevalent conditions converge, and the audience quickly becomes aware of how the piece functions through the process of its unfolding. This extremely intentional visual didacticism is important in the wake of modernism's separation of the senses. In order to be understood, the process is to be watched as well as listened to.

The idea of *watching* microphones and speakers as opposed to just listening to these speakers problematizes modernism's idea of absolute listening by embracing the visibility of motion. The same speakers that statically rested on the stage of Schaeffer's absolute music are dynamically repositioned and perform through embodied movement. Instead of reproducing pre-composed sounds, the work transforms sounds into instruments that produce unique feedback tones based upon their physical forms (shape, weight, size, etc.), as well as on their relationships to the material aspects of the microphones and the acoustic resonance of the performance space. The speaker/microphone/space interaction becomes an instrument of sorts, albeit an instrument that is (almost) visibly devoid of the bodily presence of a human performer.

Through the motion of their interaction, the microphones and speakers transcend instrumentality in the conventional sense and can be better understood as gestural performing bodies in and of themselves. This is strikingly similar to the conditions of the automated musical instruments that predate recording technology. For instance, the instruments produce sound through visible motion in the absence of a human performer. The performers clearly instigate the piece but quickly depart the stage to focus audiovisual attention on the body of the instrument. Like the player of automated instruments, the performers require no training or musical skill; simply dropping the microphone and adjusting the volume are reminiscent of winding the spring on a music box or cranking a pump organ—basic actions that any novice could perform. Just as with

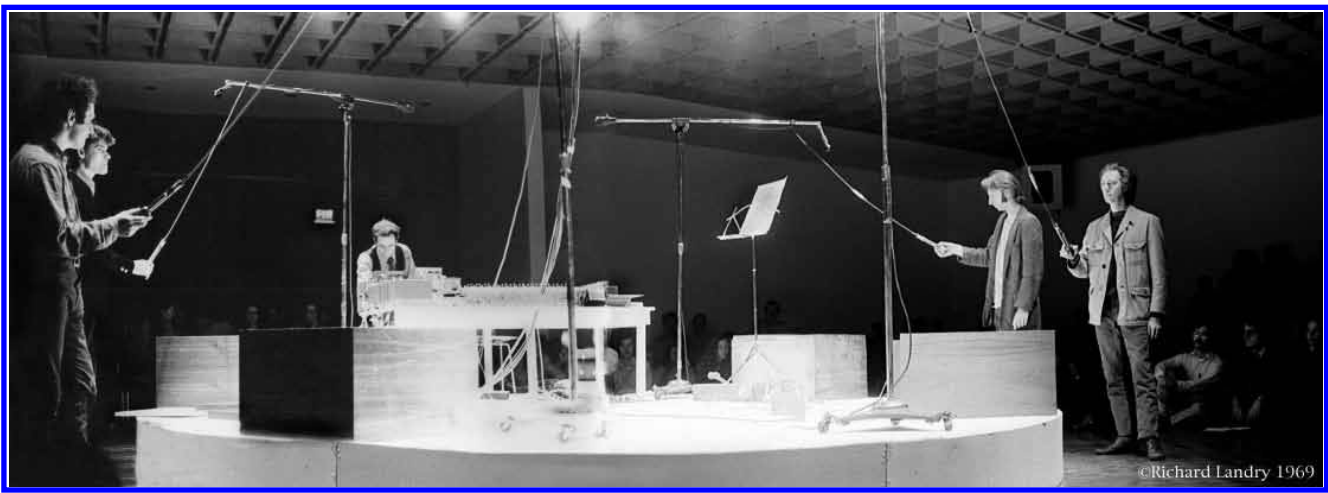


Fig. 1. Steve Reich, *Pendulum Music for 3 or 4 Microphones, Amplifiers and Loudspeakers*, composed in 1968. (© 1980 Universal Edition [London] Ltd., London/UE 16155. Photo courtesy of Richard Landry. Used by permission.)

an automated instrument, the apparent motion and causality of the sound-producing object is simultaneously seen and heard. Even the pendular motion directly evokes an antiquated, mechanical, clockwork device, further tying the work to a mechanical past.

However, *Pendulum Music* does not simply mimic the automated musical instruments of time gone by. It is important to note that the repeatability of the composition is, by intent, *not* exactly reproducible in the way that automated instruments generally are. Each time the performance occurs, it will sound slightly different, depending on a whole host of worldly factors. In this way, *Pendulum Music* passes through the lens of automated instruments by engaging an imprecise mechanism that depends on physical laws. Visually revealing the undoing of reproducibility through the mechanization of the very tools of reproducibility is a clear departure from the modernist ideal.

In an effort to bring the transformative tools of the recording studio into a performance setting, *Pendulum Music* positions the technology of the sound studio against the history of automated instruments and more generally against the history of performance and reproducibility. Reich eventually went on to depart significantly both from studio technology and from the performerless approach of sounding objects, focusing instead on a body of work that dealt explicitly with a return to human performance.

MUSIC ON A LONG THIN WIRE

The second piece I discuss is Alvin Lucier's *Music on a Long Thin Wire* (Fig. 2). Lucier instructs:

Music on a Long Thin Wire is constructed as follows: the wire is extended across a large room, clamped to tables at both ends. The ends of the wire are connected to the terminals of a power amplifier placed under one of the tables. A sine wave oscillator is connected to the amplifier. A magnet straddles the wire at one end. Wooden bridges are inserted under the wire at both ends to which contact microphones are imbedded, routed to a stereo sound system. The microphones pick up the vibrations that the wire imparts to the bridges and are sent through the playback system. By varying the frequency and loudness of the oscillator, a rich variety of slides, frequency shifts, audible beats and other sonic phenomena may be produced [10].

Like Reich's *Pendulum Music*, Lucier's piece includes a set of distinct instructions that trigger a visual/sonic experience that depends on the basic physicality of material conditions. At first Lucier experimented with performing on the wire by manipulating the pitch of the audio oscillator but ultimately he decided to remove the presence of a visible human performer, choosing instead to leave the oscillator on a single setting. "I discovered that by carefully tuning the oscillator, the wire could be left to sound by itself. Fatigue, air currents, heating and cooling, even human proximity could cause the wire to undergo enormous changes" [11]. Lucier's piece may not be as extreme in its visibly didactic qualities as Reich's, because many of the conditions that affect the sound of the work are not visible. However, the visibility of the wire in motion is extremely important, as Lucier instructs: "Light the wire so that the modes of vibration are visible to viewers" [12].

While it may not be clear to most visitors what exactly is causing or affecting

the vibration, the visibly vibrating wire is clearly creating the sound that one hears. By translating a pure and invisible mode of sonic vibration (a sine wave oscillator) into a visible, physical material (a vibrating metal wire), Lucier converts the nonvisual sonic techniques of the sound studio into the visible realm of a performing object.

Lucier's choice to treat this work as an installation as opposed to a performance is significant. While it is possible to vary the oscillation and play the wire as a live performer, Lucier "decided to remove [his] hand from the musical process" [13]. In this sense he goes one step further than Reich, divorcing the visibility of the performer entirely from the performance of the musical process. This choice puts an even greater emphasis on the visible/auditory presence of the object, allowing visitors to approach the material intimately without the usual boundary of audience/performer. The performerless, automatic nature of the work allows a close proximity to materiality that is also reminiscent of mechanical musical instruments. With the removal of the performer, one becomes not only more aware of the mechanism of performance but also more intimately attentive to the material that is producing the sound.

The installed nature of a work such as this also undoes any idea of fixed performative duration. The sound of the wire proceeds continuously, limited by the duration of its exhibition rather than by the timed attendance of a seated audience. In this way, the piece fades in as each visitor makes a bodily approach and fades away in volume upon departure, mimicking the ebb and flow of a volume pot as it is turned up or down in

a studio. Just as the music might seem to continue after the volume fades out on a vamp at the end of a pop song, so does a sound installation physically engage this sense of continuity as one departs the space. It is through the movement of one's body that one fades the volume of the piece down, simply by walking away from the installation. The audience is put in bodily control of the termination of their own musical experience, subtly translating the transformative processes of the recording studio into a physically embodied experience.

**80 PREPARED DC-MOTORS,
COTTON BALLS, CARDBOARD
BOXES 71×71×71CM**

The final work to address is one by Zimoun, a contemporary Swiss artist known for a growing number of object-based sound installations. Utilizing commonplace, inexpensively procured materials, Zimoun's work grows out of the advancing popularity of DIY electronics. In *80 prepared dc-motors, cotton balls, cardboard*

boxes 71×71×71cm, 80 cotton balls attached to 80 DC motors randomly beat against 80 cardboard boxes (Fig. 3). Repetitions of this single mechanical action combine in great number across stacks of boxes to create a dense and continuous soundscape.

The repeating forms of single points of sound are relatable to more recent developments in recording technology that allow electronic musicians to copy, cut and paste sounds over and over again, looping and layering a single sound event into a similarly dense sonic landscape. Zimoun has successfully translated this digital editing process into a mechanical, physical presentation, thus making visible the layering that the studio so easily allows. The use of industrially manufactured materials allows the physical objects visually to mimic the reproducibility of sound in the studio environment.

Of course this reproducibility is complicated by the inherently idiosyncratic sonic quality of each object's sound. Thus, the exacting uniformity of the material is partially undone by the subtle

acoustic differences that can be heard within the sonic character of each individual object. This aspect of the installation is intensified by the spatialization of the work. Upon entering the space, one hears an apparently continuous sound, but as one approaches the work, what emerges is an auditory awareness of the distinct rhythm and timbre of each of the sounding objects. The visibility of the object's motion emphasizes this relationship, allowing the listener visually to focus in and to hear the individual sonic event of a single cotton ball in motion.

In a sense this spatialization of discrete sound events encourages visitors to mix the piece by moving through the space with their own bodies. The body of the listener again mimics the volume fader of the studio, intensifying and focusing attention on specific sound events within the context of a larger whole. Also, as in Lucier's and many other sound installations, when we depart the space we perform a final bodily interaction as the sounds of the installation crossfade into the sounds of the everyday.

Fig. 2. Alvin Lucier, *Music on a Long Thin Wire*, conceived in 1977. Realization for the film *NO IDEAS BUT IN THINGS—The Composer Alvin Lucier* by Viola Rusche and Hauke Harder at the Hamburger Bahnhof, Berlin, 2011. (© Alvin Lucier. Photo © Viola Rusche and Hauke Harder.)





Fig. 3. Zimoun, *80 prepared dc-motors, cotton balls, cardboard boxes 71x71x71cm*, sound installation, 2011. (© Zimoun. Photo courtesy of Studio Zimoun.)

All three of these examples present attempts at new modalities of performance by breaking away from the sonic hegemony of the recording studio and into the realm of visibly embodied sonic objects. These works do not represent a denial of the recording studio as a tool of aesthetic discovery but can rather be understood as a unique approach to the performance of sonic transformations. The way in which these works make use of a visible mechanism should be understood not as a nostalgic step backward toward some pre-rationalized time but instead as a way of addressing fundamental questions concerning the history of musical performance, reproducibility and the separation of the senses. Reflective of our immersive position within the current technological era, these works inventively occupy the threshold of virtual construction and embodied experience.

Object-based sound installations exist in dialogue with the history of listening in the West as they seek to introduce sight and body into the transformative possibilities of the recording studio.

Manuscript received 2 January 2013.

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Sound artist and composer Ethan Rose has released recordings, scored films, constructed performances, created sound installations and worked with a variety of collaborators. In works that manifest across a range of media, Rose's consideration of sound reaches out from the formal mechanics of studio composition to investigate revealed gestures of sonic transformation.

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Dead Silence: Ecological Silencing and Environmentally Engaged Sound Art

Dugal McKinnon

Silence in sound art assumes multiple roles and forms, which are not true acoustic silences but rather sonic liminalities in both the perceptual and acoustic senses; sounds that we can barely hear or of which we are not aware until alerted to them. Heard this way, silence corresponds to the best known of all silences in the arts, that of John Cage, which of course is not silent at all. As Cage put it, “There is no such thing as an empty space or an empty time. There is always something to see, something to hear. In fact, try as we may to make a silence, we cannot” [1]. Cage’s repurposing of the intentional listening of musical experience opened up the sonic environment to the same aesthetic appreciation that had until then been associated most strongly with music. Cage’s silence was a provocative foray into the heterogeneity of the sonic environment, extending from the Futurist fascination with urban-industrial sound (as Cage commented late in his life, “The experience of silence . . . almost anywhere in the world today, is traffic” [2]), and his work established the ground for the emergence of soundscape composition and acoustic ecology, evident in the influence of Cage upon R. Murray Schafer [3].

Cage’s silence is predicated on acoustic presence, however marginal it may be. To experience Cagean silence (“ambient noise”) is to give attention to what is already there to be heard—all sound [4]—and which is most often ignored or, in a long obsolete sense of the word, overheard (as in overlooked), by attention to what is supposed to be heard (music and speech). Douglas Kahn critiques Cage’s silence for its silencing of the polymorphosity of sound, reducing it—in a move kindred to Pierre Schaeffer’s *écouter réduite*—to sound alone, which he argues makes it also a process of musicalization. According to Kahn, Cage’s attention to all sound is little different in intent from Schaeffer’s fixation on *l’objet sonore*, as musicalizing the everyday world of sound is also an act of silencing social, political, ecological and other dimensions of sound, just as Schaeffer’s need to create formally malleable sonic materials required the stripping away of causal and semantic properties of sound [5]. More recently, Seth Kim-Cohen [6] has extended Kahn’s critique through his agitation for noncochlear sound art, which attends to the nonsounding dimensions of the sonic, chiefly the conceptual, and the use of these in sound art. Yet while it is apparent that Cage wanted sound to be nothing more than itself (“I love sounds, just as they are, and I have no need for them to be anything more” [7]), his calling attention to the sonically liminal reconceived the act of listening, and through the musicalization of all sound, the aestheticization of the *sonus mundus*, he established a means by which silence could be heard.

Cage’s contribution to the emergence of soundscape composition and acoustic ecology is apparent in the formal definition of the soundscape as “the sonic environment” [8], suggesting that all sound constitutes the soundscape. Silence is of course a component of the soundscape and is understood pragmatically within acoustic ecology and soundscape composition. In Barry Truax’s definition, a hi-fi soundscape is one in which the sonic environment is acoustically transparent. It is one that is comparatively silent, in that there is a relative absence of ambient, or unwanted, sound in comparison to lo-fi soundscapes, which are acoustically opaque, or noisy [9]. Given the green tone of acoustic ecology and soundscape composition, hi-fi soundscapes in that context connote the prized natural environment while lo-fi soundscapes are associated with the (debased) built environment. The sounds of the natural world, or pre-urban-industrial soundscape, are valued, while sounds associated with the built environment, such as Cage’s beloved traffic, are not. This binary valuation has often been challenged in recent times, not least of all by Francisco López, who points out that many natural environments are terrifically noisy [10].

Despite the foregrounded (if noise abatement-fixed) ecological concerns of these movements, Schafer and Truax appear to adhere to an understanding of silence that, like Cage’s, is based on acoustic presence and functions according to the logic of silencing and musicalization. Acoustic ecology is open to all sound in principle only. In practice some sounds and soundscapes are desirable and valued while others are not. The hi-fi soundscape is therefore concerned with silence in a non-Cagean sense; it is (relative) acoustic silence, or quiet, which serves as a frame within which esteemed sounds can be readily auditioned [11]. Those sounds without musical value are to be silenced in the interests of the hi-fi soundscape, while acoustic silence itself is to be increased so as to increase the acoustic transparency of the soundscape and enlarge its audible horizon. This means that acoustic ecology, while deeply concerned for the audible presence of select sounds, is predicated on the acoustic silencing of others. This, however, is not only a tool in the kit of acoustic ecology. It is also a negative endpoint in audible ecologies: There are sounds and soundscapes that are threatened with silencing or that have already been silenced. As the slogan has it, “Extinction is forever.” It is of course the case that it is not the extinction of sounds that should give cause for concern, but the extinction of the things that make those sounds or the ecosystems

ABSTRACT

Silencing and musicalization, as defined by Douglas Kahn, are valuable means to call attention to the sonically liminal. They create a frame within which acoustic silence can be attended to, either as a conceptual phenomenon or as the dead silence of sounds and soundmakers subjected to ecological silencing. Through critical discussion of silence in Kahn’s writing on John Cage, as well as in acoustic ecology and soundscape composition, an outline of ecological silencing is developed and applied through the examination of environmentally engaged sound works by Sally Ann McIntyre of New Zealand and Katie Paterson of Great Britain.

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See <everyleafisnear.blogspot.co.nz/2011/04/collected-silences-for-lord-rothschild.html> and <www.katiepaterson.org/icerecords/> for supplemental files associated with this issue.

in which they are enmeshed. This raises a question: To what extent is acoustic ecology, and also Cage, concerned with silencing in an ecological sense? It could be alleged that the silencing engaged in by both acoustic ecologists and Cage contributes to sonic species loss, in terms of reducing awareness of and openness to the diversity of the soundscape and the heterogeneous nature of sounds themselves. Certainly this resonates with the positions that Kahn and Kim-Cohen advance concerning the soundscape post-Cage; yet Kahn does not elaborate on ecological silencing in his discussion of Cage [12], and Kim-Cohen is too busy with the conceptual potential of sound to attend its ecological fate. The acoustic ecology community, on the other hand, would be affronted by the notion that the sounds of things matter more than the things that make sounds. Yet it is the case that the loss or degradation of sounds and soundscapes themselves is often emphasized in this community, this in itself being a matter of concern to acoustic ecologists: “Do we care about sound primarily, or ecology?” [13]

Ecological silencing is properly un-

derstood as an ecological event. Indeed, there’s very little discussion of silence per se in Rachel Carson’s epoch-making environmentalist text *Silent Spring*. Carson’s concern was not for silence itself, but silence as a symptom of dangerous human interventions into the natural world: silence as an outcome of the effects of synthetic pesticides, DDT in particular, on the biosphere. In the book’s opening chapter, Carson describes a fictitious but typical mid-20th-century American town blighted by the effects of “a white granular powder [that] some weeks before had fallen upon the roofs and the lawns, the field and streams.” The outcome of this dusting of pesticide is a “spring without voices. On the mornings that had once throbbed with the dawn chorus . . . there was now no sound; only silence lay over the fields and woods and marsh” [14]. In this context, aesthetic concern for silence itself sounds inappropriate. Silence, as a signal that all is not well in the biosphere, is to be filled with the sonic abundance—noisiness—that signals a healthy ecosystem. The sonic image of a silent spring is a powerful one, and as a pioneering environmental activist Carson successfully

deployed this image to mobilize public opinion against synthetic pesticides in the United States. The aestheticized, which is to say musicalized, sound-image of a silent spring, itself inspired by a line from Keats’s poem *La Belle Dame Sans Merci* (“The sedge has wither’d from the lake, / And no birds sing.”), is a means to sound out the real-world problem signaled by silence.

