You're furnishing a room with unusual sound sources, and in order to transport it, small is essential – so compact technology's the way to go

the amplified touring sound installation

New and Used Furniture Music and *When It Rains*

BY GORDON MONAHAN

introduction

For *Musicworks 63* Gordon Monahan wrote an article entitled "Kinetic Sound Environments as a Mutation of the Audio System," in which he described some of his pieces that involve loudspeaker cabinets containing unamplified sound-generating mechanisms, and discussed the role of amplification and computer control in his installation work. He characterized the loudspeaker as a cultural icon and described computer-automated instruments as mutations of loudspeakers, relating these concepts to his installation *Sounds and the Machines that Make Them*. Monahan has continued since then to invent innovative combinations of acoustic sound and computer control, sometimes with amplification. He will be presenting two pieces at the Open Ears Festival in Kitchener in May, 2003. One piece is an expansion of a sound installation entitled *When it Rains*, which was first presented in 2000 by New Music Concerts of Toronto. The second piece will be a new multimedia performance piece, *New and Used Furniture Music*. In this article, Gordon Monahan outlines several issues pertaining to the creation of these pieces. His new works combine a number of interests and pursuits that he has undertaken over the past twenty years, and extend his use of sound-generating devices controlled by computers.

-Editor

MIDI-controlled mechanics

I've been delving into MIDI-controlled mechanics ever since Laura Kikauka and I first worked with Trimpin at the Banff Centre in 1990. Laura is a Canadian installation artist who collects huge quantities of weird objects, and animates them using mechanical and electronic systems. While Laura and I were artists in residence in Banff, we did a performance called *The Cocktail Party Effect*. The idea was that we would have a social event – a cocktail party with drinks and background music – where we would perform and present several pieces. It was set up like a bar or lounge, and things happened in the space – Trimpin played some automatic piano pieces, Laura rode her "Elkcycle," a bicycle with antlers that controlled sound playback via the light generator on the wheel. We pretended that it also controlled the scrolling of a video projection following elk around Banff. This was actually controlled manually, but it was very funny to see people tricked into thinking that we had somehow interfaced the bike generator to the video playback. I also played a few short pieces for amplified prepared piano, as well as some for MIDI piano. This was the first time I used the MIDI-to-control-voltage system, and I shortly after began building MIDI-to-voltage converters, based on Trimpin's devices. In the ensuing years I've built up a system of MIDI-control interfaces and Max patches to work with them, and made a few large-scale installations using MIDI-to-mechanical control. Being a fan of machine artists such as Survival Research Labs, Matt Heckert, Chico MacMurtrie, Jim Whiting, etc., artists who build their own performing machines and machine environments, I've always been keen to incorporate machines and / or mechanics into my music installations and performances. This is the nature of sound sculpture. Sound sculptures are quite often sound machines invented by artists or musicians. Sometimes they are physically activated or played by people, and sometimes they are automated in some way.

In the early and mid-90s I toured quite a bit with a series of installation-performances called *Multiple Machine Matrix*. I continually developed it along the way, but one practical problem with my installations was the amount of time it took to install them, usually about five days, working with an assistant. It can be really difficult to develop good pieces that do not weigh a huge amount and take a crew of five or ten people to install and operate. As the late Jerry Hunt used to say, "the ultimate piece is a 100-pound show." He could fit his pieces into a couple of suitcases and fly from Dallas to whereever. The more sound sculpture installations I do, the more I want to figure out how to mount a "100-pound show" – something easy to transport and set up, yet big enough to fill a space and provide for a full performance. Another drawback of real-time unamplified instrumentation was that an installation would have to be mostly all set up in my studio before I could work on the compositional aspects of the piece – the programming. That's because all of the music was live and acoustically produced, so the note-by-note programming and composing could only be done when I had a chunk of time to set up the piece and run through segments and musical ideas.

