Lecture at the Siebu Museum Tokyo 1982
Talk and question period

I would like to talk about what the installations are and how some of them are made.

The works I will describe are all non-visible sound structures. They exist in both public places and in cultural contexts. They shape, transform, create, define a specific space, with sound only. They exist not in isolation, but within their context, the context of their sound environment, their visual environment, and their social environment. The existing sound environment is an important part of how the works are formed. They are not formed in isolation but grow from those three aspects, their visual context, their social context, and their sound context.

Some of these works are outside of places where we expect culture to be. The works of this kind rest on two basic ideas. One is to deal in a complex way with a broad spectrum of people, both culturally initiated and uninitiated. The other idea is that they can enter into people's daily lives. They are in places and contexts which allow people to come across them in their daily activities, rather than deliberately going to a specific place at a specific time to hear them.

Not using sound recordings to describe them is a basic principle of mine. There are also some practical reasons for it - the first being that they are, in fact, un-recordable. Many of them have sound components which cannot be recorded. They are also sometimes made up of sound topographies; instead of being spatially one dimensional like music, they have two or three dimensions - they have different sounds in different places. So the question of where to record a work comes up.

But, most importantly, they exist in a specific context, and they grow from that context. To take the one component that's recordable, to take that away from the context, misleads people about the nature of these works.

Tonight I'd like to talk about my process in making them, how they're made, something which isn't evident in the experience of the works.

Because I'll be talking in detail and sometimes in a technical way, I feel that it's important that I have questions from you to tell me what I need to explain. After each work that I describe, I will ask if there are any questions.

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The first long-term work was set up in New York City in 1973 at the entrance to a subway station, which was also the entrance to a building. A space which hundreds of people walk through every day in the course of their normal activities. People enter the subway through a stairway and come up from it on an escalator. This space has street sounds; it's not a quiet place. One side is also open to a park.

The work was made up of a field of very soft click- or tick-like sound zones forming different configurations at ear level throughout the space. It was generated by sixteen sound sources, four each mounted on each of four pillars, and pointed in different directions to form areas of sound that people walked through. The areas overlapped and mixed; if you were standing in one you heard its source most, but also adjacent ones as well.

The sounds were short; and they varied between being a sharp click to being long, almost like the chirp of a bird. Each one had a separate, independent speed. Because of these different speeds, they combined to form different rhythmic structures, depending on the listener's location or pathway through the space.

There was another factor which changed the piece over a long period of time - the timbre of each source and its speed changed with weather conditions. Temperature, light, humidity, wind speed, all affected, in a

complex way, the speed of each individual source and the nature of its sound, making it more of a click or more of a chirp.

I wasn't interested in weather conditions per se; I wanted an ongoing stimulus to change the sound-generating process I had set up. Most people walked through the space as part of their daily routine. I was interested in a level of perception that usually occurs visually. Along routes that we walk very often, we quickly learn the visual environment in detail; but then we gradually stop seeing it because of its familiarity. But if something in it changes from one day to the next, even if it is a very small part of it, the change immediately jumps out at us. I wanted something like this to happen on an aural level.

As these sounds were very soft and mixed with the street sounds, people had the alternative to notice the piece or not notice it and, as they passed through this space daily, to recognize the effect of weather conditions upon different days. The work was anonymous.

The next work was made in a very different context - part of a visual arts exhibition in Kassel, Germany - a very lush park with, in this case, lots of visual sculpture in adjacent areas. The piece occurred in the clearing, around a tree.

There were eight sound sources, eight speakers, hidden in the tree. These speakers were of a very special nature, more directional than those of the last work, so that the sounds weren't perceived as coming from the tree. They were reflected from the ground; it seemed that the sound was emanating from the grass rather than the tree, forming click points scattered throughout the clearing. People approached and passed through the clearing in a variety of ways, depending on their movement through the surrounding park.

In this case, the clicks were much slower, with several seconds of silence between each one, so that they didn't form rhythmic patterns as in the first work I described but instead served to define or articulate the space itself.

The timbre of these sounds related to sounds which happen in this environment, the sounds of stepping on a twig, or a drop of water falling from a leaf.

I'd like you to ask some questions to get the discussion started.

Q. What kind of directional device did you use for the subway entrance?

A. They were horns with directive patterns.

Q. How do you contain the area of the sound so that it doesn't scatter elsewhere?

A. A loudspeaker of this kind focuses sound on a specific area. It's a directional source, and therefore it forms that kind of pattern.