For contemporary sound artists engaged with environmental matters in which silence plays a role, the question is: How to make dead silence speak? How to represent and deploy it meaningfully and in ways that do not cloak it in the habits of silence associated with Cage and acoustic ecology? One of the most problematic silences for both Cage and acoustic ecology is the substitution of recorded for live sound [15]. The fear here, following Jean Baudrillard’s theory of simulation, is that the recording silences the living, sounding thing. This perennial concern, encapsulated in Schafer’s concept of schizophonia as an aberrant technological phenomenon, is as old as recording technology itself. In contrast to this perspective, however, recording

Fig. 1. Sally Ann McIntyre, *Collected Silences for Lord Rothschild (*Heteralochaacutirostris*, *Scelogaualbifacies*)*, sound/transmission art, 2012. Transmission at entrance to track 4, Waiorua Valley, Kapiti Island, 17 May 2012, 5:03pm, 25min. The broadcast of the recorded silence of mounted specimens of extinct species into their former habitat highlights ecological loss. (© Sally Ann McIntyre. Courtesy of the artist.)





Fig. 2. Katie Paterson, film still from *Langjökull*, *Snæfellsjökull*, *Solheimajökull*, three digital films, 1h 57m, 2007. Sound recordings of three Icelandic glaciers on records made of frozen meltwater from those glaciers are played until the records melt, mimicking the loss and silencing of their source. (© Katie Paterson. Courtesy of the artist.)

can be used to musicalize acoustic silence as the horizon of the audible [16], bringing it into dialogue with Cagean silence and, as we will shortly hear, creating a powerful affective tool through which to address ecological silencing.

The musicalization of acoustic silence is made possible by the intentional act of recording that functions as a framing device for acoustic silence. This is a Cagean move: the giving of duration to something that is without duration, just as *4'33"* gives form to the silence of the place of listening, thereby calling attention to what is acoustically present there. If nothing is acoustically present, or if the thing being recorded cannot be acoustically present, then recording—and listening—draws attention to the acoustic silence of that thing. Such a move can be conceptual, as in Yoko Ono's *Tape Piece III* [17] or artist Julian Dashper's recordings of canonic artworks of the 20th century [18]. When the intention of the work is ecological, however, acoustic silence takes political form; the gap between the acoustic absence of silenced thing and the Cagean silence we hear around it calls attention to the irrevocable loss inherent in that heterogeneous silence. This is achieved in Sally Ann McIntyre's transmission arts piece, *Collected Silences*

for *Lord Rothschild* (2012) (Fig. 1), which replicates Dashper's move but with an ethical-environmental dimension:

Recordings of the mounted specimens of two species of endemic New Zealand birds, the Huia (*Heteralochaacutirostris*), and the Laughing Owl or Whekau (*Sceloglauxalbifacies*) held in the collection of The Museum of New Zealand Te Papa Tongarewa. Both these species were driven to extinction, partially through the actions of European collectors, in the early 1900s. They were both still recorded as alive during the twentieth century's first blossoming, after the invention of recording technology, but neither of their songs are on record [19].

Making dead silences speak may also be predicated not on acoustic silence but, taking a conceptual turn, by evoking the ecological silence of an extinct thing through sound. Another work by McIntyre, *Huia Transcriptions* (2012), uses "transcriptions to music box of one of the few extant accounts of the calls of Huia (*Heteralochaacutirostris*), as notated by a Mr. H. T. Caver in the late 1800s," which are "played back in the early morning chorus into forest areas of Kapiti [Island, NZ], amplified non-electronically on the trunks of species of trees Huia would likely have climbed" [20]. What this allows us to hear, negatively mag-

nified through the audible presence of living birds, is the silence of the extinct Huia, as the simple transcriptions and music box realization of these fail, poetically and affectingly, to do anything more than gracefully approximate a call known only through musical and textual descriptions [21].

The schismogenesis of recording, a more productive conceptual cousin to Schafer's schizophonia, also plays a vital role in environmentally engaged sound art such as McIntyre's. Schismogenesis, in Stephen Feld's use of the term (itself borrowed from Gregory Bateson), brings a new kind of sonic entity into being, which reveals aspects of its live source but is not the same as this source [22]. This is a useful word for a familiar idea, much beloved by phonographists of all kinds: Schismogenesis is what made possible the soundscape analyses of the World Soundscape Project as well as the sonic discourse of Schaefferian musique concrète. Yet the recording does not and cannot substitute for the absent source, despite the presence of its acoustic trace. In this way sonic schismogenesis has a melancholy ontology, a cousin to the melancholy of the photograph as conceptualized by Roland Barthes [23], which always points to the loss or lack

inherent in the photograph's highly delimited capture of the past in the form of chemical traces of light. As with photography, recording is a time-binding technology [24] that, unlike photography, has protensity (continuation in time), but like photography can only point to a past reality. Following Heidegger [25], it can be said that recording reveals, but an inescapable aspect of this revealing is to expose the limits of recording technology: The recording (or better, photograph), like the photograph, points as much to what it cannot do as to what it can do. Sounds can be captured and restored but their sources and makers cannot be. Protensity can only be simulated in the recording. Sonic schismogenesis therefore always has the grain of sadness, of loss, in its timbre. In the context of ecological silencing, and the presencing of the acoustic silence that signals it, the recording affectively heightens the profundity of the ecological loss of sounds and their makers: "All recordings are historical documents that will hold relevance for future generations, especially as environments continue to change and species become rare or extinct" [26].

The melancholy of ecological silencing is played out eerily in Katie Paterson's *Langjökull, Snæfellsjökull, Solheimajökull* (2007) (Fig. 2), in which "sound recordings from three glaciers in Iceland . . . [are] pressed into three records, cast, and frozen with the meltwater from each of these glaciers, and played on three turntables until they completely melt" [27]. The ice recording, as a deliberately evanescent reproduction of an "endless" geological feature, imposes a humanly perceptible duration upon a process that is difficult but crucial to conceptualize as global warming accelerates the ice melt. In Paterson's work, ecological silencing becomes an event that is witnessed

through the pushing of sonic schismogenesis to an extreme: The silencing of the sources, the glaciers, is played out before our ears and eyes, as their immensity and protensity are condensed into finite size and duration that is brought to an end in the present, alerting the listener-viewer to the ominous future silence of the melting glacier. The immutable is muted. Dead silence.

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World on a Wire: Sound as Sensual Objects

Chuck Johnson

In the opening scene of Rainer Fassbinder's dystopic 1973 sci-fi miniseries *World on a Wire*, a troubled computer programmer, Henry Vollmer, exclaims, "You are only someone else's image of you." Vollmer is expressing a sentiment that is echoed by other characters, who begin to suspect that their world may be no more "real" than the virtual reality they have created inside a supercomputer. When I first saw the program in 2011 during its limited theatrical release in the U.S.A., I was struck by its visual feast of kitsch and near-future modernism. But I found especially compelling its audacious synthetic soundtrack—used to great effect by composer Gottfried Hüngsborg to underscore the story's critique of cybernetic thought.

In the mid-20th century, against the backdrop of the Cold War and the advent of computer technology, the branch of systems theory known as cybernetics was presented as a way to study control and communication within complex systems. Although its origins are in mathematics and military engineering, this conceptual paradigm also captured the imaginations of the burgeoning counterculture and its most forward-thinking artists. Central to cybernetic thought is the conception of everything from organisms to organizations, from human minds to "nature," as self-regulating systems that seek equilibrium, or homeostasis.

According to Katherine Hayles, cybernetic theory, in its trajectory toward posthumanism, has developed through three distinct stages. She marks the stages in terms of a shift in focus from control and homeostasis toward autopoiesis and emergence and later toward virtuality and embodiment [1]. These stages share a holistic view of systems that sees information as separate from matter—and in some ways *more real* than material reality. Whether one claims that systems self-regulate and seek stability via feedback or that they self-generate and produce complexity, it seems to be assumed that the system's behavior is somehow greater than the sum of its parts. Is it possible to understand complex behavior without believing that what we witness is greater than the parts generating it?

I am a musician and composer, and for the past 10 years or so I have worked with electronics, software and interactive technology. I have noticed that in my field ideas about emergent behavior and intelligent systems are taken for granted, and the discourse for developing and critiquing this work is shaped by the ideology we have inherited from strains of

cybernetic thought. To be clear, I enjoy making art with complex systems and emergent phenomena. However, my research in this subject has been inspired by a desire to look honestly at how we are accustomed to interpreting systems-oriented work.

What are the political and social implications of a practice that embraces system design, indeterminacy and the axis between chaos and control? Once examined, can we say that these ideas (or perhaps more importantly the attitudes these ideas represent) serve us in grave political and ecological times?

Perhaps there is a better way to engage with the phenomena that we perceive as systemic behavior. The work of literary theorist Timothy Morton and others working in object-oriented ontology provides a framework that avoids holism, reductionism, determinism and idealism. This view is in the lineage of flat ontology, and it considers everything to be an object—electrons, smartphones, sound waves, planets, sonatas, dust particles, Republicans and so on. The lists of outrageously disparate objects that object-oriented ontologists are fond of making are also objects, as are the object-oriented ontologists themselves.

Like Russian nesting dolls, objects may contain other objects, but the whole doll is not greater than its parts. In an object-oriented ontology, the parts are neither dispensable nor replaceable, and they have autonomy and interconnectedness with other objects. Objects have sensual experiences of other objects, meaning that objects also have qualities that are withdrawn and inaccessible to these relations.

For example: An audio speaker and the sound wave that excites it are undoubtedly in a sensual relationship. Yet the waveform only experiences the specific range of the speaker's movement that its frequencies excite. And the speaker only experiences the spectra of the waveform's harmonic content that electronic circuitry can transmit. Each has qualities that are withdrawn from the other, in spite of their interconnectedness.

When we avoid the undermining of reductionism or the overmining of holism, we can hold the view that "the world is enough," as object-oriented philosopher Levi Bryant puts it [2]. Objects are not defined by their relationships, because the relationships between them are objects too, and so are the systems in which the objects participate.

In the systems-oriented sonic arts, the virtue of holism has not been questioned with much rigor, as far as I can tell. However, in a conversation with Bay Area computer music pioneer

ABSTRACT

In the mid-20th century a new conceptual paradigm rose to prominence in the sciences that captured the imaginations of the burgeoning counterculture and its most forward-thinking artists. Against the backdrop of the Cold War, a branch of systems theory called cybernetics was presented as a way to understand complex systems. Cybernetic thought has continued to exert a hegemonic, if unintended, influence in the field of experimental and technology-driven arts. The author argues that the idealistic and technoutopian character of cybernetic thought, including the holistic view of emergence, does not serve us in grave political and ecological times and suggests new ways to understand emergence in sound art that are free of the ideological baggage of cybernetic thought.

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See <www.youtube.com/watch?v=CBaQvFDHCBY> and <crossfade.walkerart.org/brown-bischoff/introduction_main.html> for supplemental files associated with this article.

This article was originally presented as a talk at the Radical Arts and Politics Conference, City University of New York, 2011.

John Bischoff, I was reminded that the social backdrop of his formative years was the upheaval of the late 1960s and 1970s and the specter of nuclear annihilation [3]. The systems-theory inspirations of the 1960s counterculture provided a hopeful alternative to the monolithic state and corporate entities that seemed to be so fully in control of daily life.

Media theorist Christina Dunbar-Hester notes that although artists like John Cage, Brian Eno, Bebe and Louis Barron, and Herbert Bruhn espoused the ideas of Norbert Wiener and other early cyberneticists, the work of these artists spoke more clearly to the attitudes and concerns of the second wave of cybernetics [4]. Gregory Bateson and Margaret Meade refer to this stage as second-order cybernetics, in which they recognize open systems wherein observers are also actors [5].

Returning to the mind-machine analogy in early cybernetics, consider the work of Howard Odum—an early cyberneticist and founder of the field of ecology. At this time (the 1950s), the primary concerns of cybernetics were developing an understanding of systems by means of modeling and promoting the idea of the mind as a network—and correspondingly seeing “mind” in systems. Odum was taking the analogy of the mind as a network further by drawing schematic diagrams of ecosystems, actually using the symbols and syntax of electronics to represent the pathways and processes within and among life forms.

The history of cybernetic thought was critically examined in a 2011 documentary series for the BBC by Adam Curtis called “All Watched over by Machines of Loving Grace,” which borrows its title from a wistfully techno-utopian poem by Richard Brautigan. The series posits Odum’s work as one of many points during the history of cybernetic thought in which the theories of balance and self-regulation were uncritically codified as scientific fact. When I saw images of Odum’s schematic models in Curtis’s documentary I was immediately reminded of David Tudor—an artist whom Dunbar-Hester does not mention but whose influence on subsequent generations of systems-oriented sonic artists cannot be overstated [6].

When Tudor, known for his meticulous work in preparing and scoring piano performances of Cage’s indeterminate compositions, transitioned into working solely with electronics, he began to represent his own compositions as schematics. Tudor’s works for live electronics consist of complex, often recursive networks of

relatively simple audio circuits, designed to elicit unpredictable behavior.

The sonic result of Tudor’s work—perhaps conceptually inspired by early cybernetics—has a remarkable, living quality. But when I listen to Tudor’s works for live electronics I do not hear the sonification of a closed system correcting itself via feedback—far from it. Tudor is the participant-observer, perpetually tweaking the circuits as he finds new ways to excite them into thumping, squealing, vocalizing, chattering—and, yes, feeding-back. His pieces truly evoke characters and presences, or “sonic entities,” to borrow a term from Bay Area electronic musician Tim Perkis [7].

Tudor approached his practice with a quasi-spiritual rigor and is known for describing the systems he created—often on the day of a concert through many hours of improvisation and adjustment—as systems with inherent intelligence that had to be coaxed, and then allowed space, to emerge [8]. But the physicality of Tudor’s sonic entities problematizes a tendency in cybernetic discourse identified by Hayles—the disembodiment of information.

The customary way to read Tudor’s work is to frame it in the language of second-order cybernetics. And Tudor’s interest in bringing out the immanent—if withdrawn—qualities of his systems does seemingly place his work within this conceptual model. However, I think Tudor’s sonic art may have foreshadowed—and can be read within the framework of—the more contemporary view of object-oriented ontology.

What is a Tudor piece if not an interconnected “mesh,” to borrow Morton’s term—a mesh of configurable objects in sensual relationships with one another? Remove one object or add a new one and the piece is not the same—it may even implode, or explode. A performance of his piece *Toneburst* famously ignited the speakers of an old theater in Buffalo. And these sonic entities—can we not view them as Morton’s “strange strangers,” so-called visitors with whom we have an ethical imperative to engage on their own terms? This is the ecological experience of a systems-oriented work, in my opinion.

Although I agree with Dunbar-Hester that much systems-oriented sonic art draws from the ideas attributed to Hayles’s second wave, I would argue that all three stages are present in this field and often overlap. While Cage’s indeterminate scores and utilization of randomness may have produced radically different results with each performance

of a piece, certain cybernetic-inspired process-oriented works by minimalist composers tend toward stasis and stability as they seek out common tonalities and resonance.

And virtuality makes its mark in the sonic arts even before the first experiments of Jaron Lanier and his cohort, as in Rich Gold’s late-1970s piece *Terrain Reader*, performed by Bay Area computer network ensemble the League of Automatic Music Composers. *Terrain Reader* is actually the 8-bit sonification of a virtual terrain, as explored and translated into tones by a program Gold wrote on his KIM-1 microcomputer [9].

A League piece is configured as a network, an open system that the members of the ensemble approach as an instrument. The players—all of them programmers and circuit hackers to some degree—are first and foremost improvising musicians. The recordings disclose a process orientation—the pieces begin mid-stream and end with little regard for closure or resolution.

Although at times sonically dense, League pieces usually contain discrete voices—entities that overlap, playfully and violently collide, and trigger other entities—almost as if these sonic entities are themselves the “Automatic Composers” of the group’s name. On first listen, it is difficult to hear beyond the grainy 8-bit surface. With late-1970s computer technology, resolution and timbral complexity had to be compromised in order to generate and control sound in real time. To my ear, however, the rawness of the sounds contributes to their unique identities as sonic entities, and to a sense that one is having an encounter with the uncanny, as Morton describes encounters with the strange stranger.

That artists might be fascinated with indeterminacy, process and emergent phenomena should come as no surprise. Tim Perkis and John Bischoff were members of a community of electronic musicians affiliated with Mills College in the 1970s and early 1980s who are widely acknowledged as the first to employ microcomputer and network models in their work.

The generation of Bay Area sonic artists that included Bischoff and Perkis, who were both members of the League and later the Hub, has a unique place in this history. Bischoff studied electronic music at Mills College and studied under Tudor and Robert Ashley, among others. Bischoff and his associates are thus quite directly connected to the Cage lineage—they are arguably the next generation in the American experimental tradition.

They also happened to mature as artists at the same time and geographical place as the explosive growth of the U.S. tech industry seated in Silicon Valley, and only a decade after the same part of the country became the epicenter of the 1960s counterculture.

As Bischoff and Perkis write in the liner notes to the League of Automatic Composers' retrospective, released in 2007:

In the air then there was a sense of new possibilities, and the feeling of the need to build a culture from the ground up. For music, specifically, this meant redefining everything about how it's done, from the instruments and tuning systems to the musical forms, venues, and social relations among players and audiences [10].