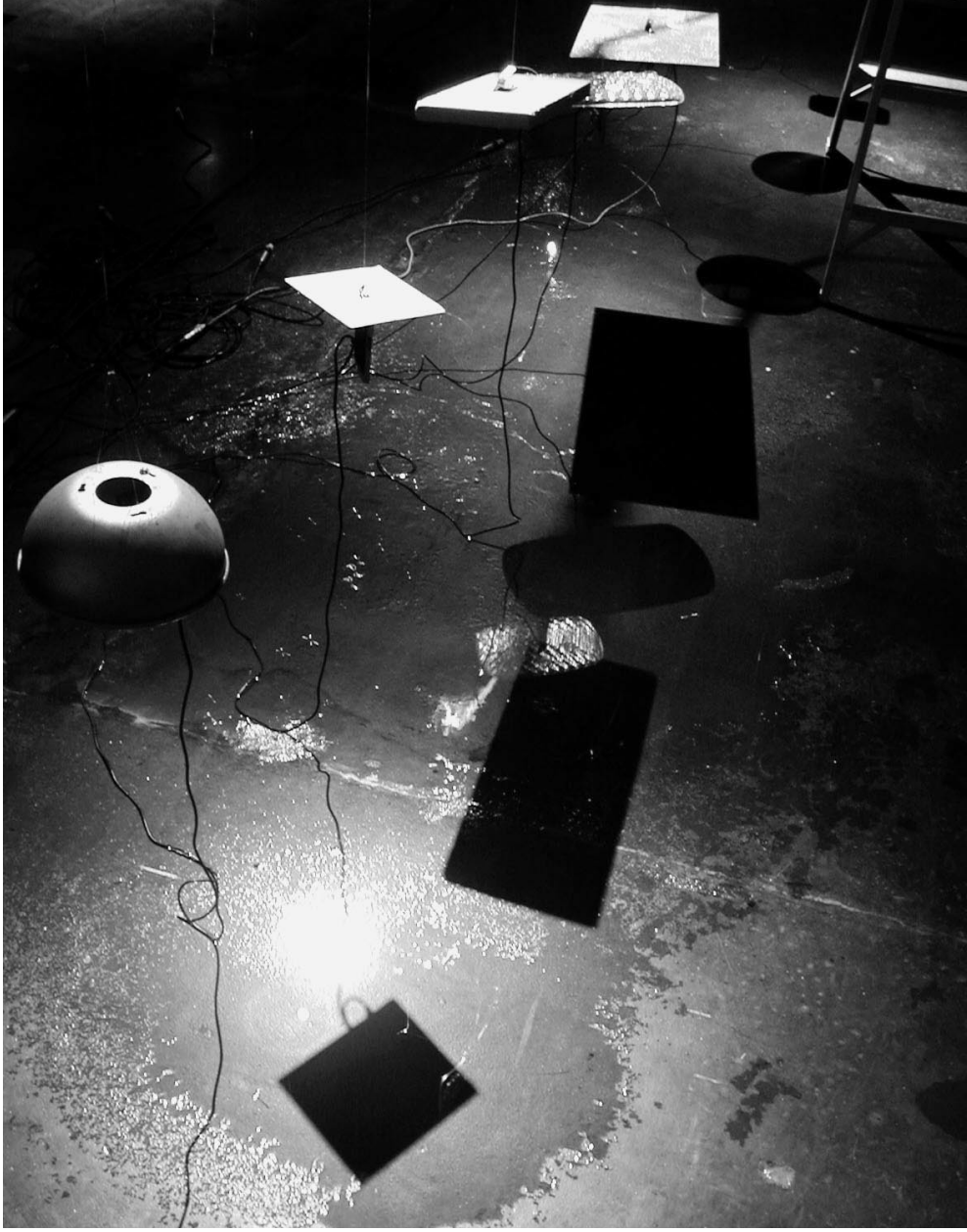
About five years ago I started to integrate some instruments into my installations. I amplified some long strings with vibrating motors attached to them, whose speeds were MIDI-controlled, and also some long strings which were connected to a sort of large whammy bar, a pneumatic cylinder that alternately stretched and slackened a long amplified string. The layering of acoustic-mechanical sounds with amplified mechanical sounds produced some very nice effects, often causing a listener to wonder whether they were hearing an amplified or unamplified sound. Amplification has become so prevalent over the years that we sometimes don't distinguish between acoustic sound and amplified sound. This blending of perception creates uncertainty – is it live or is it recorded – and raises questions about what the term "music" means to us. I think a lot of people today think of music as something that exists primarily on CD or radio, and that can occasionally be heard in live performance, but even then usually amplified, as are the guitar, drums, and electronics of the rock band structure.