Q. How do you make sound into space?

A. I do it in many ways. Or more accurately I use sound to change the way we perceive a space. In the Kassel piece, it was the separate sounds happening slowly in different places which defined the space. The clicks were separated by a second or two of silence, and also had physical space between them. This pointed out, emphasized, directed attention around the clearing in a way that created the sense of this space.

Q. When you make a work, do you know what you are going to do beforehand?

A. I deliberately don't go into a situation with a preconceived idea. For me a work starts by choosing a particular place, then going into it and making sounds, gradually learning about the acoustics of it, its aural environment, getting a feeling for its visual environment, and then slowly defining the work's sound. It's a long-term process.

Q. I think what he's asking is if you have the idea first and then try to realize it.

A. No, I don't. I choose a place first; the mechanics of the piece follow that. Then the sound itself comes from working within that place, and grows from my imagination of that place and my experience with its three kinds of context. Did I answer your question?

Q. Yes.

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This next work was completed in 1980. It existed in a public botanical garden in St. Paul, Minnesota. The space is an unusual one in that geographical area. It's full of plants, large and small; and in that part of the United States the weather gets extremely cold in winter, twenty degrees below zero. So it forms a kind of extreme contrast to the outside environment.

It's a very large dome that's one hundred feet, thirty meters, in diameter, and twenty meters high.

The work was formed with sixty four percussion instruments, so to speak, sixty four sources controlled by one computer - each one having a percussive sound, but forming a percussion chorus or percussion orchestra.

This chorus was playing low drum-like sounds in three pitched areas which are resonances of the dome. Each of the sixty four sources was an independent member of the chorus. In addition there was a bell-like sound which seemed to move across the space - once here, then a few seconds later there, continually crossing the space.

Like the other two pieces, the sounds are very soft; the piece is very subtle.

Are there any questions?

Q. Are the sounds made by recording the natural sound environment?

A. No, they're made by sound synthesis circuits which I build. None of the works use sounds from their environment directly. In other words I'm not using a microphone to record those sounds and then reproducing them. But they do grow out of that specific environment. When I begin conceiving of the sound for a work, I do that at the same time that I'm listening to that environment. So the sounds I build grow out of that situation, but they aren't of that situation.

Q. Was the work sounding twenty four hours a day?

A. Yes. This garden's only open about eight hours a day, though, so the piece was only heard for that period of time. Other pieces - the ones that are in public places - are continuous and available twenty four hours a day.

Q. Since you don't plan a work in advance, aren't you surprised when you finish?

A. The process of making a work is one of constant readjustment. I start by identifying a general area of sounds that I'll use in the piece. Making it is a focusing process which gradually becomes more detailed, until it reaches a point of fine tuning. So at the end, no, I'm never surprised. But if I was able to stand back with the perspective I began with, I would be.

Q. How do you compose the work?

A. It's a good question. I don't compose a series of sound events. The piece is made up of a series of processes, which are independent and go on continually - so that, unlike a recording which is repeated over and over again, the work continually evolves itself and never repeats. It just continues to evolve.

Q. How do you make the bell-like sounds move?

A. I project the same sound from different places. Since it's an identical sound, when it comes from another source the illusion is that it has moved.

Q. What is the reaction of people to these works?

A. With all of the works, it's a difficult question to answer. I think it's the same question that a sculptor who makes steel sculpture in a public place has a difficulty answering, too. People walk past or go through these works in the course of doing something else. In a visual work, you can see whether they look at it. But even if they don't look at it, they could be sensing it and seeing it without deliberately stopping and walking around it. There's no way to get an accurate public reaction like one can in a concert hall with applause.

Your question is something I always get asked; usually the person is interested in measuring the success of these works. The success of an artwork is an individual question, one that can only be answered by each individual perceiver for himself, not by counting how many people react to it.

These pieces don't stimulate a negative reaction. There aren't people who are outraged by them. Those who would be, never notice them.

Q. Can you describe the system which produced the sounds?

A. In this work I managed to develop a rather sophisticated computer system. It was the realization of an idea I had had for some time. As I work in the real world, I felt I needed to find a way to approach its aural complexity, which is created by many sources. Even when they are all the same type of source - cars or crickets, for instance - each is in a different place and has a slightly different sound.

Most audio technology is designed to recreate a sound situation - the stereo system simulates the concert hall in the living room. I was not interested in simulating a sound field with stereo or even quadraphonic sources; my problem was to create the sound field. I wanted to approach the level of aural complexity of the world we live in.