For Bischoff, theoretical inspiration came from Bateson and the "synergetics" of Buckminster Fuller, and he was enthralled with the self-sufficient hacker ethic that he encountered in the burgeoning Northern California tech culture and while studying with Tudor at Mills. Perkis credits an early exposure to emergence theorist John Holland, theoretical biology, Von Neumann and Whitehead for his embrace of a systems-oriented approach. However, Bischoff emphasizes that musical concerns were always at the fore, and one gets the sense that he and his cohort were compelled by the promise of a new level of conversation with the work.

The Bay Area at the time was cultivating a strange mix of counterculture radicalism with techno-utopianism and a libertarian strain of capitalism. Richard Barbrook and Andy Cameron label this the "California Ideology" [11]. Although not fully realized until the 1990s, the California Ideology combines the individualism of Silicon Valley capitalism with the holism of New Age spirituality and cybernetics. This belief system is alive and well—it is "in the water," so to speak. And it informs how we approach and interpret experimental sonic art and can be

seen in the glorification of cutting-edge technology and the drive to appropriate new technologies as soon as they are made available, with relatively little critical discourse.

And yet, as every day brings new evidence of dire economic, ecological and political circumstances, it is now clear that neither the Invisible Hand of the market nor the free will of creative individuals nor a self-regulating Gaia/Space-ship Earth is capable of correcting the course. Morton suggests that a change in thinking is required before real solutions can even be envisioned—what he calls "Ecological Thought." And I hope to discover some modest—if inconsequential—first steps in my re-listening to the experimental music that has had a formative influence on my development as a practitioner, as well as in my own systems-oriented work.

My electroacoustic project Blood Wedding—a collaboration with Danishta Rivero—has completed recordings of two pieces that are inspired by Morton's take on object-oriented ontology and his ideas about art for an ecological era. Specifically, we use tuning systems to approach the harmonic series as an example of what Morton calls a "hyper-object"—an object that is massively distributed in space-time and of which we can only perceive a minuscule part. The recordings will be released in late 2013 as a collaborative effort between Blood Wedding, visual artist Marlo Pascual and Morton, who has written an essay in response both to the recordings and Pascual's visuals.

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Manuscript received 2 January 2012.

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Emily Carr University of Art & Design
Donna Cox
Creative Disturbance
The Daniel Langlois Foundation
Char Davies
The Exploratorium
Penny Finnie
Steve Forestieri
Gregory Harper
John Hearst
Intel Corporation
LABoral Centro de Arte y Creacion Industrial
The LEF Foundation
Alan Malina
Marjorie Malina
Jacques Mandelbrojt
Christine Maxwell-Malina
Ontario College of Art & Design University
Sheila Pinkel
Michael Punt
Rhode Island School of Design
Itsuo Sakane
School of the Art Institute of Chicago
Scottsdale Center for the Performing Arts
Martin Segal
SFSU International Center for the Arts
Sonia Sheridan
Srishti School of Art, Design and Technology
swissnex San Francisco
SymbioticA
Marcia Tanner
Makepeace Tsao
UCLA Art / Sci Center
UC Santa Barbara, Media Arts and Technology
Program
UC Santa Cruz, Digital Arts and
New Media Dept.
Universidad Autonoma de Occidente,
Engineering Department
Universidad de San Buenaventura,
Multimedia Engineering Program
Universidade de Caldas
Universidade do Minho
University of Calabria Evolutionary Systems
Group
University of Denver School of Art
and Art History

University of Évora, CHAIA
University of Florida Digital Worlds Institute
University of Illinois
eDREAM Institute
University of Leiden
University of Plymouth, U.K.
University of Washington DXARTS
UTS Creativity and Cognition Studios
ZKM | Center for Art and Media

La Gioconda (Mona Lisa)

(\$500 to \$999)

Roy Ascott
Lars Ole Belhage
Martha Blassnigg
Anna Campbell Bliss
Leif Brush
James D. Burke
Richard Clar
Una Dora Copley
Bryony Dalefield
Michele Emmer
William Fawley
Arana Greenberg
Michael Joaquin Grey
Dene Grigar
Rosemary Jackson
Larry Larson
Lynn Hershman Leeson
Guy Levrier
Isabel Maxwell
Merrill Lynch Foundation
Emanuel Nadler
Nessim & Associates
Sam Okoshken
Steve Oscherwitz
Trudy Reagan
David Rosenboom
Jack Sarfatti
Joel Silverman
Christian Simm
Tami Spector
Meredith Tromble

Flying Machine

(\$250 to \$499)

Loren Basch
Ray Bradbury
Bettina Brendel
Shawn Brixey
David Carrier
Eva Craig
Holly Crawford
Eugene Epstein
Lawrence Fane
Herbert Franke
Doreen Gatland
Pamela Grant-Ryan
Oliver Grau
Linda Dalrymple Henderson
Robert Hill
Curtis Karnow
Melinda Klayman
Kathleen Laziza
Thomas Mercer
Gianluca Mura
Frieder Nake
Barbara Nessim
Jack Ox
Ed Payne and Liss Fain
Nancy Perloff
Frank Popper
Harry Rand
Beverly Reiser

Mark Resch
Eric Roll
Edward Shanken
Leonard Shlain
Todd Siler
Jesse Tischler
Joan Truckenbrod
Kelvin Tsao
Jonathan Willard
Barbara Lee Williams
Richard A. Wilson
Stephen Wilson
Gary Zellerbach

Angel

(\$249 and under)

Anonymous, Aaron Alpar, Charles Ames,
Craig Anderson, Art Science Collaborations
Inc. (ASCI), Yasuhiro Asoo, Bret Battey, Marc
Battier, Mark and Lauren Beam, Patricia
Bentson, Timothy Binkley, The Birse Family,
Marc Böhlen, Deborah Branton, Robert A.
Brown, Ronald Brown, Willi Bruns, Annick
Bureaud, James Burke, David Carter, Rosa
Casarez-Levison, Webster Cash, Katherine
Casida, Joel Chadabe, Alison Chaiken, John
Chowning, Richard Clar, Computer Art
Studio/Gunter Schulz, Ivo Cristante, Elizabeth
Crumley, Mary & Michael Cunningham, Danish
Film Festival, Bob Davis, Derrick de Kerckhove,
Goery Delacote, Lily Diaz, Agnes Denes, Emma
Lou Diemer, Steve Dietz, Augus Dorbie, Hubert
Duprat, Elmer Duncan, Ann Elias, Sherban
Epure, Theodosia Ferguson, John Fobes, Tim
Fox, Alan & Mickey Friedman, Ryozo Fujii,
Kai-hung Fung, David Gamper, Jonathan &
Donna R. Gennick, George Gessert, Ken
Goldberg, Yusef Grillo, Karen Guzak, Craig
Harris, Isabel Hayden, Margaret Hermann,
Doris Herrick, Estate of Dick Higgins, Kathy
High, Anthony Hill, Toshiyuki Hiruma, Gerald
Holton, Hungarian University of Crafts &
Design, Amy Ione, Susan Joyce, Raymond
Jurgens, Eduardo Kac, Robert Kadesch,
Marshall Kaplan, Ken Knowlton, Zdenek
Kocib, Kenji Kohiyama, Thomas Kostusiak,
Kathleen Laziza, Levi Family Foundation,
Frederick Loomis, Carl Machover, James
Maher, William Marchant, Delle Maxwell,
Elliot Mazer, Kevin Meehan, Minneapolis
College of Art & Design, Mit Mitropoulos,
Moët Hennessy-Louis Vuitton, Jason Monberg,
Roger Mulkey, Geetha Narayanan, Alex
Nicoloff, Greg Niemeyer, Hiroshi Ninomiya,
Elaine Petschek, Anne Brooks Pfister, Glenn
R. Phillips, Victor A. Pickett, Otto Piene, Ann
Pizzorusso, Herbert & Joan Webster Price,
Patric Prince, Wolf Rainer, Peter Richards,
Ron Rocco, Peter Rudolphi, David M. Russell,
Mr. and Mrs. Robert Russett, Colin Sanderson,
Piero Scaruffi, Patricia Search, Allan Shields,
Gregory C. Shubin, Joel Slayton, John Slorp,
Avril Sokolov, Kirill Sokolov, Christa Sommerer,
Rejane Spitz, Anait Stephens, Robert Strizich,
The Sun Microsystems Foundation, Inc., Robin
and Barbara Tchartoff, Tamiko Thiel, Rodrigo
B. Toledo, Heinz Trauboth, Mark Tribe, Karen
Tsao, Roman Verostko, Alexandre Vitkine,
Annette Weitraub, Natalie & Mark Whitson,
Alan Thompson & Sharon A. Widmayer,
Ioannis Yessios, Robert Zimmerman

“Electric Music” on the Victorian Stage: The Forgotten Work of J.B. Schalkenbach

Daniel Wilson

Sound art has antecedents in the acoustical wonder-working of the ancients and in the metaphysically oriented secret teachings of the Pythagoreans. However, it was with the refinement of mechanics and electromagnetism in the 19th century that sound art would mature as an art form. Sound art did not exist as a standalone art form as we know it now; the aversion of the delicate Victorian ear to discords ensured that clear distinctions were drawn between musical parts of a performance and “descriptive” parts. Descriptive elements encompassed the imitations, instrumental or otherwise, of real-world sounds within music. Percy Scholes wrote disparagingly of this “cruder kind of ‘programme music,’” drawing attention to its short-lived popularity in “uncultured circles” [1]. It was, however, an anachronistic precursor to the 20th-century Futurist *Intonarumori* [2] and Russian abstract industrial symphonies [3]. Certain artistes exerted considerable efforts in designing mechanisms for producing such descriptive flourishes, and the most pioneering was Johann Baptist Schalkenbach (1824–1910) (Fig. 1)—an inventive acoustician who, in the 1860s, began employing electricity to remotely trigger descriptive effects placed on a par with the music itself [4,5]. These

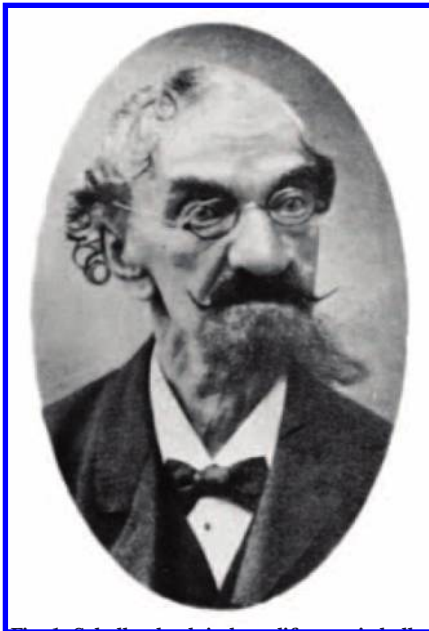


Fig. 1. Schalkenbach in later life: music hall postcard, circa 1900s. (Public domain. Collection of the author).

efforts occupied a no-man’s land between science, art and music that is today designated as sound art.

Schalkenbach was born in Trier, in what was then part of the Prussian Rhineland, but would spend most of his adult life in Britain. He studied music under Moritz Hauptmann at the Leipzig Conservatory before traveling to France, and in 1861 he filed a patent for an instrument he called the “Piano-Orchestre” (Fig. 2).

After this was granted in the autumn of the following year [6], Schalkenbach arrived in England.

The patent illustrates an amalgamation of a reed harmonium, a second smaller accordion-like harmonium (known as a “harmoniflute”) linked to the main harmonium bellows, a row of bells, tam-tams, triangles, drums, cymbals and whistle pipes—all operated by keys or stops. The keys controlling the drum parts were connected to beaters on springs, producing drum-rolls. Whilst playing the harmonium, the player would be able to control the percussion controls using the forearm or wrist. Additionally, any combination of harmonium keys could be temporarily locked down into position to sustain their tones, allowing the player to perform elsewhere simultaneously (Fig. 3).

Two large funnels were coupled onto the sound-holes of the harmonium, transforming the reed tones. The funnels, respectively, contained a “tremolo valve” within the throat, interrupting the current of air flowing out, adding tremolo. This valve was basically a hinged “clapper” that would periodically shudder with the pressure of the harmonium’s sound-filled exhaust.

One curious soundmaking feature was a hollow ball placed beside an air valve. Schalkenbach writes:

When this valve is opened by means of a stop placed beside it, the air enters the ball (which turns freely on its axis) through a hole, and by this means, according to the position of the ball, sounds are produced which are sometimes like the whistle of a locomotive, sometimes like the raging of a storm [7].

Le Monde Illustré reported that the “Piano-Orchestre Électro-Moteur” featured electromagnetic elements activated by nine buttons [8], yet the patent did not detail these electrical attributes (most likely employing solenoid-like mechanisms).

The absence of electric elements in the patent was possibly due to their constituting an infringement of an existing patent. An electrical method of remotely playing keyed instruments had been previously patented by Alexander Bain in 1847 [9], and designs for electric doorbells were also starting to appear. The magician John Henry Anderson had used the same principle to create spirit rappings in the 1850s [10] (Fig. 4). Another magician, Robert-Houdin, also employed electromagnetism, notably in an extravagant doorbell and door-entry system at his house [11].

In June 1863, at one of Schalkenbach’s earliest performances in Britain, the “Grand Piano Orchestre” was said to

ABSTRACT

This paper provides an overview of electrical pre-loud-speaker sound art in Victorian music halls, focusing on key figures, including one of the first female performers of an electrical musical instrument. Control of “acoustic incidents” separate from the artiste and the employment of artful presentation to create an aesthetic edifice—prerequisites of sound art—are apparent in the entertainments examined here. It is shown that the issues of today’s sound art (in reconciling science with art, the coveting of the “active principle,” etc.) were also a concern in these early sound art ventures.

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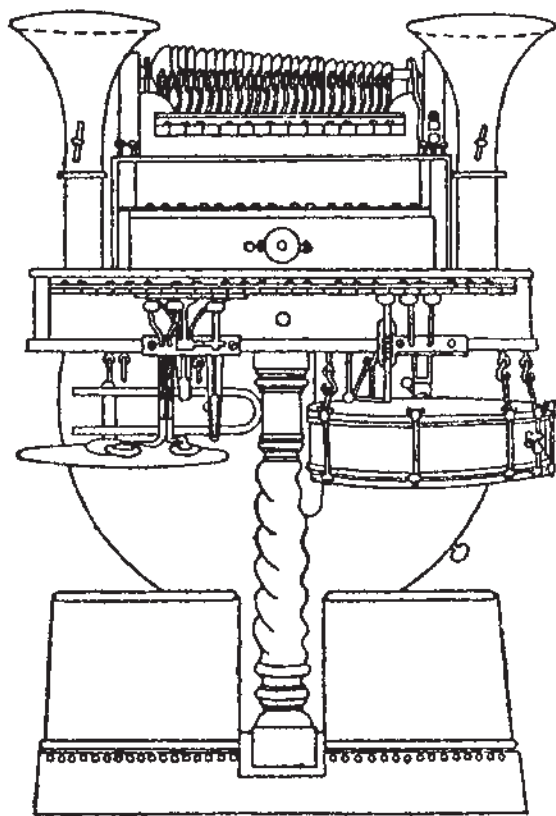


Fig. 2. The Piano-Orchestre, edited from the U.K. patent by the author (© Daniel Wilson).

have combined 26 instruments, upon which he played selections from popular operas [12]. In late 1864, it was reported that Schalkenbach was using 16 elements of zinc and carbon inserted into mercury bisulphate (this battery required cleaning and replenishing every 6 months). The battery poles were connected to electromagnets and brought into action by controls on the main instrument [13]. Descriptive, militaristic pieces were played, featuring remotely discharged pistols and many other “startling effects.” It was said that the instrument had a capacity beyond all existing instruments in effectively rendering “destructive pieces” [14] and also that a remotely played drum, suspended from the ceiling, was suggestive of the Davenport Brothers’ spiritualist séances [15].

In December 1866 Schalkenbach appeared with his “Piano Orchestra with Electric Motion” as part of the Royal Polytechnic Institution’s Christmas season. He became unofficial resident organist here for about 4 years. Although the Polytechnic was renowned principally for its visual exhibitions [16], there were also many acoustical exhibits, including “whispering galleries,” advanced noises-off sound effects accompanying magic lantern projections, lectures on “Acoustic Illusions” and musics of the world,

variations of the famous talking head of Albertus Magnus, Charles Wheatstone’s acoustic “telephonic concert,” and radical musical instruments.

Schalkenbach’s setup was installed in the Polytechnic’s Great Hall and performed upon daily. This hall also contained an automaton called “The Automatic Leotard”—a life-size mechanical trapeze artiste—designed by Francis Seraphicus Pichler [17], a colleague of Schalkenbach’s (and later his spouse’s brother-in-law). Pichler was a Hungarian harmonium-maker who provided experimental acoustical apparatus for John Henry Pepper’s projects [18]. Schalkenbach would often meet with Pichler at his instrument shop at 162 Great Portland Street. In the creative and inspiring environment of the Royal Polytechnic, and with the close acquaintance of Pichler, Schalkenbach was enabled to refine his setup further.

Jeremy Brooker, in his study of the role of music at the Polytechnic, tentatively suggests that the “musical possibilities” of Schalkenbach’s instrument might have influenced the institution’s decision to purchase an in-house electric-action organ in 1868, manufactured by Bryceson [19], that Schalkenbach would also play upon [20]. Indeed, Schalkenbach’s electro-musical ideas frequently caught on, as we shall see below.

AFTER THE POLYTECHNIC

By May 1871 Schalkenbach returned to concentrate once again on developing what he now called his “Orchestre Militaire Electro-Moteur.” A long engagement saw the instrument supporting a minstrel troupe, during which time he integrated one of the spectacles seen at the Royal Polytechnic: the influence of the “Great Lightning Inductorium” (capable of producing a spark of 27 inches [21]) is apparent in Schalkenbach’s exploitation of “lightning” effects.

Due to the complexity of the setup and Schalkenbach’s energetic performances (he was said to appear as if he had “twenty arms and as many legs, all performing at once” [22]), some reviewers had difficulty discerning between the effects electrically produced and those mechanically produced—an ambiguity Schalkenbach no doubt played upon.