The Cage-Varèse-Futurist concept that music would be environmental, and chance-based in structure, is perhaps now becoming more accepted as more people drift toward fringe ideas, experiencing new musical and acoustical possibilities. With that comes the challenge of hearing layered acoustic and amplified sounds as musical structure, and distinguishing between them. The listener asks herself or himself, "Am I a passive or an active participant? Is this sound inherent in this environment, or is it made by an object in the space? Is it random or predetermined?" Which sounds are real and which are imaginary? Which sounds are ancient and which are modern? And,

"Where and when does the piece end?" (Unfortunately a too-commonly asked question.)

One technical problem with amplifying sound sculptures is the signal-to-noise factor of the pickups. It's rather difficult to find decent noise-free contact pickups at an affordable price, and this is an important consideration when you need twenty-four pickups for one installation. During the development of this MIDI hardware I was occasionally able to hire an assistant named Stock, who is a highly skilled Dutch computer programmer and electronics expert. He came up with this simple idea: take two piezo pickups and glue them to a common surface (piece of wood or metal), solder the grounds together and solder each positive ceramic section to the "hot" and "cold" pins of an XLR jack – and you have a perfectly noise-free, electrically balanced, high amplitude pick-up. If you connect twenty-four of these pickups to a twenty-four-channel board, you have a surprisingly noise-free result. Some white noise builds up if the gain is at maximum – for delicate water-drop percussion, for instance, you need maximum gain – but this device works very well otherwise. I've designed a few variations of pick-ups based on this and have made about fifty of them. I recently sold ten of them to the industrial music band Einsturzende Neubauten, who say it's the best pick-up they've ever used. I'm making a new series that I'll use in *When it Rains* at Open Ears in Kitchener-Waterloo: they'll be waterproof.

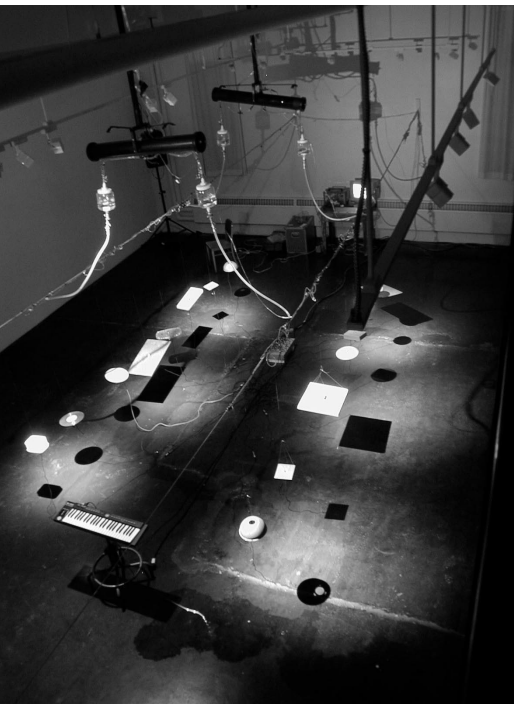
Using amplification means that the sound sources can be small and lightweight, so the multiple pickups allow me to use such systems in reasonably complex set-ups. Another advantage of using amplification in sound sculptures is that I can sample each individual sound and use a sample program on my computer that can be activated by Max or Performer, and I can develop the musical compositions without having to set up the entire installation. I can work anywhere I have my computer, so I don't have to set the installation up every time I want to work on it. Of course, I don't get the full effect of space, distance, live sound source, etc., but I get a pretty good approximation of the musical composition. That means I can spend longer periods of time on the musical aspects of the piece.