The system producing the work in the dome consists of one synthesizer for each source, so there are sixty four synthesizers and sixty four speakers, each one completely independent of the others. While building the sounds, I controlled them by using a modified, battery-operated television set, which I could carry around, with something called a light pen. With those two things I could set any parameter of any synthesizer from any point within the space. And I could also define patterns of each parameter, values which changed in time, by drawing on the screen with the light pen. So with this system it was possible to make each synthesizer do something which is completely different from each other one. Their combination which is perceived as a whole is then never the same; it was always changing and evolving.

Q. I don't understand why you can't do the same thing with tape recordings.

A. For the long term installations, and especially a permanent installation, tapes aren't practical. They wear out. But more importantly the idea of something repeating itself exactly is a very simple one. Even if I set up sixty four endless tape loops, I would have a much simpler set of possibilities than I do here with sixty four synthesis circuits.

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This next work was the first sound installation I ever did. It was set up in 1967.

It was installed outdoors on a kilometer of roadway in Buffalo, New York. It was the beginning of these ideas of making work which was integrated into people's daily activities. Buffalo is typical of a number of American cities, where people have stopped walking. They only move through the city by their car. Even if they're going two blocks, they drive. If I wanted to make something they could come across, it made sense to do a work for people in cars.

I set up a number of short-range radio transmitters along this kilometer of roadway. Each transmitter was broadcasting on the same place at the radio, the same station so to speak, but each one had a different sound. Each transmitter had its own antenna which formed the physical shape of the sound. In the drawing, each transmitter's antenna or its broadcast area is represented by a different color.

As a listener drove through the area with his radio tuned to the 'station', he heard mixtures of the sounds over his car radio. For example, if he started from the left side of the drawing, he drove into the sound broadcast by the blue antenna; as he approached the area of the orange antenna, he began to hear a mixture of the two. The proportion of the mix was determined by his position on the road; the more towards the blue antenna, the more of that sound in the mix. The attacks and decays of the sounds were determined by the shape of the antenna configuration. If an antenna crossed the road perpendicularly, the sound occurred suddenly; if it crossed the road diagonally, then the sound got louder

gradually. If the listener chose to enter from the other end, of course the succession of sounds was reversed.

Like the first piece I described, this work was also sensitive to weather conditions. The sound broadcast by each short-range transmitter was made up of a number of sine waves. Their frequencies were determined by weather conditions, so the timbre of each of the transmitted sounds changed with the weather.

Depending on which direction a driver entered the piece, how far to the left or right side of the road he was, how fast he moved through it, and what the weather conditions were, the work was different. He assembled it for himself as he passed through it and for himself only.

I stopped using weather conditions as a stimulus after 1973. I found that it was a distraction for most people; they could only think of these installations as strange kinds of weather forecasters rather than as sound works.

Any questions? Yes.

Q. In this case, do you hear the sound only from the speakers in your car, or outside as well?

A. You hear it only from the speaker of your car, so not only is the piece invisible, it's inaudible until each listener's car radio exposes it to him, when and according to the way that he's driving through the space.

Any more? Yes.

Q. Were the transmitters AM or FM?

A. They were AM here, because the majority of radios were AM then. But I'm in the process of proposing a new work in Los Angeles which would be FM. It's just a matter of picking the most common form of radio at the time.

Q. How did people react?

A. In this case it was even harder to tell how they reacted, because they were in their cars. It's always a question I hesitate to answer, too. In most of the works, people ask me if I go and sit by them and watch people's reaction. I don't.

Which isn't to say that I don't care how people react to them. But, in the process of making them, I'm usually in the midst of people who are using that space. They become a factor in the foundation of the work. Once I've made it, it's theirs and it's up to them.

Q. I think you don't like to impose your work on people.

A. When I work in the public sphere, I am not interested in generating a confrontation. I feel like I am working in a space which is theirs; I'm in their territory.

The public works are all deliberately pitched at a threshold of perception, a point where people can notice them or not notice them. They're often disguised, almost hidden in their environment.

But in the case of the pieces for people in cars, it's a more deliberate situation - a much more obvious sound situation. So they are two different categories. The pieces for cars are separate, in a way, from all of the other installations in that respect.

Q. How did people know about the work?

A. It was advertised in a newspaper for the time that the work was up, and also a map of the work was given out at the driveway entrance of the museum which was at one end of the piece.

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The next work I'll talk about was a short-term installation in a historic building in New York City, a large formal room where the customs officers worked in the 19th century.

It's oval in shape, a rotunda with a curved ceiling.