One of Schalkenbach’s sketches formed a descriptive musical fantasia: an Alpine village fete interrupted by a thunderstorm, with accompaniments of “howling wind, pattering rain, and flashing lightning.” The lightning is reported to have been “the genuine article, without the slightest adulteration, Herr Schalkenbach having in his new musical machine an unlimited stock of the commodity on hand” [23].

Another novel instrumental addition at this time was the “Electro-Zither,” said to be particularly effective during softer passages, from which “long and sustained notes” were obtained “by electric agency” [24]. A review noted how “a very singular effect is produced by the continuation of sound which is kept up by the agency of electricity upon the strings of the instrument” [25]. This feature was alluded to in other reports as the “Aeolian Harp,” but it is uncertain how the effect was achieved. It would be futile to speculate, but electromagnetically resonating a metal pianoforte string had been achieved in the 1840s by Auguste de la Rive [26]. It involved feeding a coil, in close proximity to the string, with a pulse-train of current at an arbitrary frequency. (If a similar system was employed, Schalkenbach’s *electric* instrument would approach nearer the definition of an *electronic* instrument).

“MAGNETIC MUSIC OF THE SPIRITUAL WORLD”

In November 1873, Schalkenbach began a residency at the Lyric Hall on Great Portland Street, close to both the Royal Polytechnic and Francis Pichler’s dwell-

ings, where he was now lodging. Here, Schalkenbach added controls for “brilliantly coloured lights” with “electrical effects which would put ordinary pyrotechnic displays altogether in the shade” [27,28], all whilst keeping up a “complete instrumental concert” [29]. Reports also tell of a striking acoustic effect, possibly associated with the Electro-Zither: “dulcet strains of peace” [30] emanating from different parts of the hall.

Schalkenbach developed dynamically varied musical sketches to fully demonstrate the capabilities of the instrument. For instance, the man-o-war ship sketch described a ship docked in port, the arrival of the Navy, the departure, an approaching storm, a mariners’ prayer, the ensuing relief at being out of danger, a military parade on board, followed by sighting of the enemy, the battle climax, victory and the finale [31]. Such scenes featured the bold tone combinations of the main instrument, along with “drums, bells and clappers” electrically sounded, trumpets sounding in at least two places at once, “the distant roar of artillery,” “the clashing of cymbals” and “the shrill note of the ear-piercing fife” [32]. The instrument also facilitated the firing of miniature cannons from distant parts of the hall. The music was said to be composed by Schalkenbach himself [33], making it some of the earliest original scored material for an electrical instrument.

It is very interesting to note that, in contrast to the occlusions of stage magic, Schalkenbach openly offered to explain all about the inner workings of his instrument in the summer of 1874. He issued an advertisement in *The Era*:

In answer to many applications, Herr Schalkenbach is now ready to supply, or to give all necessary information for the construction of the various Electro-Musical Instruments and Appliances as used in his Entertainments during the last Fourteen Years, viz., Electric-String Instruments, Trumpets, Chimes, Bells, Cuckoo, Birds’ Song, Drums, Triangles, Castanettes, Tambourines, Sledge Bells, Slash of Whips, Bagpipes, &c. Instruments in direct communication with the keys of Piano, Harmonium, Organ; or, if desired, Musical Boxes with Electric Arrangement for Releasing of flywheel. Imitation by Electricity of Thunder, Rain, Roaring of Waves, Lightning, Marching of Troops, Galloping of Horses, Locomotive in Motion, Electric Cannon, Mitrailleuse, Pistols, Rockets, Optical Music with Vacuum Tubes, &c. &c.

Instruction given in the use of all the above, be it for Solo Performance or in conjunction with the Orchestre [34].

In May 1875, Schalkenbach’s organ was destroyed by a fire at a Liverpool

music hall. He had insured it for £900, although he estimated its material value to be £1000 [35]. Nevertheless, by November he had rebuilt the instrument and was performing again (see Fig. 6).

MASKELYNE AND COOKE

One of the most significant engagements in Schalkenbach’s career was with the celebrated magicians Maskelyne and Cooke at the Egyptian Hall, beginning late in December 1876 [36]. It is curious to note that in Schalkenbach’s aforementioned advert he mentions “musical boxes with electric arrangement for releasing of flywheel,” and some months prior to his engagement, in August 1876, Maskelyne and Cooke exhibited a Spirit Musical Box: a music box suspended from the ceiling, playing songs on command. There was also exhibited a “Mystic and Oracular Tambourine”—placed among the audience in the center of the hall—answering questions by percussive rapping [37]. Both are suggestive of Schalkenbach’s handiwork.

Maskelyne and Cooke would often feature musical-acoustic oddities on their bill. Schalkenbach had taken over from Thomas Manton who had previously been engaged playing a musical glass instrument, the “Crystalophonicon” [38].

As well as playing between illusions, Schalkenbach’s Orchestre Militaire also accompanied illusions, including that

of Mr. Cooke levitating in the air, “surrounded by spirit flames,” accompanied by a “triumphal march” with remote bells, tambourines, etc. [39].

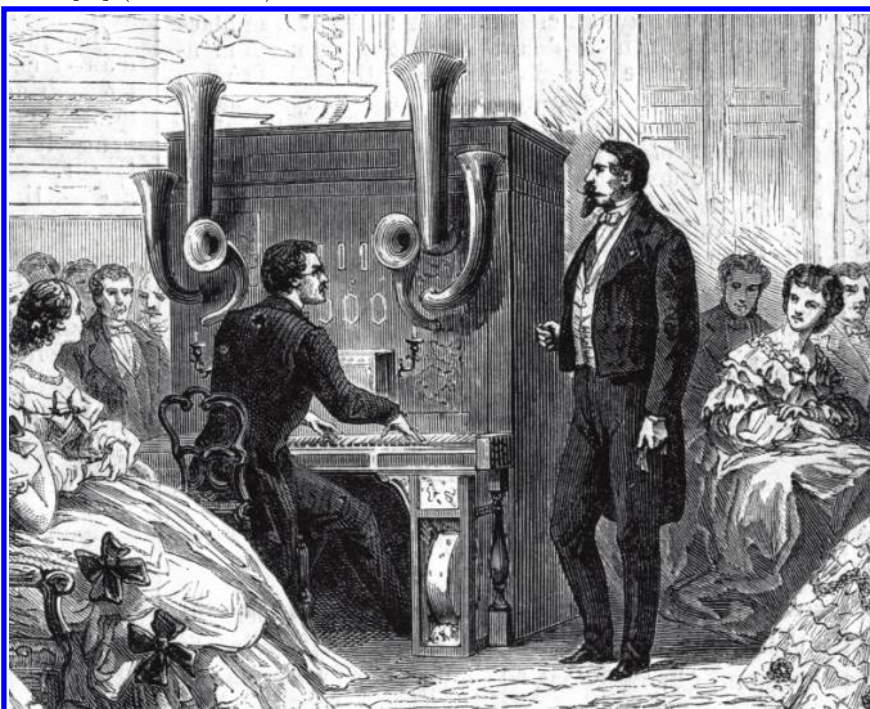
PIANO-HARMONIC

When Schalkenbach’s Egyptian Hall engagement concluded in April 1877, he obtained a patent for another groundbreaking acoustical innovation, the “Piano Harmonic,” which specified that pedals could be added to pianos, enabling special damper heads to make gentle contact with strings at their nodal points to transpose any keyed notes into their respective harmonics (he suggests the octave, the fifth, the double octave and the third of the double octave) [40]. As with his earlier patent, there are no electrical aspects. It is not known to what extent this was adapted to the Orchestre Militaire, but its existence demonstrates how sophisticated Schalkenbach’s ideas were, and such an effect could easily mislead an unknowing audience into believing an electrical agency was at work.

THE 1880s

Even more electrical additions were added to the instrument in its music hall engagements in the 1880s. One press release enthused that the “Orchestre du Diable” (as it had been temporarily restyled) “quite surpasses the telephone

Fig. 3. Schalkenbach performing before Emperor Louis Napoleon at the Château de Saint-Cloud [71]. (Public domain)



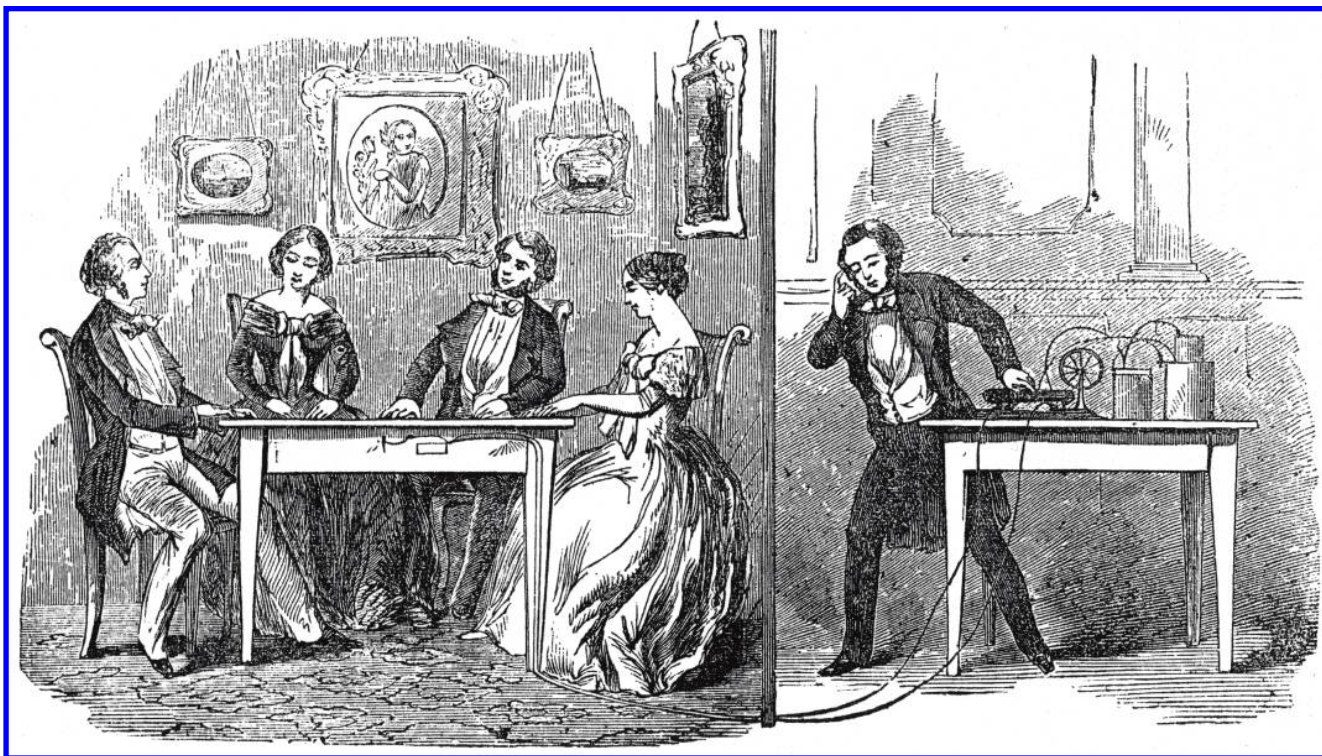


Fig. 4. John Henry Anderson demonstrating electromagnetic “spirit rapping” [72]. (Public domain)

in its astonishing powers” [41]. By 1881, Schalkenbach was experimenting with the feature of rigging bare wires on certain seats in the audience, allowing him to shock unsuspecting members of the audience at key moments [42].

A review from July 1883 illustrates how sprawling the *Orchestre Militaire* had become:

Round the theatre . . . connected by wires with the instrument, are subsidiary musical instruments, such as three German zithers fixed on one sounding board, peals of bells, a number of trumpets, a small electric railway train carrying on the engine an incandescent lamp, a windmill, a church, a catacomb, and the warlike implements. . . . Not only a series of martial airs were performed, with the accompaniment of the detached zithers, bells, trumpets, drums and gongs, but guns were discharged, the mitrailleuse growled out its murderous volleys, a thunderstorm was simulated with torrents of rain and rushes of wind, the church was struck by lightning, the catacomb thrown upon, disclosing a cross illuminated by an electric lamp, with a choir of angels chanting around it; and, finally, the passing away of the storm clouds, giving glimpses of the moon and a triumphal illumination of the *Orchestre Militaire*.

The same review also gives a rare overview of its electrical arrangements, involving “insulated wires, a bichromate battery of twenty-six cells, four Geyslers [Geissler] Vacuum tubes, with Rhumkorf coils, and a multiplicity of ingenious appliances for their application” [43].

MEPHISTO (OR, STEALING SCHALKENBACH’S THUNDER)

The 1880s saw many imitations of Schalkenbach’s work [44]. It was common for music hall acts to pirate other acts—copycats were called “duffers.” One such copycat instrument sprang up at Schalkenbach’s old stomping ground, the Egyptian Hall. This instrument was styled as the “electric and automatic Orchestraphone,” but later renamed “Maskelyne’s Automatic Orchestra,” without allusions to electricity (which would somewhat “give the game away” in a stage-magic setting). All the key elements of Schalkenbach’s act were present, but it is possible that this derivation had Schalkenbach’s blessing, given his previous involvement with Maskelyne and Cooke.

By far the most interesting performers to have appropriated Schalkenbach’s work suddenly appeared in Birmingham in September 1884. It was presented under the name “Mephisto” by two younger variety hall serio-comics, H.F. Juleene and Dot D’Alcorn (Fig. 5), who had no previous recorded dabbings in electricity. Appropriately enough, both were skilled at impersonation.

The *Mephisto* title may originate from a description of Schalkenbach himself: In July 1883, one enthusiastic reporter had written, “[Schalkenbach] might be taken for an electrical Mephistopheles,

for sparks are flying round his head and appear to be scattered from the ends of his fingers, while his very eyes seem to emit lightning” [45].

H.F. Juleene began his stage career in the mid-1860s as a skater, later adopting musical and character skits [46]. His adverts give a flavor of his repertoire: performing as “German, Dutch, Swiss, Italian, Chinese, Japanese, Portuguese, Spaniard, Skating Market Girl, Mandoline Soloist, and forty others” [47]. Juleene’s real name was John Parsons (c. 1842–1905); he was the son of a Warwickshire drysalter.

Around May 1880, Juleene unveiled his new entertainment, “The Musician, Poet, and Painter, and Enchanted Studio,” featuring many songs and impersonations. He toured the music halls with this show for [a?] year—receiving lukewarm reviews—before the actress and pianist Dot D’Alcorn was taken on as a notable co-performer. By the summer of 1882, Juleene and D’Alcorn were regularly billed together. D’Alcorn’s real name was Susette D’Alcorn (c. 1859–1903), a daughter of the music publisher Henri D’Alcorn (who had likewise altered his name from George Henry Stannard Allcorn; he was noted as an expert in copyright law [48]).

In early October 1883, Juleene and D’Alcorn were featured together in the same theater company as Schalkenbach—a significant convergence [49].

Evidently inspired by Schalkenbach, in 1884 they unveiled their *Mephisto*, unashamedly billed as

all new and original. ELECTRICAL MARVELLOUS MOTORS, MYSTIFYING MORTALS, Manufactured by H. F. Juleene, who has travelled the world, and brought together all that Art could devise or Money command to make this what it has proved, the greatest novelty on the surface of the earth [50].

To their credit, the act derived some originality from D'Alcorn's role as possibly the first female professional "electric musician" [51] performer. To put this into perspective, "electric musician" was a sensationalistic styling typically encompassing mere illumination, as seen with the so-called electric musician Herr Tholen—a comic musician with an electric light bulb affixed to his nose. Another instance is seen in the "electrical musical" interludes of singer Harriet Laurie (a.k.a. "The Electric Star"), who was herself a pioneer with her electrically lit outfits but did not perform *electrically actuated* music. (Significantly, Laurie was also on the same bill with Schalkenbach, Juleene and D'Alcorn in October 1883.)

The extraordinarily grandiose adverts Juleene unremittingly submitted to *The Era* were heedless of Schalkenbach's life's work. These adverts display high admiration for D'Alcorn: praised as "the only lady electrician on the terrestrial orbit," a "brilliant vocalist," etc. [52]. D'Alcorn wore full Mephistophelian costume

whilst playing the electric keyboard, producing "hundreds of effects never before introduced on earth" fixed around the hall [53]. Juleene's bombastic praises for D'Alcorn weren't merely superficial advertisements, but heartfelt encomiums, as they were eventually married in June 1889.

A rattled Schalkenbach responded by arranging for a message to be placed atop the next *Mephisto* advert published on 20 September 1884:

HERR J.B. SCHALKENBACH . . . The sole inventor, patentee, and only performer on the Orchestre Militaire Electro-Moteur, frequently called "The Electric Organ," takes this opportunity of informing the musical world in general, and all whom it may concern, that twenty-three years ago, and previous to his renowned performances before His Majesty the late Emperor of France, he invented and patented the above for England, France, Prussia, Bavaria, Italy, Russia, North and South America, &c., that the patent rights have long since lapsed, and, in consequence, any person is at liberty to imitate the same.

Herr Schalkenbach, in the interest of science and art (even against his own interest), has been, and is always ready, to explain his system to those who are desirous of acquiring knowledge in this direction, and offers them the same facilities he extended to others who have asked permission to imitate some of his effects, and to whom he has given every instruction.

Herr Schalkenbach, having kept pace with the progress of electrical and acoustical science, and manifesting this in the

various additions and improvements he is continually making to his instrument, is still giving exhibitions. . . . [54]

The next *Mephisto* advert brazenly retorted that "electricity, that master of all sciences, in the hands of JULEENE, has accomplished more than was expected from an Englishman." Ironically, Juleene, who had adopted his foreign stage name for exotic grandeur, was now compelled to boast of his nationality. He announced that the instrument had cost £2,500 to build, and ends with a parting shot at Schalkenbach: "there are a few dogs that growl, but we do not fear them" [55].