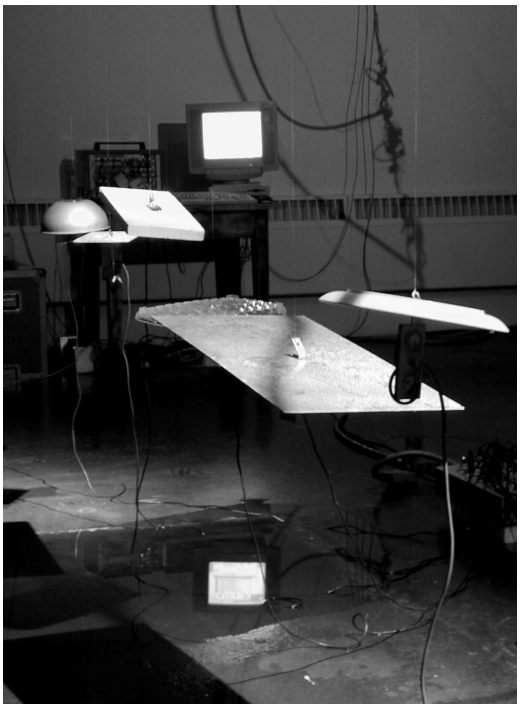


When It Rains (2000-2002)

When It Rains is an interactive automated sound-sculpture environment consisting of thirty-two MIDI-controlled water valves dripping onto twenty-four suspended objects (small metal and plastic items). Each object has a contact pick-up attached to it, so that when a drop of water lands on the object, the resonance of that object is amplified through a PA system (mixer, amplifier, and loudspeakers). Each pick-up is a balanced-XLR-type and has a dedicated channel on the mixer, so that each pick-up sound can be individually equalized, thus enhancing the natural harmonic tones of each individual object. Pre-programmed musical sequences play the water valves. The sequences consist of MIDI notes played in rhythmic patterns, where each note triggers a forty-millisecond pulse that causes a corresponding valve to open just long enough to form a drop of water. This drop then falls approximately one to two metres, and lands on the object suspended below it.

The sound imagery created by this piece may require the listener to examine the question of opposites and contradictions in sound and musical phenomena. The central conceptual concern is to use primitive sounds (water drops on various surfaces and materials) to imitate technological sounds (e.g., electronic samplers imitating natural sounds). The technological sounds (sound samples) are not present in the installation, but their acoustic images do reside in the perceptual memory of the modern listener.





The piece was inspired by seeing Trimpin's piece for MIDI-controlled water drops, which he did at the Newfoundland Sound Symposium in 1992. One main difference between *When it Rains* and Trimpin's piece is that all of the water drops fall onto amplified objects in my version, while in Trimpin's piece the drops fell on unamplified homemade latex drumskins and glass-blown objects. Perhaps the most amazing thing about Trimpin's piece, for me, was seeing that drops of water could be precisely enough computer controlled that distinct rhythms could be played with them.

I've rebuilt the installation from scratch since its first realization. Now it's larger, and the musical compositions are more developed. Some objects have two drops falling independently on them because the sound they emit varies, depending on where the drop falls. I have about ten pieces written for the installation, each between three to five minutes long, and these pieces are called up and played back in random order as viewers enter and move about the exhibition space. The use of a hi-tech interactive computer control system in combination with the natural element of water is a metaphor for interfacing technology with natural forces. Rather than venturing into nature with audio-documenting or audio-generating equipment, I am attempting to bring natural elements into an indoor exhibition space by controlling and manipulating water drops to create organized sound and music.

New and Used Furniture Music

New and Used Furniture Music is a forty-five-minute multimedia performance piece using a homemade sound sculpture and a small number of water drops (not as many as in *When it Rains*). The instruments include large metal sheets vibrated by variable-speed motors, long piano strings vibrated by motors or stretched by pneumatic pistons, and water dropping onto amplified objects of various types. Though there is no literal reference to Satie's furniture music, the concept of a sound environment in a general sense can be traced back to Satie. Also, many of the objects I use in the piece were originally intended for other purposes – thus the "New and Used" part of the piece, providing for the crucial part of the pun.

