Site of Sound #2: Of Architecture and the Ear

EDITED BY BRANDON LABELLE & CLÁUDIA MARTINHO

Justin Bennett / Usman Haque / David Schafer / James Webb / Edwin van der Heide / Raviv Ganchrow / Jodi Rose / Nigel Helyer Michael Gendreau / Jean-Paul Thibaud / Tao G. Vrhovec Sambolec / Oliver Laric / Anthony Kelly & David Stalling / Romano Natasha Barrett & Birger Sevaldson / Scott Arford & Randy Yau / Riccardo Benassi / Carrie Bodle / Jenny Pickett & Julien Ottavi Pascal Broccolichi / Franz Pomassl / Jacob Kreutzfeldt / Joaquín Gutiérrez Hadid / Björn Quiring

The Audience Inside the Instrument
Edwin van der Heide

When I was asked to make a new work for the big Wasserspeicher, the current location of the Singuhr Hörgalerie in Berlin, I had an unusual observation. The space exists of four rings around each other and is truly reverberant. The biggest ring has a circumference of about 90 meters. Each of the four rings has a wall built in it that interrupts the ring except for a small opening in it. When one person stands on one side of such a wall and another person stands on the other side of that wall you can speak to each other through the corridor. The sound travels from one side of the wall, all the way along the corridor, and arrives at the other side of the wall. When I discovered this behavior I was surprised that you were still able to understand the speech although it had travelled a long distance and obtained a long tail of reverb. In a church, for example, for example it's often difficult to understand each other when you try to speak at a reasonable distance because the length and amount of reverb mask the fast temporal changes present in speech. It is the ring-shape of the corridor that reflects the sound further and further and hardly reflects it back. While the sound is traveling through the corridor it's actually returning to its original location. Another observation that I had is that it was possible to hear the sound arrive at the other side of the wall and therefore experience the speed of sound. The time it takes for the sound to go round is long enough that the returning sound is perceived as separate from the produced sound. I therefore decided to call the work *The Speed of Sound*.

We can think about a string as a one-dimensional space. When the string is plucked the sound of the impulse is traveling through the string and reflecting back at both ends of the string. We can think about the sound of a string as the reverb of the plucking that takes place in a one-dimensional space. Because the impulse is repeatedly being reflected up and down the string at a relatively fast speed we perceive this as a pitched sound and not as individual reflections. The decay of the tone is the decay of the reverb. When a reflection would be repeating at a slower rate there is a moment where we don't perceive the reflections as a pitched sound but as a rhythmical sequence.

Reverb is a combination of many reflections that have, depending on the shape of the space, a more regular or irregular character.

When thinking about the space I started to think about the four rings as air-based strings, not straight strings but curved circular strings, strings that are big enough to be inside of them.

The observation of producing sound on one side of the wall and hearing the sound arrive at the other side of the wall made me wonder how it would be if there wouldn't be a wall blocking the sound. I started to experiment with this by placing a microphone on one side of the wall and a speaker on the other side of the wall. The sound picked up by the microphone could now be amplified and played on the other side of the wall by using a speaker. With this setup it became possible to make the sound go round and round as if it were a perpetuum mobile. With each round the sound becomes more reverberant until it loses its understandability and gets a more stretched tonal quality. The idea of using a speaker and a microphone in order to make the wall transparent came from the perspective of opening the ring, but has similarities to Alvin Lucier's *I am sitting in a room*, for example, which focuses on the resonant frequencies of a room.

By placing a microphone and a speaker in each of the four rings I created the possibility to, not only, make the sound continue within one ring but also make interconnections between the different rings. A sound that is reaching the wall of one of the four rings can be played and continue in any of the four rings. I started using a computer with four independent audio inputs and four independent audio outputs. By developing custom software I started to explore dynamic interconnections between the four rings. One idea was interconnecting two rings with each other to create a corridor that has the length of the sum of the two. Another idea was creating an infinite inward spiral where the sound from one ring continues in its neighboring ring and where the most inside ring is connected to the most outside ring.