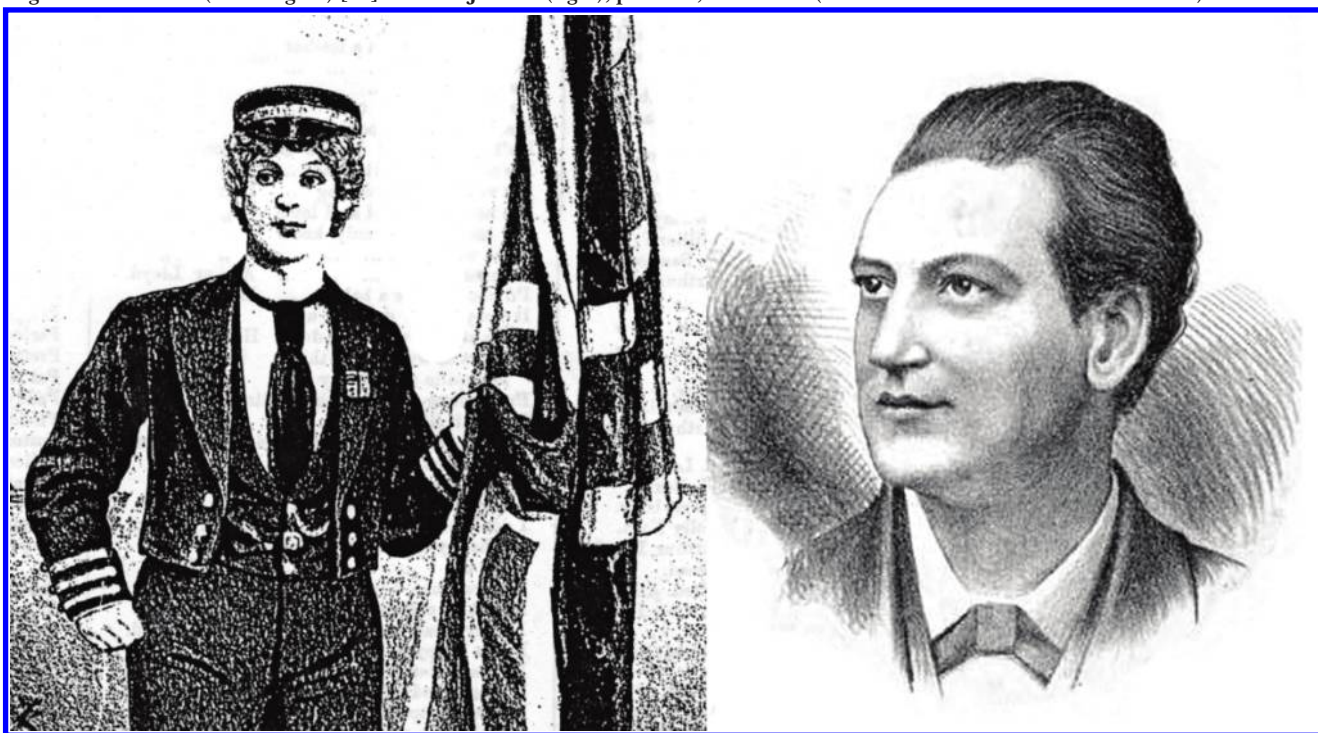
In another *Mephisto* advert Juleene writes:

Am not indebted to any foreign instructor. Every foreign importation is improved upon in the hands of Old John Bull. I shall be pleased to give gratuitous information and instruction to any one wishing to learn the science of electricity, and not try to mislead them when commencing operations [56].

Above this advert appeared a strategically placed notice by a colleague of Schalkenbach's—the champion skater and swordsman Thomas Henry Crowther:

ELECTROMANIA. Managers would do wisely to remember the old proverb, "the biggest balloon when exhausted of gas goes into a very ordinary hamper," in reading advertisements of a certain electrofanatic, who can learn no more in this

Fig. 5. Dot D'Alcorn (in male garb) [73] and H.F. Juleene (right), postcard, circa 1870. (Public domain. Collection of the author.)



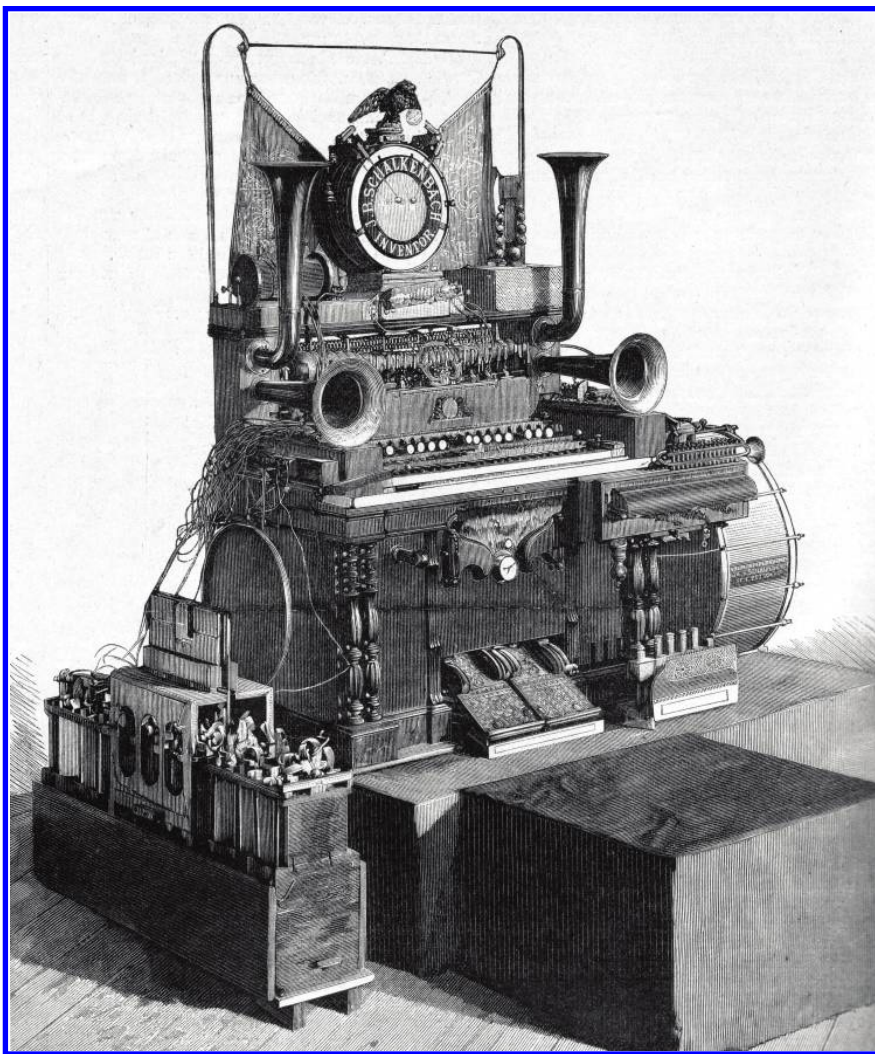


Fig. 6. A detailed engraving showing the second incarnation of Schalkenbach's instrument, post-1875 (after the original was destroyed in a music hall fire) [74]. (Public domain. Collection of the author.)

terrestrial orbit, but when acts, and not words, speak, has a very base public imitation. ELECTROMANIA. By permission and assistance of Herr Schalkenbach. "Electromania" eclipsing nature herself. "Electromania" is in its thirtieth month of preparation. Includes every phenomenon discovered, and several items never seen or imagined, and will be in readiness for Pantomime of '84-'85 [57].

Crowther had actually been preparing an entertainment of his own called *Electromania*—announced in November 1883 [58] (whilst *Mephisto* was also in preparation). Of a similar age, and in the same orbits as Juleene, they were likely acquainted but evidently on less than friendly terms. Crowther's *Electromania* entertainment is not well documented, and he is seen in the "For Sale" column of *The Era* in May 1885, offering his own electrical apparatus shortly before his departure on a world tour with his sword and skating act:

An elaborate and comprehensive ELECTRIC EXHIBITION of working novel-

ties, a la Herr Schalkenbach. To be sold for under one-fourth of the original cost, including four octaves electric bells, giant microscope, arc and incandescent lamps, railways, church, windmill, scenery, fitting with vacuum tubes, lightning tubes, magnets, several kinds of powerful intensity coils giving 18 in. spark, batteries, tambourines, castanets, triangles, bells, &c. In fact, only requires fixing up to be a first-class show. Price to an immediate purchaser seventy-five guineas. T.H. CROWTHER [59,60].

Meanwhile, Juleene and D'Alcorn began stating that their act had been patented: "PATENTED. Argument flattened into oblivion. Can't help it" [61] (starting in September 1884). Apparently, no attempt had been made to patent *Mephisto* [62]; this was a deception typical of music hall hubris.

Mephisto was said to produce from a single keyboard the effects of an organ, harmonium, "full orchestra," seven brass drums, castanets, bugles, silver tambourines, thirty silver bells, triangles, torpedoes, Turkish cymbals, lightning,

thunder, hail and rain storms, shipwreck and light-house, wind and water mills in motion, mocking birds and cuckoo, "Anvil Chorus," "Musical Soup Kitchen," an electric illuminated railway, the ascent of a balloon and "electric shocks everywhere" (via seat electrification à la Schalkenbach) [63]. Juleene writes that a week of setting up and two tons of wire and machinery are necessary for *Mephisto's* production, with, reportedly, 23 electromagnets, seven electro-motors, 23 contact-breakers, and three intensity coils ("the larger permitting a naked spark of ten inches") [64].

Juleene and D'Alcorn's *Mephisto* achieved much success, as they toured British "provinces" untrodden by Schalkenbach. They also embarked on overseas tours to the U.S.A. and to Australia—continents where Schalkenbach had not performed.

There was one unfortunate incident in the U.S.A. when seats were electrified via the *Mephisto* instrument. An unlucky old soldier in one of these seats received a shock during a concert in Chicago and tried to sue both the proprietor and Juleene. However, the U.S. tour was, on the whole, successful, as they were offered another engagement by Thomas Edison, for the 1893 Chicago Exhibition [65].

Juleene and D'Alcorn continued touring with *Mephisto* (mostly across Britain) for the rest of their career—up until the early 1900s—with the electrical centerpiece variously styled as an "Orchestra Electrique Infernal" or "Orchestre Infernale" [66].

Schalkenbach also continued touring, but failed in 1891 to obtain a new patent relating to pianos [67]. By 1895, it was apparent his work was being superseded by Maskelyne and Cooke's apparatus at the Egyptian Hall (played by Francois Cramer); "the wonderful combination of instruments . . . is to Schalkenbach's contrivance what the electric light is to gas" [68]. At the same time, descriptive effects were falling out of favor as music grew more tonally complex [69]. Elsewhere, sound reproduction technology developed apace. The use of electricity onstage to create wonder was also moving away from the use of wires, toward wirelessly activated apparatus using primitive coherers [70].

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 54. *Era* (20 September 1884).
 55. *Era* (4 October 1884).
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 57. *Era* [53].
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Manuscript received 2 January 2013.

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INTRODUCTION

ON-LINE SUPPLEMENT

Sound Art Theories Symposium

On a November weekend in 2011, some 150 people attended Chicago's first Sound Art Theories Symposium. I organized the symposium for the Sound Department at the School of the Art Institute of Chicago, and it would not have happened without the support of the department's faculty, staff and students, as well as the school's Dean of Faculty, Lisa Wainwright. Additional support in the form of ancillary sound art events was provided by Experimental Sound Studio. During the 2-day symposium, 13 scholars presented papers with wide-ranging, deeply thought out and occasionally contradictory approaches to theorizing sound as art and art as sound. Intentionally broad and nontopical, the symposium was, I think, what my opening remarks had hypothesized: an "enticing, provocative, messy and substantive" pluralistic environment for thinking of, about and through sound and much more. And as the closing remarks by the invited presenters attested, it provided a much-needed, invigorating and supportive framework for a discourse that all would like to see (and hear) continued. So, at the invitation of Nic Collins, with the participation of several of the symposium's presenters and through the indefatigable editorial assistance of Patricia Bentson at LMJ, I am pleased to extend the discourse a little further into the foreseeable future with this on-line publication of seven of the papers presented in 2011.

LOU MALLOZZI

Organizer, 2011 Sound Art Theories Symposium

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Lou Mallozzi is a Chicago-based artist known primarily for his work in sound, often with a focus on dismembering and reconstituting language, gesture, and signification. His work includes performances, installations, music works, recordings and radio works. In addition, his visual art practice includes drawing and other media. He has performed and exhibited extensively in the U.S.A. and Europe. In addition to his solo works, Mallozzi often collaborates with artists, filmmakers and musicians, including Sandra Binion, Michael Vorfeld, Alessandro Bosetti, Michael Zerang, Frédéric Moffet, Antonia Contro, Jacques Demierre, Vincent Barras, Fred Lonberg-Holm, Charlotte Hug and many others. He has received several fellowships from the Illinois Arts Council and artist residencies through the Chicago-Lucerne Sister Cities Program, the Rockefeller Foundation Bellagio Study Center, Ragdale Foundation and Spritzenhaus Hamburg. He is an Adjunct Professor of the Sound Department of the School of the Art Institute of Chicago and Executive Director of Experimental Sound Studio. For more information, see <loumallozzi.blogspot.com>.

ON-LINE SUPPLEMENT: SOUND ART THEORIES SYMPOSIUM

The following papers were originally presented at the 2011 Sound Art Theories Symposium (SATS 2011), organized by the Sound Department of the School of the Art Institute of Chicago, November 2011. The symposium presented papers on a wide range of approaches to current theoretical work in the area of sound as art and art as sound. Abstracts from a selection of SATS 2011 papers are presented here; full papers can be viewed at <mitpressjournals.org/toc/lmj/-/23>.

“SOMETHING MISSING”: NOTES ON WRITING SOUND AS LANDSCAPE AND *MISE-EN-ABÎME*

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ABSTRACT

This text introduces an idea of “writing sound” as an activity that constantly reshapes a landscape defined by specific instances of listening to, and filling in, the space repeatedly occupied by and emptied of aural presence. It turns to the notion of “*Stimmung*” as “atmosphere,” “mood” and “tuning,” introduced by Georg Simmel in his *Philosophy of Landscape* (1913), to outline an idea of “writing-sound-as-landscape.” In particular, the notion of landscape as a human construct is considered, to support a thesis of “writing sound” as an experience created by specific moods, yet actual as it exists in a place, and on a page. Two examples in fiction are considered—Italo Calvino’s short story *A King Listens* (1986) and Flannery O’Connor’s novel *The Violent Bear It Away* (1969)—to examine how sound takes shape through words, ingrained in the act of fabrication and calling for narrativity and reference. The notion of reference discussed by Bruno Latour is introduced to support a case for the function of reference in writing sound as an inclusive, necessary gesture: it carries meaning and does

not call for external frameworks of legitimacy. Finally, some considerations are presented on “writing sound” as a layered construction and as the trace of the experience that makes it every time anew, gathered by the author while writing her book *En abîme: Listening, Reading, Writing. An Archival Fiction* (Zero Books, 2012).

FROM AN AESTHETICS OF THE REAL TO THE REALITY OF THE AESTHETIC: RANCIÈRE, *SICK* AND THE POLITICS OF SOUND ART

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ABSTRACT

Coincident with sound art’s ascendancy over the last decade has been art theory’s engagement with the work of Jacques Rancière. However, there is little scholarship that has attempted to bring his thought to bear on the question of theorizing sound art. A key reason for this absence may be because Rancière rejects the modernist periodization of art, the notion of art’s autonomy, and the idea of medium specificity. Such a rejection poses problems for any theory of sound art that begins with the presupposition that sound differs essentially from other artistic media.

This essay contends that Rancière’s rejection of modernist principles proves more valuable for a theory of sound art than others that would argue for a sonic turn in aesthetic practice or for sound art’s material specificity, which would isolate sound art and close off its political potential. The author argues that Rancière’s conception of “the distribution of the sensible” helps us break away from a fascination with an “aesthetics of the Real,” of which sound tends to be conceived as an emblem, to an appreciation of sound art’s contribution to what might be called “the reality of the

aesthetic.” As an example of this contribution, the author analyzes Haroon Mirza’s *Sick* (2011), as it was installed in the Central International Pavilion at the 2011 Venice Biennale, focusing especially on Bice Curiger’s curatorial decision to house Mirza’s piece within a “para-pavilion” designed by Monika Sosnowska, which also exhibited photographs by David Goldblatt. The assemblage of *Sick*, Sosnowska’s para-pavilion, and Goldblatt’s photographs of post-Apartheid South Africa offers a glimpse of sound art’s redistribution of the sensible and “the common” at stake in this redistribution.

A SYMPATHETIC RESONANCE: SOUND, THE LISTENER AND AFFECT THEORY

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ABSTRACT

In his recent book *In the Blink of an Ear*, Seth Kim-Cohen identified a conceptual turn in sonic art practices through his proposition of “non-cochlearity.” The non-cochlear is analogous to Duchamp’s concept of “non-retinal visual art” and references Rosalind Krauss’s expanded field of sculpture to propose a similarly expanded field for sound art. Kim-Cohen argues for a post-structuralist framework relating the sonic and the extra-sonic within sound art practice. But while the proposition of non-cochlearity might be productive for the sound artist, is it equally productive for the listener? An increasing number of scholars in the humanities have become dissatisfied with the shortcomings of post-structuralist thought with reference to its privilege of pre-determined structures of meaning. Under the banner of affect theory, these scholars have focused on concepts of movement across, between, and beyond intersectional positions, invoking the philosophies of Spinoza and

Bergson to show that post-structuralist analyses may be of limited applicability. What is the significance of affect theory for the listener, whose experience is tied not only to systems of meaning, post-structurally conceived, but also to the real-time analog in-folding and accumulation of sensory information? If non-cochlearity as a feature of contemporary sound art welcomes the conceptual notion of non-sonic sound, what is the relationship between the listener of sound art and the listener in general? This paper seeks to probe the relationship of sound and affect first in theory and then in “the field,” through a sound studies take on ethnographic participant observation in quotidian sonic environments.