I hang most of the "instruments" and the water drop valves and water tubing from a flexible grid of overhead steel cable. Some of the objects have contact pickups attached, but for some of the long strings I use magnetic guitar pickups. There are also unamplified thunder sheets mixed in acoustically. In *New and Used Furniture Music* I want to avoid a problem that occurs with some computer music, which is performed with the audience watching a musician stare at a laptop computer for the duration of the concert. I've performed this way myself, and I've come to realize how boring it can be. So I have a couple of computers set up to run the piece, and I activate parts of the piece using sensors – basically piezo-to-MIDI sensors that I can hit or touch to control MIDI activity. I also control some aspects with a theremin I got from PAIA Electronics that outputs control voltages that are then converted to MIDI velocity values. I also play the theremin itself in one section, so the actual sound of the instrument is heard, instead of it just controlling other sounds and actions. The theremin represents mystery, because the tones are produced through the ether, with no physical contact with the instrument. It is controlled by the performer's movements, through body capacitance picked up by changing proximity to the theremin. It is a wonderful instrument – it has a kitschiness to it, reminiscent of the sci-fi movies of the '50s and '60s, in which it was frequently used, and it also has a lot of historical reference, being one of the first electronic music instruments invented. I use the MIDI-interactive theremin as a device to control the speed of electric motors that resonate long amplified strings suspended through the performance space. As the motors spin at different speeds, they induce

various harmonic vibrations in the strings, which are amplified by magnetic pick-up. As part of the performance, the motor is also physically dragged along the string to vary the length of the resonant section of wire. The dragging of the motor and the varying of the motor speeds to induce changing harmonic vibrations in the multiple strings will constitute a performed section of the final work. Five or six video cameras will record real-time close-ups of some of the smaller mechanical movements that produce the tonal vibrations, and these images will be projected onto a video screen as a backdrop to the performance. The images will be layered and cross-dissolved with one another and with the computer screen showing the Max patch, so that the audience can get a sense of what the computer is doing during the show.

Using video is one way to overcome the problem presented by having many small actions take place throughout a space in which the audience cannot move freely, or where it is inappropriate for the audience to be moving around. Some of these actions can be projected on a video screen, so the audience can see them and connect the visual image to what they're hearing.

Conclusion

The installation form is like a laboratory that allows me to experiment with ideas, since objects or processes can be altered during the public exhibition of a piece. When I present an installation as a performance, I am taking the term "experimental music" literally, and setting up an experiment on a stage containing various hybrid technologies and home-made sound sculptures and electronics. I remember mentioning to David Tudor in 1994 that I was having difficulty with a piece at the time, and he chuckled and said, "Oh, you can make anything work. You just have to figure out how to do it." That showed his sense of experimentation, and also his cavalier approach to working on a stage. So when I feel overwhelmed with mounting a new piece, I remember his words of assurance and keep trying to figure out how to do it.

Gordon Monahan is a Canadian artist living in Germany. His works for piano, loudspeakers, video, kinetic sculpture, and computer-controlled sound environments span various genres, from avant-garde concert music to multimedia installation and sound art. In collaboration with Laura Kikauka and Bastiaan Maris he created The Glowing Pickle (1993-95), and later, with Laura Kikauka, the infamous Berlin underground club Schmalzwald (1996-2000). In addition to creating works for sound sculpture environments, he also performs on electric organ with the band Fuzzy Love.

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résumé français

Gordon Monahan discute de deux installations qui seront présentées au festival Open Ears en mai 2003, à Kitchener-Waterloo, Ontario. When It Rains est une version élargie d'une pièce présentée en 2000 qui met en jeu un dispositif MIDI d'écoulement d'eau sur différents matériaux générateurs de sons. New and Used Furniture Music, qui sera également présentée à Montréal en novembre 2003, est une performance multimédia comprenant une projection vidéo et un theremin qui agit à la fois comme instrument et dispositif de contrôle. Monahan discute du cadre conceptuel et parle des défis techniques inhérents à la création d'une installation sonore de grand format, donnant un aperçu de son travail avec les contrôleurs MIDI et l'amplification à l'aide de micros-contacts. Il aborde également certaines questions concernant l'expérience immédiate du son et la signification de la musique dans la culture contemporaine.