Besides working with dynamic interconnections between the rings I started experimenting with manipulating the sound in between picking it up and playing it back. I decided to work with two manipulations: one being a variable delay time and one being a variable linear frequency shift. By delaying the sound, it became possible to create the suggestion that the corridor would be longer than its actual length and because of the variable nature of the delay a corridor could even be shrinking or growing. The frequency shift created the possibility to shift the frequency up (or down) for each time the sound is being picked up. The reason for introducing the manipulations was to be able to transform the acoustic properties of the space in real-
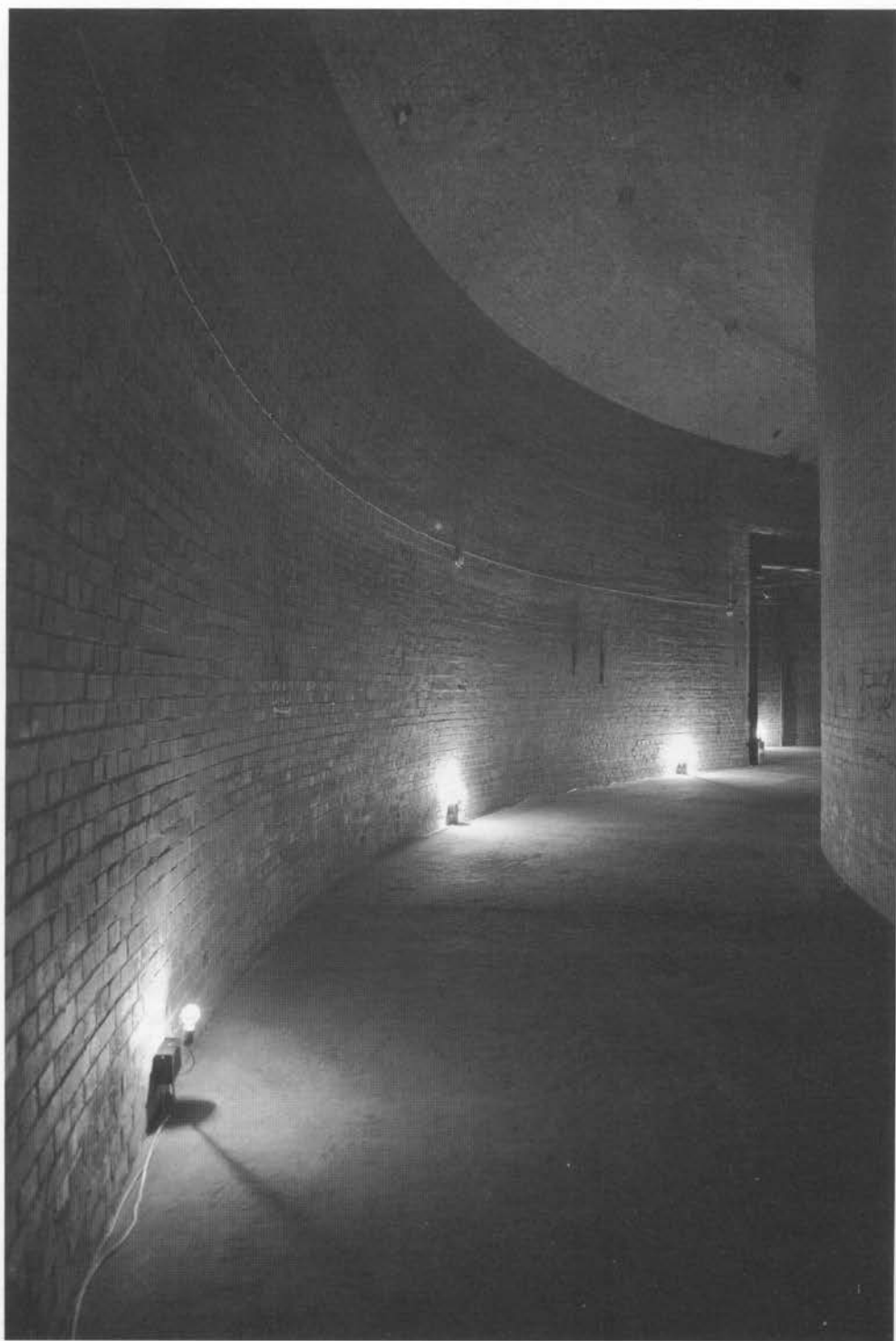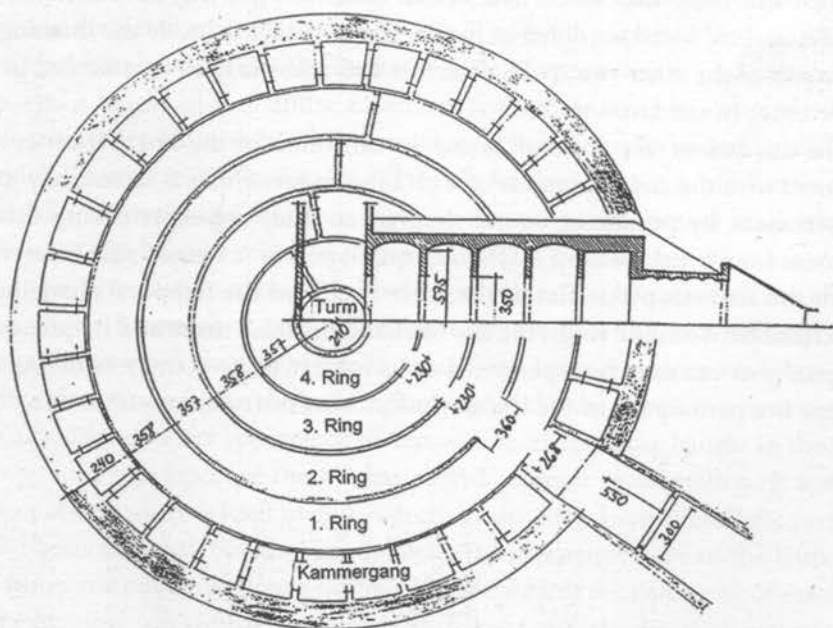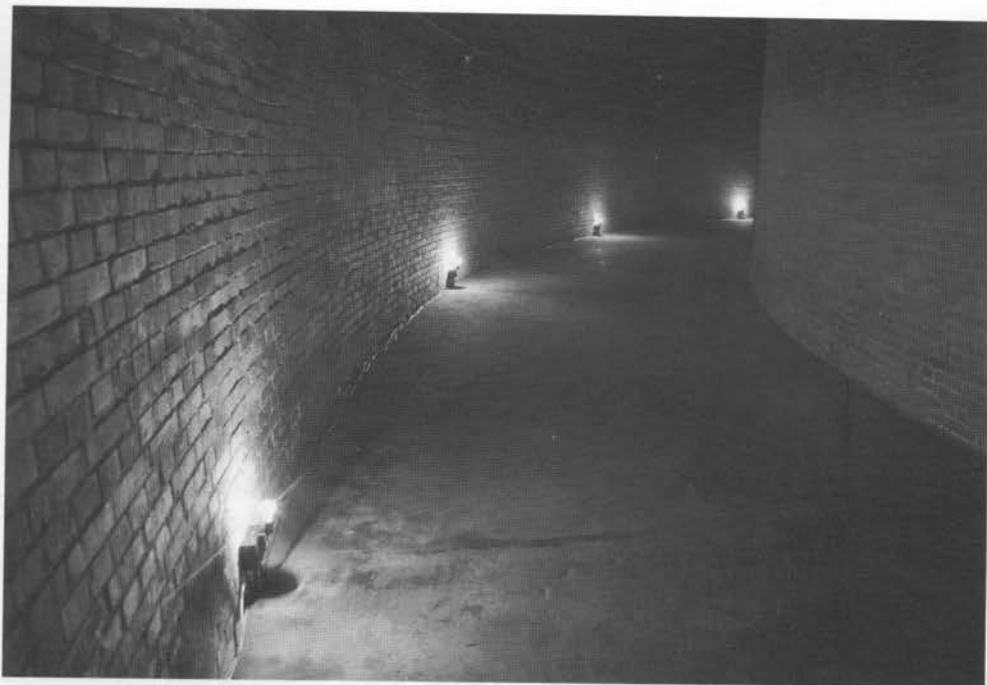
The Wasserspeicher. Entrance Belforter Strasse, in cm.