REPETITION AS RADICAL REFERRAL: ECHO AND NARCISSUS IN THE DIGITAL INDEX

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ABSTRACT

Drawing from the myth of Narcissus and Echo, the author articulates the relationship between aural and visual reflection as simultaneous and contradictory paradigms for subject-forming reflexivity, as well as creative utterance, in contemporary media cultures. As compliment to the well-established notion of narcissism in media art (Rosalind Krauss, Lev Manovich), the author references the work of Jean-Luc Nancy to develop *echoism*, a sonic-reflexive mode for interpreting interactive installation, video, sound art and Internet-based artworks through sonic, haptic and social content of media. The author further describes the impact of media echoism through Walter Benjamin’s descriptions of mechanical reproduction, in particular how mechanical reproduction weakens an artistic object’s gaze-informed, visually rooted reflexive power, or aura. As such, the author proposes that the development of the term *echoism* balances the visual bias of media narcissism, gives articulation to how contemporary media challenges and expands traditional visual relations between self and image, and necessitates differing notions of audience, authorship and objecthood in visual arts contexts.

BURDEN BANGS JOY: SOUND ART AND THE RETURNS OF ROCK AND ROLL

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ABSTRACT

So much sound art aspires to little more than so much navel-listening. The theory that attends it is equally guilty of this circumspect banality. A kind of radically subjective phenomenology prevails (despite the fact that such an approach is bound to be self-canceling). An alternative practice and theory eschews any sensory privilege bestowed upon sound, and instead takes it for granted that sound is both constituted by and constitutive of its cultural modes and meanings. Looking to rock and roll for an antidote to sound art’s malaise, an aesthetics of intensity is suggested. The lineage of this aesthetic is traced through the use of the term “intensity” in the work of Diedrich Diederichsen, Jean-François Lyotard, Gilles Deleuze and Friedrich Nietzsche. The thread is picked up in the performances of Chris Burden and the rock writing of Lester Bangs and Camden Joy. Along the path, doubling back at times, veering corybantically, attention is paid to the sound artist Christof Migone; the author’s own artistic practice; and the bands Can, the Velvet Underground and the Stooges. No eschatology nor teleology, only the endless banging on of necessity and resistance.

ASPECTS ON DURATION: THE VULNERABILITY OF PERMANENCE IN SITE-SPECIFIC SOUND ART IN PUBLIC SPACE

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ABSTRACT

This paper considers site-specific sound works in public space, addressing how these works relate to spatio-temporal events that unfold over extended durations. How does a permanent site-specific sonic artwork connect to the transformation of a place over time? Can a permanent sound installation become truly durable? By using the concepts *territorialization*, *deterritorialization* and *reterritorialization* (Deleuze &

Guattari), and by juxtaposing two different well-known permanent artworks (Bernhard Leitner’s permanent sound installation *Sound Space* and Max Neuhaus’s permanent sound installation *Times Square*), the author aims to point out how time, spatial instability, and artistic appropriation of a site can all play important roles in the reception of an artwork over time.

SONIC POSSIBLE WORLDS

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ABSTRACT

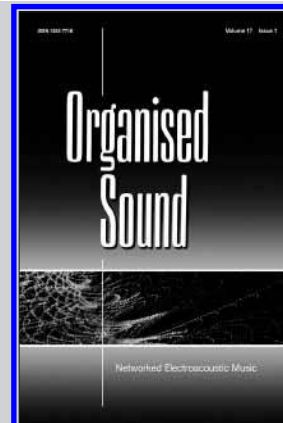
This essay introduces the idea of Possible World theory as a potential strategy to engage in and debate sound: sonic works and the acoustic environment as well as musical compositions. The suggestion is that Possible World theory allows for a consideration of the soundscape and sonic works as environments, as sonic worlds that offer an alternative view—a possible and even an impossible view—challenging and augmenting what we pragmatically refer to as the actual world, which is invariably legitimized and situated within a visual and linguistic understanding. The benefit of Possible World theory for sound art is understood to lie in its ability to analyze what is “proposed” by sound: It allows for an exploration of the “then what . . .” of a sonic “if that . . .” rather than limiting itself to the notion of one actuality. Additionally, Possible World theory’s modal approach, the idea that possible worlds exist in a universe of mutually accessible and thus cross-referential worlds, allows the listener not only to access sonic works as environments, as sonic worlds, but to be able to compare and cross-reference a variety of different sonic works understood as worlds within one sonic universe—establishing a comparative field that can facilitate the analysis of diverse sonic works across genres and times. Listening to this comparative field positions its diverse sonic works as possible sonic worlds in relation to phenomenological life-worlds, taking care of the perceptual reality of what is possible in the ephemerality of the unseen.

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sound—or its absence

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sound—or its absence

From the silence encouraged by the space of the gallery to the environmental immersion of earthworks and other site-specific interventions, sound—or its absence—often marks both the means of production and the condition of reception of the work of art. Whether putting pressure on the coded acoustics of the place of engagement (Broccolichi and Urstad), exploring the audible trace of language (Katchadourian and Obadike), the evocation of the acoustic-imaginary in conceptual art and music (Candiani, Drew and Wang), sound can be worked as material (Umeda), developed as medium (Webb) or function as support.

Hailing from Canada, France, Japan, Mexico, Norway, South Africa, Taiwan, the United Kingdom and the United States, the artists represented on the LMJ23 CD are as diverse in their approaches to sound as they are in their geographic dispositions. These artists are representative not of the sound practices of their respective countries and communities, but of the breadth of approaches that must be reconciled to begin a discussion about sound in contemporary artistic practice worldwide. I have approached the curation of this CD from the perspective of an artist engaged in dialog with a growing community of practitioners less interested in the fact of a work's soundfulness than in the space that sound opens up materially, expressively and conceptually.

Many of the recordings here are static documents of works intended to be experienced in situ, while others are at home in headphones. For an understanding of the current state of sound at any given time, a sensitivity to the sound-making properties of work outside the genre-limited discourse of sound art is becoming increasingly necessary. For convenience, the word sound has stood as a placeholder for a range of much more subtle characteristics: sound can be understood not only as a physical acoustic phenomenon, but also as the audible (semiotic) presence of the voice, conceptual and physical silence and noise, the subject of both interior and exterior hearing, and the object of attentive listening. The reduction to the single descriptor “sound,” has limited the hermeneutic potential of what is a rich and varied matrix of meanings while at the same time suggesting an intrinsic modernism that has only been amplified by the medium-specific rhetoric surrounding unified theories of “sound art.” In the work presented here, I have attempted to proceed with a mind attuned to the multi-modal experience of works that employ sound to varied ends from expressive means to physical material, and from spatial signature to linguistic trace.

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Seth Cluett is an artist, performer and composer whose work ranges from photography and drawing to video, sound installation, concert music, and critical writing. His research investigates the media history of the loudspeaker and the documentation of sound in art. His work has been presented internationally at venues such as MassMoCA, The Kitchen, GRM, Palais de Tokyo, STEIM and Dundee Contemporary Arts. Recent work is documented on Line, Radical Matters, Sedimental and Winds Measure recordings. The recipient of grants and awards from the Foundation for Contemporary Arts, Meet the Composer and the Andrew W. Mellon Foundations, he holds an M.F.A. in electronic art from Rensselaer Polytechnic Institute and a doctorate in music composition with a graduate certificate in Media & Modernity Studies from Princeton University. In the fall of 2012, Cluett joined the faculty of Contemporary Arts at Ramapo College of New Jersey. For more information, see <www.onelonelypixel.org>.

sound—or its absence: Contributors' Notes

CURATED BY SETH CLUETT

See <mitpressjournals.jorg/toc/lmj/-/23> for full access to LMJ23 and CD tracks, as well as supplemental materials. See <leonardo.info/lmj> for more information and resources.

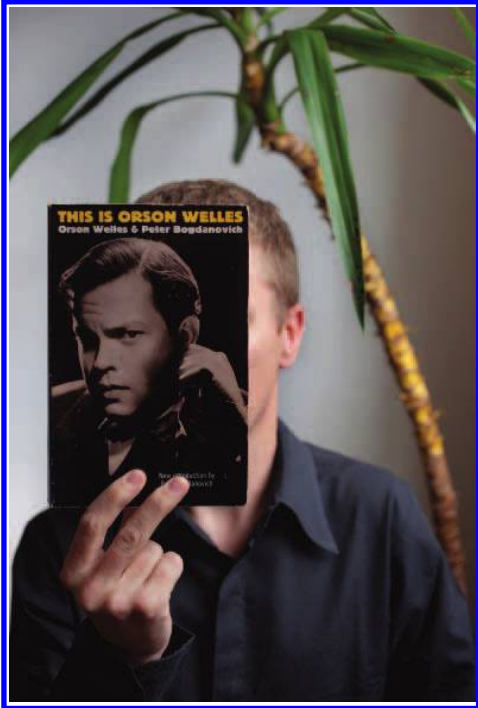


Fig. 1. James Webb, *Telephone Voice*, self-portrait, 2011. (Photo © James Webb)

JAMES WEBB: *TELEPHONE VOICE*

Composed by James Webb. Voice actor: Adrian Galley.

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Website: <www.theotherjameswebb.com>.

I used a clairvoyant to contact Orson Welles, interviewing him and transcribing the resulting speech for a voice actor to perform. Conceptually, the deceased American auteur directs the clairvoyant and through him the actor, who in turn influences the listener. The title refers to a style of telephonic enunciation often used to convey not only clarity but also a sense of status. The project was curated by Rahma Khazam and commissioned for the Palais de Tokyo's *Répondeur*, a monthly show where artists make works for the exhibition space's answering machine. The voice actor was Adrian Galley.

James Webb (b. 1975, Kimberley, South Africa) has been working on large-scale installations in galleries and museums, as well as unannounced interventions in public spaces, since 2001. His work explores the nature of belief and dynamics of communication in our contemporary world, often using ellipsis, displacement and humor to achieve these aims. Webb's work has been presented around the world at institutions such as the Palais de Tokyo in Paris, CCA Kitakyushu

in Japan and the Darat al Funun in Amman, Jordan, as well as in major international exhibitions such as the 55th Venice Biennale, 3rd Marrakech Biennale, the 2009 Melbourne International Arts Festival and the 9th Biennale d'Art Contemporain de Lyon. Webb was the subject of the survey show, "MMXII," at the Johannesburg Art Gallery in 2012. His work is represented in the collections of the Iziko South African National Gallery, Johannesburg Art Gallery, Nelson Mandela Metropolitan Art Museum, the Darat al Funun, Amman, and Domaine Pommery, Reims.

CATHERINE BÉCHARD & SABIN HUDON: *THE CIRCULATION OF FLUIDS I*

Audio document of sound installation of paper horns of various sizes mounted to a wooden structure with each equipped with its own custom-sized loudspeaker, an amplifier channel and an ultrasound sensor, 2008–2009. By moving and wandering throughout the space, the visitor activates and shapes subaqueous recordings captured by hydrophones (waterproof microphones): underwater recordings made in lakes, rivers, ponds, a waterfall and barrels filled with water, at various locations throughout the province of Québec, Canada, July and August 2007. Web: www.bechardhudon.com.

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Website: <www.bechardhudon.com>.

When invited to submit an audio document from one of our sound installations for the LMJ23 CD, we chose *The Circulation of Fluids*, created in 2008–2009. This installation probes water's resonance: this liquid body is familiar to us mainly through vision and aerial hearing, but its subaqueous echoes are still quite foreign to us. Freshwater, saltwater, utility or drinking water, it remains an integral part of our lives. Most of our planet is submerged and the human body is essentially made up of water. We come from fluids; we live in the rhythm of fluids. Listening to aquatic worlds unveils an ontological and social background whose potential metaphors we can explore through our aerial ears.

The Circulation of Fluids is a sound installation made up of paper horns of various sizes mounted to a wooden structure with intersecting stems, multiplying perspectives and horizons. Each horn is equipped with its own custom-sized loudspeaker, an amplifier channel and an ultrasound sensor. By moving and wandering throughout the space, the visitor activates and shapes the various subaqueous modulations captured by hydrophones (waterproof microphones). The closer the visitor is to the audio source, the louder the sound level, and conversely, the farther away, the lower the intensity. The sounds lie dormant, waiting for the interlocutors' movements to trigger them to reveal themselves. They come and go, shaped by human motion. The predominant feeling is one of an acoustic



Fig. 2. Catherine Bechard & Sabin Hudon: *The Circulation of Fluids I*, sound installation of paper horns mounted to a wooden structure and each equipped with its own custom-sized loudspeaker, an amplifier channel and an ultrasound sensor, playing underwater recordings made in lakes, rivers, ponds, a waterfall and barrels filled with water, 2008–2009. (Photo © Catherine Bechard & Sabin Hudon)

dive into an antrum of a constantly changing fluid universe, revealing inaudible yet vaguely familiar worlds. The work acts as a network activated at different points in space; it is organic and relational, prompting dialogue between the attending elements—sounds, sculpture, visitor—that come together to create a whole in its own right. Lines of force and listening paths are created, altered and replayed.

Our relationship to sound within *The Circulation of Fluids* [1] is closely linked to the work's materiality and its connection to space and time. To produce the audio document, we numerically captured variations in movement and distance generated by the 11 sonars placed near the horns. Since each sonar is associated with a loudspeaker and an independent audio source, we have also recorded the sounds transmitted through the 11 paper horns. By using the same computer program as in the installation process, we have collected 11 audio tracks resulting from the variations in volume produced by the sonars and mixed them in stereo. Through this technique, we created the audio piece here, which represents, as far as possible, the diffusion and listening context of *The Circulation of Fluids*.

Note

1. For visual references of the installation, visit bechardhudon.com/projects/la-circulation-des-fluides-i-2008-2009/.

Catherine Béchard and Sabin Hudon form an artists' duo who live and work in Montreal in the fields of sound sculpture, kinetic sound installations, audio art, electronic art and performance. Animated objects and their components have been at the heart of their research and creation from the very beginning. They are interested in listenership through resonance itself (resonance as source and reception), in acoustically generated sounds/noises, their propagation and the impressions they create, as well as the things and empty spaces that make up our perceptual fields. By assembling the fleeting pull-forces that sight, touch and sound exert on each other, the duo realizes works that attempt to make visible and audible trivial details of our everyday microcosm. These are shaped by the space environment itself as well as the motion or stillness of people in their installations. The duo's works put into perspective the transient and ever-changing nature of things and beings as well as our temporal presence in the world. Their collaborative works have been featured in solo and group exhibitions throughout major Canadian cities, the Czech Republic, Brazil, the United States and Germany.

MAIA URSTAD: *MEANWHILE, IN SHANGHAI. . .*

Stereo remix of site-specific sound installation created by the composer, 2011–2013.

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Meanwhile, in Shanghai. . . is a site-specific sound installation that I have been developing since 2011. It was created for the European sound art network Resonance, and was exhibited in five European cities between 2011 and 2012. Each exhibition situation has been different in character and appearance—from an acoustically dry garage in a former tobacco factory in Riga to a reverberant, white space at Singuhr Sound Gallery in Berlin. The work has thus been adapted both visually and sonically to each new space. The installation employs dozens of portable radios, suspended on long steel strings from the gallery ceiling, each playing a multichannel sound composition consisting of recordings of radio transmissions from around the world. This audio is transmitted wirelessly via local FM transmitters to the radios, creating a rich spatial environment. The radios appear as personalities with stickers, stains and traces of different owners, and with a variety of designs, from 1960s transistor radios to 1980s square boombox marvels to the pocket radios of today—all the latest smashing hi-tech wonders of the day they hit the market, ending up in ruins after 5 years of use. Each speaker gives a rich variety of sound quality; upon entering the installation, the visitor comes into close contact with these properties, which reflect the relationships among technological development and physical movement, proximity and distance, and notions of globality and contemporaneity.

The title *Meanwhile, in Shanghai. . .* was inspired by the way that thought bubbles in comics describe illusory time—and place—movement; the title just as easily could have been: *Simultaneously, in Baltimore. . .* or *Later, Somewhere near Cairo. . .* For this work I collected radio clips referring to concrete places and times: 23 Uhr in Deutschland, Cinco de la Mañana en Madrid, or 7:00 in Nova Scotia. These clips are joined to form a composition, along with recordings of other radio-specific, unintended sounds such as white noise, crackles and interference. The polyphony of voices, tones, buzz and noise forms a backdrop for on-air specific explorations about time and place—a phonogram of a 24-hour cycle on the air.

Fig. 3. Maia Urstad, *Meanwhile, in Shanghai. . .*, site-specific sound installation of dozens of portable radios suspended on long steel strings from the gallery ceiling, each playing a multi-channel sound composition consisting of recordings of radio transmissions from around the world, at Singuhr Sound Gallery, Berlin, 2012. (Photo © Cyan, www.cyan.de)



Contemporaneity is the thematic point of departure; our living contemporaneity is consciously invoked by the radio. The radio follows the day like a clock, where hourly news updates provide us with a shared routine that synchronizes the rhythm of everyday life [1]. Tuning between stations, this contemporaneity changes with the world's time zones, and each hour has a distinct character. At any time, one can, from one's local space somewhere on the globe, tune into the daily rhythms of different time zones and visit all places at all times. Today, we assume that the world lives in one global time in a universal existence. But—economically as well as ecologically, we are simultaneously connected to people who find themselves in completely different daily realities and environments.

The installation invites the audience to move between the radios in the exhibition space, with the sound changing as one moves. The track on this CD presents a stereo remix intended for headphone listening. It is thus a specific work for close-range listening—the experience of being inside the installation is replaced with a pure auditory experience.

Reference

1. Media researcher Lars Nyre, "The Movement of Language in Radio—A Phenomenological Approach to Sound," *Norwegian Journal of Media* No. 1 (1998).

Maia Urstad is an artist working at the intersection of audio and visual art, predominantly with sound installations and performances. She was educated at the Bergen National Academy of the Arts and also has a background in rock music. Her recent work interrogates the history and methodology of communication technology: from Morse code and other long-range signals to digital terrestrial networks and the use of fiber optics. Radio is a central theme in her work, in that the authority of the medium opens up visual and conceptual possibilities. Urstad's solo and collaborative work has been presented at spaces such as Singuhr Sound Gallery, Berlin, Germany; Reina Sofia Radio, Madrid, Spain; Bergen Art Museum, Norway; Johannesburg Art Gallery, South Africa; Prefix ICA in Toronto, Canada; Mamam do Patio, Recife, Brazil; and Electrohyte at Malmö Konsthall, Sweden. Urstad curates and produces art projects through her company Maur Projects, and she is one of the founders of Lydgalleriet Sound Art Gallery in Norway. She is a member of the international sound art collective freq-out, curated by CM von Hausswolff, and her soundworks are published by Touch Music [MCPS].

TANIA CANDIANI: SOUND PIECE FROM PLATAFORMA SONORA/TORRE RELOJ

Forty-eight alarm clocks recorded in a studio, with 48 aluminum trumpets, 48 speakers, three amplifiers and metal structure, Condesa D.F., Mexico City, 2012.

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Website: <www.taniacandiani.com>.

This work is an architectonic and sound intervention. My intention was to reflect on the present and on memory, on our activities and schedules, on sleep and rest. With this piece I wanted to explore the possibility of manipulating the perception of time and its sound. If at a symbolic level we use mechanical and programmed rhythms, such as the sounds and melodies of old alarm clocks, as metaphors for the elasticity of time, the physical properties also allow us to talk about continuous symmetries and time translation. Between the two levels, the piece works as much in its capacity for connecting harmonic qualities as in its manifestation of the potential energy stored in the sound waves. To view a video of the installation, see <<https://vimeo.com/43941806>>.

Fig. 4. Tania Candiani, *Sound Piece from Plataforma Sonora/Torre Reloj*, sound installation of 48 alarm clocks recorded in a studio, with 48 aluminum trumpets, 48 speakers, 3 amplifiers and metal structure, Condesa D.F., Mexico City, 2012. (Photo © Tania Candiani)



The research processes of Tania Candiani take as starting point language, text and the political implications of the domestic. Her translation strategies among systems—linguistic, visual, phonic—and practices generate associations where there is a constant nostalgia for the obsolete that makes us consider the discursive content of artifacts and our former projections of the future. She has gathered interdisciplinary work teams to achieve poetic intersections between art and technology. Candiani's work is in private and public collections at the Museum of Contemporary Art San Diego; the San Diego Museum of Art; the Mexican Museum, San Francisco; Deutsche Bank; INBA, Mexico; among others. Her most recent exhibition at Laboratorio Arte Alameda (LAA) in Mexico City will be followed by a comprehensive research book on the project. She was awarded a fellowship by the Guggenheim Foundation and a grant by the National System of Art Creators of the National Fund for Culture and the Arts of Mexico (FONCA). Her project "Five Variations on Phonic Circumstances and a Pause" received the Award of Distinction in the category Hybrid Arts in the 2013 Prix Ars Electronica.

MENDI + KEITH OBADIKE: AUTOMATIC

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Website: <www.obadike.com>.

Automatic is at once a sound art meditation on hip-hop techniques and an homage to the intersecting work of two painters. Keith recorded himself performing words found in the paintings of Raymond Saunders and Jean-Michel Basquiat, and we used the textures and rhythms of those recordings as the foundation of the composition. We riff on these artists as they riff on others. This imaginary sonic meeting (of the more senior West Coast painter Saunders with East Coast painter Basquiat) was created in a real-time performance (not unlike a studio dub mix) with a number of filters from an early hardware-based digital mixer and a customized granular processor.

Both Saunders and Basquiat are famous for employing the language and techniques of graffiti and are well known for creating works that pull from ideas from the street and the gallery. As in hip-hop, Saunders's and Basquiat's specific ways of employing found objects are key parts of their own voices.

They make visual sampling feel personal. This sound piece is one in a series that we made around 2000 that both referenced the work of other artists directly and attempted to carve out a personal sound.

Stereo and multichannel versions of this project have been presented in the past. *Automatic* was first presented as public sound installation in 2000 and has since been presented in concert and broadcast on radio.

Mendi + Keith Obadike make music, art and literature. Their work has been commissioned by The Kitchen, Rhizome/The New Museum; The NY African Film Festival with Electronic Arts InterMix; Northwestern University; Bucknell University; the Yale Cabaret; Whitechapel Art Gallery, London; and the Whitney Museum of American Art. They have released two albums on Bridge Records and a book of poetry with Lotus Press. They have two artists' books scheduled for release in 2013 through 1913 Press. Their sound installation American Cypher was exhibited March–June 2013 at The Studio Museum in Harlem, and their opera-masquerade Four Electric Ghosts is touring. For more information, see <www.obadike.com>.

TETSUYA UMEDA: SPARK, BUBBLE

Performed and recorded by Tetsuya Umeda at almost music, Osaka, 2012. Mastered by Nishikawa Bunsho.

Contact: E-mail: <umedatetsuya@gmail.com>.

Tetsuya Umeda is one of the leading artists in Japan working with sound installation and performance. Umeda employs minimal electronic means to produce sound from everyday objects, such as balloons, fans, tin cans and dog whistles, in a transparent process that takes place before viewers' eyes. His self-created sound tools retain their particular histories and operate by reflecting the surrounding conditions of the space: temperature, shape, airflow and the motion of people. The resulting effect is that of an experimental sound laboratory that exposes viewers—as both witnesses and partners—to the entire process of sound production and to the surprising discoveries that ensue during each unique event. Umeda is based in Osaka, Japan.

Fig. 5. Tetsuya Umeda, *Spark, Bubble*, schematic of sound performance, 2012. (Illustration © Tetsuya Umeda)

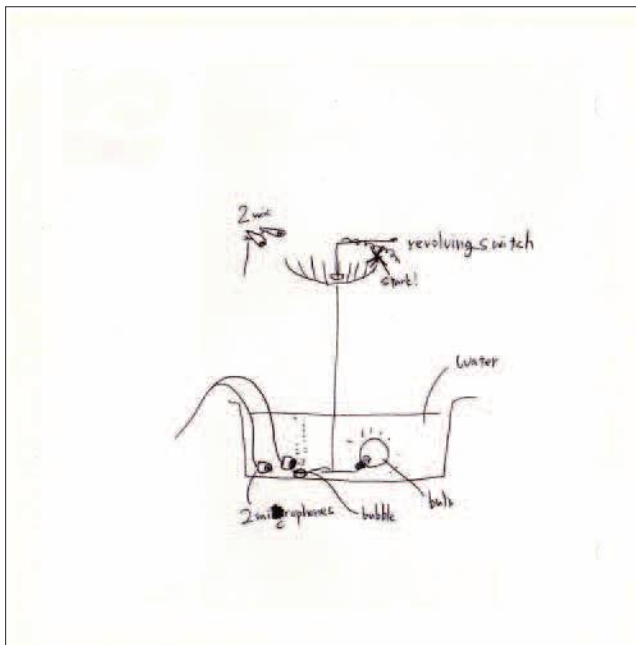


Fig. 6. Pascal Broccolichi, *Espaces injectés*, recording session at the BASF factory, Lyon, France, 2010. (Photo: © Pascal Broccolichi)

PASCAL BROCCOLICHI: ESPACES INJECTÉS

Phonographic environment created by using recordings made in 2010 at various industrial sites of the chemistry valley near Lyon, France. Co-produced by the Centre d'Art Plastique de Saint-Fons avec l'aide du pôle Arkema de Pierre-Bénite, Bluestar Silicones France SAS, and BASF Performance Products, France. Phonography created and produced by Pascal Broccolichi, Studio Son Villa Arson, Nice, 2012. Mastering by Norscq, Paris.

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Website: <www.pascalbroccolichi.com>.

Text by Thierry Davila. Made in 2011 on the occasion of a monograph show organized at the Centre d'Arts Plastiques in Saint-Fons, outside Lyon, *Espaces injectés* is based on a number of recordings made by Broccolichi on the strip of chemical plants that runs alongside the River Rhône for about 15 kilometers. This is an historic industrial site, bound up with the industrial revolution and vital to the economic activity of the region and, in particular, the city of Lyon. The valley emerged as an industrial center in the late 18th century, when the chemical industry began to develop, following the silk industry. In the 19th century a number of chemical processes and substances were developed (the Lumières brothers had a factory there, which is where they used the acids they made to develop their films) that provided the foundation of the fortune made more recently by groups such as Rhône Poulenc. Today, parts of this “chemical corridor” have fallen into disuse, making them the living memory, or palimpsest, of the past, albeit abandoned

or partially destroyed. Broccolichi used the appropriate tools to dip into the current acoustic identity of several zones in this region by capturing some of these resonances, aiming at a kind of phonographic portrait of the territory. To do this, he used (among other things) an acoustic antenna capable of picking up sounds as much as a kilometer away (this kind of equipment is often used by ornithologists because it is both precise and discreet). Climbing up the chimneys of a factory, he picked up the general mood—the drone, as the technical term goes—of the valley. He also explored the old BASF factory that once made magnetic tape and now lies abandoned and empty. There he made numerous sound recordings and met former employees who gave him a unique account of these personal and collective industrial memories (the buildings were demolished shortly afterwards). Psychologically, this experience had a powerful human and aesthetic impact on the artist as the experience of an emotional memory, of embodied memory, of its beauty and fragility, the suffering and dramas that it evokes. The acoustic material gathered by Broccolichi was not reworked: the sound plates were mixed but not treated, so as not to add complexity to complexity. There is nothing baroque, therefore, about this sound capture. It is a readymade sampling of a world of vibrations that no longer has a functionality, without any industrial effectiveness (at least as far as the BASF factory is concerned), one that comes across with great clarity. It is the record of a relic.

Developed within several different disciplines, the work of Pascal Broccolichi is based on listening and, more specifically, on sound envisaged as a vocabulary of forms that lend themselves to the creation of installations. As a framework for his research, the artist has developed a network of multiple environments connected by ongoing relationships between one work and the next. By scattering the customary principles of certain acoustic laws and their fields of technological application around the exhibition art space, Broccolichi coordinates the typology of sounds with our capabilities for perception.

HONG-KAI WANG: THE BROKEN ORCHESTRA LIVE IN STOCKHOLM

Conceived by Hong-Kai Wang. Performers: Maria Arnqvist (alto saxophone), Anders Bryngelsson (electronics), George Kentros (violin), Robin McGinley (cello), Cecilia Österholm (Swedish keyed fiddle) and Robert Spångberg (piano). Recorded by Erik Rosshagen at “Transposed Order—Open House Spring 2013,” sponsored by Iaspis, Stockholm, Sweden, 16 March 2013.

Contact: E-mail: <hongkai.wang@gmail.com>. Website: <www.w-h-k.net>.

The Broken Orchestra Live in Stockholm uses the Austrian modern composer Arnold Schoenberg’s famous quip, “My music is not really modern, just badly played” as its formal performative directive, by inviting several professional musicians on different instruments to respond to and reinterpret a childhood recording of Bach’s “Ave Maria” as performed by me and my brother. The work shares an impromptu discussion, exercise and performance as the audience witnesses the construction of a unique sonic space.

Born in Huwei, Taiwan, Hong-Kai Wang received a B.A. in Political Science from National Taiwan University, Taipei, and an M.A. in Media Studies from The New School University, New York. She works with sound as a conceptual means to investigate relations and the construction of new social space, focused on a collaborative and



Fig. 7. Hong-Kai Wang, *The Broken Orchestra Live in Stockholm*, sound performance, 2013. (Photo: Hong-Kai Wang)

process-driven approach to production. Her work spans performance, workshop, text and installation, and is concerned with listening and sound as forms of perceptual, cognitive organization and questions of relation and harmony. Wang has presented her work internationally at Iaspis, Stockholm, 2013; Arnold Schoenberg Center, Vienna, 2013; Kunstlaai Inexactly This, Amsterdam, 2012; Contemporary Art Museum Kumamoto, 2012; Leonard & Bina Ellen Art Gallery, Montreal, 2012; DOX Centre for Contemporary Art, Prague, 2012; Taiwan Pavilion, the 54th Venice Biennale, 2011; IMO, Copenhagen, 2011; Festival Eletronika, Belo Horizonte, Brazil, 2011; Casino Luxembourg—Forum d’art contemporain, Luxembourg, 2010; International Incheon Women Artists’ Biennale, 2009; La Casa Encendida, Madrid, 2008; La Noche en Blanco, Madrid, 2007; 2006 Taipei Biennial: Dirty Yoga, among others.

BENEDICT DREW: ARCHIVE TAPE FROM THE SUFFOLK CONCRETE MUSIC CENTRE 1972

Contact: E-mail: <benedictdrew@gmail.com>. Web: <www.benedictdrew.com>.

Audio document of the sound component of a video work presented at the exhibition SNAP 2013 Art at the Aldeburgh Festival celebrating the Benjamin Britten Centenary, Aldeburgh, U.K.

At the turn of the millennium Pierre Henry performed at the London Musicians’ Collective. The curator of this concert told me that he had been told by Henry that the last time he had been invited to England was by Benjamin Britten in 1953, he performed in a small cinema in small seaside town of Aldeburgh in Suffolk.

Whilst researching this I discovered this piece of tape music. It turns out that it was made at the the Suffolk Concrete Music Centre. After further research, I found that this is located in an abandoned WWII pillbox in the middle of a field and was set up by one individual. This individual had been present at the concert that first saw this music arrive on the flatlands of Suffolk and he experienced this music not as machine music but the music as a machine itself, capable of bending time and space. Wanting to recreate this practice he set about trying to replicate it, but with none of the then advanced technologies; his attempts were closer to those of the Melanesian cargo cults. His version of a concrete music became increasingly reliant on ritual in which he would try and perform a kind of magnetic alchemy.



Fig. 8. Benedict Drew, *Archive Tape from the Suffolk Concrete Music Centre 1972*. (Illustration © Benedict Drew)

A strange side effect of this dabbling in the ritual was that the trees started to mutate into what could only be described as modern sculpture and large breast-like structures emerged from the earth.

According to the little information that I could find, he claimed that this tape was produced from inside of him, and that during one of these rituals it had ruptured his stomach and wriggled out of him in a wormlike fashion.

Benedict Drew (b. 1977) works across video, sculpture, music and their associated technologies. Recent solo exhibitions include The Onesie Cycle, Rhubarba, Edinburgh; Now Thing, Whitstable Biennale; This Is Feedback, Outpost, Norwich; Gliss, Cell Project Space; and The Persuaders, Circa Site / AV Festival, Newcastle. Group exhibitions include While It Lasts, Eastside Projects, Birmingham; Is That All There Is? Import Projects, Berlin; Long Live The New Flesh, ICA, London; Revolver Part 3, Matt's Gallery London; Young London, V22, London; Paraproductio, Boetzelaer|Nispen, Amsterdam; Containing the Possible, Pippy Houldsworth Gallery; There Is Not And Never Has Been Anything To Understand!, ACS Gallery; Things That Have Interested Me, Waterside Contemporary; and Soundworks, ICA, London. Drew completed an MFA at the Slade School of Fine Art, London, in 2011. He has frequently collaborated with a diverse mix of artists and musicians and has made many works for radio, including the series Unter Radio for Resonance FM, and most recently Concrete Decent Transmission for Writtle Calling. He was lead artist for Chisenhale Gallery's Propeller Project (2012) and a LUX Associate Artist (2011/12); and in 2012 he was shortlisted for the prestigious Jarman award. Drew is represented by Matt's Gallery, London.

NINA KATCHADOURIAN: *TELEMARKETING INDETERMINACY*

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Website: <www.ninakatchadourian.com>.

I was teaching at Brown University in 2004 when I sat in on a class that was being guest taught by Alvin Lucier. *Telemarketing Indeterminacy* was made for our final class recital. Lucier talked a lot about John Cage's *Indeterminacy* (1959) in the class, which has always been one of my favorite sound works. I decided to take Cage's format (the 1-minute spoken story) to be the guiding structural principle for *Telemarketing Indeterminacy*, and I combed Cage's piece for words and sounds that I could piece together into a 1-minute telemarketing infomercial for *Indeterminacy* itself. In a few exhibitions, this piece has been put back into context by collecting phone numbers that are later called with the recording, either played live or delivered to voice mail.

Nina Katchadourian was born in Stanford, California, and grew up spending every summer on a small island in the Finnish archipelago, where she still spends part of each year. Her work exists in a wide variety of media including photography, sculpture, video and sound. Her work has been exhibited domestically and internationally at places such as PS1/MoMA, the Serpentine Gallery, New Langton Arts, Artists Space, SculptureCenter and the Palais de Tokyo. In January 2006 the Turku Art Museum in Turku, Finland, featured a solo show of works made in Finland, and in June 2006 the Tang Museum in Saratoga Springs exhibited a 10-year survey of her work and published an accompanying monograph entitled "All Forms of Attraction." The Museum of Contemporary Art San Diego presented a solo show of recent video installation works in July 2008. In February 2010 she was the artist in residence at the Dunedin Public Art Gallery in Dunedin, New Zealand, where she had a solo show entitled "Seat Assignment." She is currently at work on a permanent public piece, commissioned by the GSA, for a border crossing station between the U.S.A. and Canada. Katchadourian is represented by Catharine Clark gallery in San Francisco and is an assistant professor at NYU's Gallatin School of Individualized Study.

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- BAETENS, JAN. Review of *The Invention of Heterosexual Culture* by Louis-George Tin, *Leonardo* 46, No. 5 (2013).
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Leonardo Network News

*The Newsletter of the International Society for the Arts, Sciences, and Technology
and of l'Observatoire Leonardo des Arts et Technosciences*

Leonardo Affiliates

Leonardo Affiliates are top-ranked universities, independent nonprofits and corporations engaged in research and creative activities at the intersection of the arts, sciences and technology. We are pleased to feature three of our Affiliates:

The Sound Department at the School of the Art Institute of Chicago offers a unique M.F.A. program in the creative use of sound that goes well beyond the boundaries of a typical program in visual art, music or multimedia. Students may pursue the creation and recording of audio work; the composition of music in numerous genres; live performance, improvisation and audio installation; the integration of sound in other media, such as video, film, performance and web-based art; designing and building software and hardware instruments; live and recorded electroacoustic music; and the use of distribution technologies such as radio, Internet and others. See <www.saic.edu>.