time and turning it into a time-based transforming space; a dynamic form of sonic architecture. I would call the sequence of interconnections and transformations the composition of the work since this sequence structures time and space. I refer to the meaning of the word composition as used in the context of music but in this case not defining what sounds at which moment but to a composition that determines the behavior of the space.

As described earlier we can think about a string as an acoustic space in which the reflections lead to the experience of a tone. Let's suppose we're speaking about an acoustic guitar, then the body of the guitar can be seen as a second acoustic space in which the produced sound is reflecting and therefore being filtered and shaped by the resonant frequencies resulting from these reflections. The third acoustic space that we can distinguish is the listening room, the space in which the guitar is being played. Following this reasoning we can think about the playing of the guitar as a sound that follows a sequence of three acoustic spaces each made from a different material, with its own shape and therefore its own dimensionality and complexity. We can say that these three spaces have similar behavior while they have different shapes and scales and are based on different media. The audience is inside the listening space but not part of the other two spaces. The first two acoustic spaces are needed to create an experience in the last one.

In the case of *The Speed of Sound* we can think of the installation as a large instrument with the audience inside of it. It's the audience that is acoustically exciting the instrument by producing sound themselves. They are experiencing that same instrument from being inside of it. The audience is part of "a system" that is determined by both the acoustic properties of the space itself and the temporal changing interconnections between the rings, the use of changing delay times and frequency shifts. It's a space that can only be experienced in its full extent by actively exploring it. The audience is a participant inside the artwork. It's an instrument without an outside.
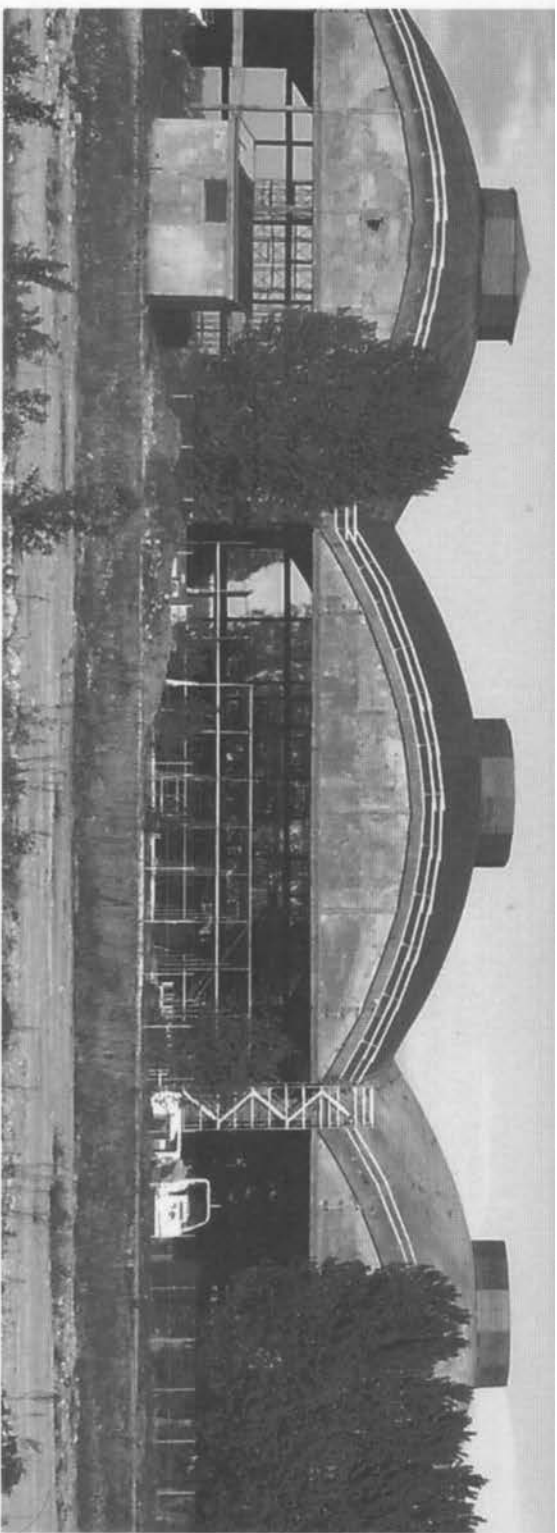
Since the publication of the first volume of Site of Sound in 1999 the issues and activities pertaining to sound and architecture have expanded to circulate more dynamically within the fields of sound art, sound design, and spatial practices. From acoustical technologies and urban planning to public art, concerns for auditory structures and the experiences of listening are finding deeper footing within both artistic and environmental contexts. Recent noise mappings across Europe, along with new possibilities for acoustical implementation, as well as the ongoing emergence of sound art and design educational programs, point toward sound as a crucial subject for thinking through contemporary culture and politics.

Site of Sound Vol. 2 aims to address contemporary work being done in the cross-over between sound and architecture. The anthology brings together new research and writing that charts out the theoretical implications and consequences for artistic and spatial discourses, while documenting contemporary projects that come to occupy and define a sonic-spatial territory.

With accompanying CD of related audio.