The Minerva Foundation is a not-for-profit, charitable foundation dedicated to promoting original and challenging approaches to the study of the visual brain. The Minerva Foundation has three foci: (1) The Golden Brain is awarded annually to an investigator in the forefront of research for original discovery of significant findings with regard to vision and the brain, (2) the International Conference on Neuroesthetics is a gathering where cross-disciplinary scholars speak to a particular theme related to neuroesthetics and (3) The Minerva House Visiting Scholar Residency Program provides an opportunity for retreat as well as exchange in a gracious house in north Berkeley, close to the University of California. Leonardo thanks the Minerva Foundation for their support of the Leonardo Art Science Evening Rendezvous series at UC Berkeley. See <www.minervaberkeley.org>.

The Herb Alpert School of Music at CalArts offers rigorous training in an unrivaled variety of musical styles and cultures. This vibrant mix helps each student acquire the musical fluency to work across conventional boundaries, expand his or her artistic and cultural horizons and develop a global creative vision. The school offers programs at the undergraduate and graduate levels, such as the Performer-Composer Program, Composition, Jazz, Music Technology, and Musical Arts. All interact in a lively, interdisciplinary atmosphere guided by principles of artistic excellence, experimentation, critical reflection and independent inquiry. Students work alongside faculty to contribute to the evolution of music practice as composers, performers and producers who will help shape the global musical landscape of tomorrow. See <music.calarts.edu>.

Leonardo Art Science Evening Rendezvous

Leonardo/ISAST is pleased to welcome the new Institute of Arts and Sciences at the University of California, Santa Cruz (UCSC), to the family of Leonardo Art Science Evening

Rendezvous (LASER) venues. In the inaugural event at UCSC, artists, scientists and scholars laid the foundation for the series by speaking about the intertwining of art and science. Questions such as “why art and science” and “why now” provide context for the series as a local forum for presenting art and science projects underway throughout the University of California, the Bay Area and beyond that are creative, original and interdisciplinary in nature.

UCSC is the third new LASER venue added this year. Since its inception, the program has grown across the U.S. with LASERS now hosted at the University of San Francisco, Stanford University, UCLA, UC Berkeley (sponsored by the Minerva Foundation) and a New York studio, in addition to UCSC. It has also sparked a sister event series in Washington, D.C., called DASER. The LASER series was first conceived and organized in San Francisco in 2008 as a forum for artists and scientists to share insights about their work with one another and with interested audience members. The event also provides participants and attendees with time to network. For information on upcoming LASER events or information about starting a LASER series on your campus, see <leonardoinfo/isast/laser.html>.

Leonardo Education and Art Forum

In conjunction with the CAA 102nd Annual Conference, to be held 12–15 February 2014 in Chicago, the Leonardo Education and Art Forum (LEAF) will present a panel titled “The Art/Science Curriculum in the Classroom and the Cloud.” The panel will present examples of instruction that brings art and science together in the university classroom. The session will also shine a light on the ongoing Cloud Curriculum initiative of Leonardo/ISAST. This initiative aims to create a clearinghouse, in the form of an open-source wiki, to disseminate examples of successful courses and course modules, building on ideas and methods that transcend disciplinary boundaries, to promote the transformation of research and educational practices.

This past year LEAF led a number of Leonardo presentations and activities around the world, ranging from meetings at the annual CAA Conference, to LASER events in New York, to organizing a workshop that addressed the development of an art and science cloud curriculum based on cross-disciplinary initiatives in Science, Technology, Engineering, Art and Mathematics (STEAM) and Science, Engineering, Art and Design (SEAD) education at ISEA 2013 in Sydney, Australia.

LEAF promotes the advancement of artistic research and academic scholarship at the intersections of art, science and technology. Serving practitioners, scholars and students who are members of the Leonardo community, LEAF is a Leonardo Working Group focused on exchange with scholarly communities, such as the College Art Association (CAA). See <leonardo.info/isast/leaf.html>.



PHILOSOPHY OF MUSIC EDUCATION REVIEW

philosophical research in music education

EDITED BY ESTELLE R. JORGENSEN

Philosophy of Music Education Review features philosophical research in music education. It includes articles that address philosophical or theoretical issues, reform initiatives, philosophical writings, theories, the nature and scope of education and its goals and purposes, and cross-disciplinary dialogue relevant to the interests of music educators.

PMER is the only journal internationally in the field of music education devoted exclusively to the examination of philosophical questions in music education. Such questions are of enormous consequence for a field that addresses public policy matters relating to cultural development.

**Estelle Jorgensen, Professor of Music (Music Education),
Indiana University**

PUBLISHED SEMIANNUALLY

eISSN 1543-3412

pISSN 1063-5734

Available in electronic, combined electronic & print,
and print formats

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Mission Statement: The critical challenges of the 21st century require mobilization and cross-fertilization among the domains of art, science and technology. Leonardo/ISAST fosters collaborative explorations both nationally and internationally by facilitating interdisciplinary projects and documenting and disseminating information about interdisciplinary practice.

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Benefits of Membership

Artists, scientists, engineers, researchers and others interested in the contemporary arts and sciences are invited to join Leonardo/ISAST. Benefits include reduced rates for Leonardo/ISAST publications, eligibility to participate in Leonardo working groups and special invitations to Leonardo sponsored events. For further details visit: <leonardo.info/members.html>. E-mail: <isast@leonardo.info>. *Affiliate memberships also available for non-profit organizations, educational institutions and corporations working at the intersection of art, science and technology.*

Publications

PRINT JOURNALS: The *Leonardo* journals are scholarly peer-reviewed journals of record. *Leonardo*, published bimonthly, is the official journal of Leonardo/ISAST. *Executive Editor:* Roger F. Malina. *Leonardo Music Journal* with CD is published annually. *Editor-in-Chief:* Nicolas Collins.

WORLD WIDE WEB: The Leonardo On-Line web site (www.leonardo.info) publishes organizational information, the Leonardo Electronic Directory and more. *Managing Editor:* Patricia Bentson.

ELECTRONIC JOURNAL: Leonardo Electronic Almanac (leoalmanac.org) is an electronic journal dedicated to providing a forum for those who are interested in the realm where art, science and technology converge. *Editor-in-Chief:* Lanfranco Aceti. *Co-Editor:* Ozden Sahin.

LEONARDO REVIEWS: The Leonardo Reviews Project, through a panel of reviewers, publishes reviews of books, journals, electronic publications and events. Reviews are published on the Web (leonardo.info/ldr.html), and selected reviews are published in *Leonardo Electronic Almanac* and in *Leonardo*. *Editor-in-Chief:* Michael Punt.

BOOKS: The Leonardo Book Series (leonardo.info/isast/leobooks.html), published by the MIT Press, highlights topics related to art, science and developing technologies. *Editor-in-Chief:* Sean Cubitt.

LABS DATABASES: Databases of master's and Ph.D. theses. English LABS: <leonardolabs.pomona.edu>; *Coordinator:* Sheila Pinkel. Spanish LABS: <www.uoc.edu/artnodes/leonardolabs>; *Coordinator:* Pau Alsina. French LABS: <francolabs.univ-paris1.fr>; *Coordinator:* Annick Bureauud.

Awards

Frank J. Malina Leonardo Award for Lifetime Achievement recognizes eminent artists who through a lifetime of work have achieved a synthesis of contemporary art, science and technology. Winners include Gyorgy Kepes, Nicolas Schöffer, Max Bill, Takis and Abraham Palatnik.

Leonardo Award for Excellence recognizes excellence in articles published in Leonardo publications. Winners include Rudolf Arnheim, Otto Piene, Charles Ames, Frieda Stahl, Donna Cox, Janet Saad-Cook, George Gessert, Alvin Curran, Karen O'Rourke, Eduardo Kac, Hubert Duprat with Christian Besson, José Carlos Casado with Harkaitz Cano, Bill Seaman, Arthur Elsenaar with Remko Scha, and Steve Mann.

Leonardo New Horizons Award for Innovation is given to individuals or groups for innovation in new media. Winners include Critical Art Ensemble, Gregory Barsamian, Graham Harwood, Evelyn Edelson-Rosenberg, Jean-Marc Philippe, Jaroslav Belik, Peter Callas, Patrick Boyd, Christian Schiess, Kitsou Dubois, I Wayan Sadra, and Ewen Chardronnet.

Makepeace Tsao Leonardo Award recognizes organizations or groups that have increased public awareness of art forms involving science and technology, particularly through exhibitions. The first award was given to La Cité des Arts et Nouvelles Technologies de Montréal.

Leonardo Global Crossings Award recognizes excellent work by international artists, professionals and scholars in the globally emerging art-science-technology field. Winners include Abdel Ghany Kenawy and Amal Kenawy (Cairo, Egypt) (2005).

Leonardo-EMS (Electroacoustic Music Studies) Award for Excellence is awarded for the best contribution to the EMS symposium by a young researcher, as decided by a joint jury. Winners include criticalartware (Jon Cates, Ben Syverson and Jon Satrom) and Michael Bullock (2008).

Leonardo Art Science Student Contest Award is a juried award for student work selected from projects received through an open submission process. The first Leonardo Art Science Student Contest award (2008) was given to Hiroki Nishino, Michiko Tsuda, Jaewook Shin, Byeong Sam Jeon, Margarita Benitez and Markus Vogl.

The Leonardo Scholarship for Media Art Histories, a collaborative project between Leonardo/ISAST and the Department for Image Science (Danube University), awards a juried half-tuition scholarship for the Master of Arts (MA) course in MediaArtHistories at Danube University to a candidate who demonstrates the potential to contribute to the new field of Media Art Histories in this time of critical worldwide challenges. The first scholarship has been awarded to Fran Ilich Morales Muñoz (2010).

Collaborations with Other Organizations

Leonardo/ISAST frequently collaborates with other organizations on topics of current interest by collaborating on conferences or workshops and by publishing special sections in *Leonardo* or co-sponsoring events. Current collaborators include:

- ACM Multimedia
- ACM SIGGRAPH
- Ars Astronautica
- Artnodes (Spain)
- Association Leonardo (France)
- College Art Association (USA)
- Creativity and Cognition Studios, University of Technology Sydney (Australia)
- Donau University (Austria)
- Electronic Music Foundation (USA)
- Fondation Langlois Research Documentation Center (Canada)
- MIT Press (USA)
- Pomona College (USA)
- School of the Art Institute of Chicago (USA)
- The University of Plymouth (UK)
- Sabanci University (Turkey)

For more information, please visit <<http://leonardo.info/collablist.html>>

Leonardo Project Working Groups

Leonardo hosts working groups on projects with a topical focus:

Leonardo Education and Art Forum: Patricia Olynyk, *Chair*; Adrienne Klein, *Incoming Chair*; David Familian, *Chair Elect*. See <www.leonardo.info/isast/LEAF.html> for more information.

Leonardo Space Arts Working Group: Annick Bureauud, Richard Clar, Roger Malina, Jean-Luc Soret, Arthur Woods.

Lovely Weather: On the Cultural Context of Climate Change. Editorial Committee: Ramon Guardans, Annick Bureauud, John Cunningham, Andrea Polli, Janine Randerson, Jacques Mandelbrojt, Drew Hemment.

Scientists' Working Group: Tami Spector, *chair*; Piero Scaruffi, Roger Malina, Robert Root-Bernstein

Artists and Scientists in Times of War Working Group: Michele Emmer, Sheila Pinkel, Ana Peraica, Randall Packer, Roger Malina.

Affiliate Members

Leonardo/ISAST invites organizations and corporations working at the intersection of art, science and technology to join the Affiliate Membership Program. Visit <leonardo.info/isast/org-membership.html> for more information.

Arizona State University Art Museum
Australian Network for Art and Technology
CalArts|California Institute of the Arts
Danube University, Department of Image Science
De Montfort University, Institute for Creative Technologies
Djerassi Resident Artists Program
Emily Carr University of Art & Design
International Graduate Centre for the Study of Culture (GCSC), Justus-Liebig-Universität Gießen
Minerva Foundation
Ontario College of Art & Design University
Plymouth University
Pomona College
School of the Art Institute of Chicago, Master of Fine Arts in Sound
School of Visual Arts, MFA Computer Art Department
UC Davis Art/Science Fusion Program
UCLA, Art|Sci Center
Universidad Autonoma de Occidente, Engineering Dept.
Universidad de San Buenaventura—Cali
University of Calabria, Evolutionary Systems Group
University of Caldas
University of California, Santa Cruz
University of San Francisco, College of Arts and Sciences
University of Technology, Sydney, Creativity & Cognition Studios
University of Texas at Dallas, Arts and Technology

Leonardo/ISAST

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Special Thanks

Leonardo/ISAST gratefully acknowledges the special efforts of the following:
Seth Cluett, Lou Mallozzi, Tom Erbe, Peter Soe

CLASSIFIED ADVERTISEMENTS

GET THE WORD OUT!

Announce a job opportunity, new project, publication or upcoming event to Leonardo's targeted community.

Option 1: classified ad in print journal

Present a short, text-only message to *Leonardo* and *Leonardo Music Journal* subscribers. *Leonardo* is published bi-monthly and *LMJ* is published annually.

Option 2: classified ad in email newsletter and on web

If you want to get the word out far and fast, you can present your message to the Leonardo community in the Leonardo Network Newsletter. Your ad will also be posted on the Leonardo On-Line website.

Option 3: display or full page ad in print journal

If your ad includes graphics, you can place a display ad or a full-page ad in *Leonardo* or *Leonardo Music Journal*.

For rates and schedule deadlines and payment options, visit: <leonardo.info/isast/placeads.html> or email the Leonardo Editorial Office: <ads@leonardo.info>

Leonardo/ISAST members will receive a 20% discount!

ERROR: GLITCH, NOISE, AND JAM IN NEW MEDIA CULTURES, edited by Mark Nunes, brings together established critics and emerging voices to offer a significant contribution to the field of new media studies, exploring the ways in which error can serve as a critical lens for understanding the principles of informatic control that govern our contemporary network society. By offering a timely and novel exploration into the ways in which error and noise "slip through" in systems dominated by principles of efficiency and control, this collection provides a unique take on the ways in which information theory and new media technologies inform cultural practice. For more information visit: <www.continuumbooks.com>.

ECOTONES is a data-ecological project by Janine Randerson that employs information from satellite telemetry and sonification of the paths of migratory birds from the Northern hemisphere to the Southern hemisphere. The bar-tailed godwit, a bird with the longest non-stop migration of any species, arrives annually in Miranda, an estuary in New Zealand's North Island. This area is an "ecotone" or transitional space between terrestrial and marine ecosystems, where land meets sea, saltwater meets freshwater. The birds are arriving to New Zealand in smaller numbers due to the lack of seasonal availability of foods, a predicted consequence of climate change, and the historical lack of human care for the ecotones, regarded as unwanted, hybrid spaces. Ecotonal space and the flight of the migratory birds are reconceived visually and acoustically in this installation to work against the atomization of North/South, human/non-human, air, sea and earthly relations. *Ecotones* will be developed at the SCANZ: Eco Sapiens residency in New Zealand in 2011. "Eco sapiens seeks to bring a range of worlds together to investigate the cultural roots of climate change, and explore poetically pragmatic approaches to encouraging the long-term cultural shifts required." Trudy Lane, <<http://intercreate.org/view/eco-sapiens>>. Janine Randerson is also a

participant in the Data Ecologies workshop series (2010–2011) conceived by Tom Corby, University of Westminster; "The politicization of climate data, whilst potentially dangerous, offers opportunities for us to re-think our relationships to science and develop discussion around interdisciplinary art/science approaches to our changing environment." Tom Corby, 9 August 2010 <<http://data-ecologies.ning.com>>.

REPRESENTATIONZ is a new blog covering how symbols, images and language affect our daily lives—from representation in art, science and culture to cryptic puzzles. The blog is run by Paul Fishwick and can be viewed on the web or via smartphone apps. Twitter and RSS feeds are available. See <www.representationz.com> for more details.

THE DIATROPE INSTITUTE has partnered with Amazon.com to create an online bookstore specializing in art, science and technology titles. Our stock includes both new and used items. We will also search for and special order hard-to-find books in the field. Please visit us at <www.diatropebooks.com>. For more information e-mail us at <info@diatropebooks.com>.

THE THURSDAY CLUB. An open forum discussion group for anyone interested in the theories and practices of cross-disciplinarity, interactivity, technologies and philosophies of the state-of-the-art in today's (and tomorrow's) cultural landscape(s). Originally set up in October 2005 by GDS, the Club has grown to include 300 members: artists, technologists, scientists—in fact, a growing diversity of people from different communities worldwide who are connected via a mailing list and online forum. Organized and supported by the Goldsmiths Digital Studios (GDS) and the Goldsmiths Graduate School, Goldsmiths, University of London, U.K. <www.thethursdayclub.net/>.

CHUA'S CIRCUIT WEBSITE. The Evolutionary Systems Group (ESG) presents CHUA's CIRCUIT <<http://160.97.10.253/chuaweb/>>, collecting Chua's different Attractors, videos, music, sound and animations. The website shows new forms of digital art and has as starting point six papers with the title "The Gallery of Chua's Attractors," published in six consecutive issues, since January 2007, in the International Journal of Bifurcation and Chaos. The six papers, together with a CD-ROM containing music from Chaos, have become a book with the same title. An experimentation with high school students on chaos is the main focus of this site.

MASTER OF RESEARCH IN COMPUTER MUSIC. The computer is becoming increasingly ubiquitous in all aspects of music. The new MRes in Computer Music at the University of Plymouth (UK) provides an exciting opportunity to pursue a research project of your choice while enhancing your career with a post-graduate academic qualification. Projects range from the development of music technology to musical practice using computers. The training conveys skills necessary to progress to more advanced research towards a Ph.D. The course is delivered in the context of the Interdisciplinary Centre for Computer Music Research (ICCMR). For more information, please contact Eduardo Miranda <eduardo.miranda@plymouth.ac.uk>.

THE CONCEPTUAL INFORMATION ARTS (CIA) PROGRAM AT SAN FRANCISCO STATE UNIVERSITY'S ART DEPARTMENT stresses experimental art at the juncture of science, technology and culture, offering both BA and MFA degrees. Contact Paula Levine. Web site: <<http://userwww.sfsu.edu/~infoarts/>>. Tel: (415) 338-2291.