The name Round, the title of the work, refers not only to these curved surfaces, concave spaces, but also to a simple musical form, which we all know, or at least in the west, as singing a round. Several people sing the same melody but start successively. The

harmony of the piece forms as different notes of the melody occur at the same time.

I wanted to set up a situation where I could turn sounds around the space, to rotate them. I set up eight channels of sound; instead of a stereo system, it was an octal system. Each channel was formed with a row of speakers laid out in a diagonal across the space. I panned the sounds from one channel to the next to move the sound within the space.

For example, in a stereo system we have two speakers; if we put a sound in one and then gradually decrease the sound in that one as we increase the sound in the other one, the sound seems to move gradually between the two speakers. In this case, though, we didn't have two separate speakers; we had eight diagonals. By panning from diagonal to diagonal, the sound rotated within the space.

There were four different sonorities to the work. Each one was passed through the eight channels at different speeds. They all moved clockwise around the rotunda but at different speeds, so the faster ones overtook the slower ones and formed a continually evolving set of mixtures for a person at any one point within the area.

This work perhaps clarifies the issue we were talking about before, of the difference in possibilities between a work that's made by synthesis and one that's just a tape being played back.

Any questions?

Q. Was it like a concert, an event?

A. No, people were free to come at any point within its three days and stay for as long as they wanted. Some of them walked around the space. They also could sit in the inner part where there was a carpet and stay for any period of time from a few minutes to several hours.

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The next work is in Times Square and was installed in 1977. It has operated twenty four hours a day since then and is now approaching its fifth birthday.

The choice of site came about quite accidentally. I happened to be walking through Times Square one day in 1973 and crossed the street at this particular point and saw the grating in the ground. At that moment, I knew I was going to do a work there. I didn't know what kind of work it would be. I had no idea how long it would take me to finish.

Times Square is the crossroads of many pathways through New York City. A large number of very different kinds of people cross this particular place every day - the work is on an island in the rivers of traffic that move through the city.

The visual context is extremely active. There's a huge amount of advertisement in the square and very bright signs. In terms of sound it is also active. The traffic sound in New York is much louder than here in Tokyo. Not only are there cars and car horns, but the movie theaters on the edge of the square advertise the movies with sound. Also record stores play records through loudspeakers onto the street.

The work's sound comes out of the ground. It's a combination of sonorities which are different in different places on top of the grating - a sound topography.

There's a large chamber underneath the sidewalk covered by a grating. The original purpose of this chamber was to ventilate the subway system. It is triangular and quite deep. One side of it has a series of tunnels of varying lengths going back to the subway track, which is under 7th Avenue.

The complex shape of the chamber led to a complex acoustic set of possibilities. I began making the piece by investigating what the resonant frequencies of the chamber were. The next step was a gradual process of selecting which resonances to use and how to use them. I finally determined a set of sonorities, four independent processes, which activate the resonances I chose, activate the chamber.

These resonance-stimulator sounds are produced with a synthesis circuit and come out of a large loudspeaker horn, one by two meters. But the sound heard on the sidewalk is not what's coming out of the speaker. I

think the easiest way to think about it is to think of the air confined by the walls of the complex chamber as a block of material which the speaker is vibrating. The vibration of that block of air is exposed through the opening of the grating in the sidewalk, as the work's sound.

Q. Weren't you bothered by the noisy character of the square?

A. No, the work includes the traffic noises. It's a funny thing. When you mix sound, you can mix sound A and sound B and you don't get sound AB, you get sound C. So, even though the piece itself doesn't by any means cover the sounds of the traffic, it transforms them into something else while you're standing in it.

The work forms an extreme contrast to the very active nature of the square itself. It's a calm place to be, although it is just a small area in the center of this high activity.

Q. Did you want to make it a sensational sound?

A. No, I wanted it to be spectacularly unspectacular. The work forms an invisible and intangible point of contrast to Times Square.

Q. I would very much like to hear it.

A. It's always there, but it's a little far away.

Q. What do you think about noise pollution?

A. A number of things. One is I think it's a mistake to think of all urban sounds as bad. There are sounds in the city which are dangerous to your ears, but they occur in discos and right next to construction. To think of all man-made sound as bad and any sound of nature's as good is simplistic. Many sounds in the urban soundscape are very interesting and complex; we shouldn't reject them out of hand just because they may not be made deliberately.

The most important thing is that we have a choice in what we hear. If we live in a building without adequate sound reduction, we don't have that choice and that tends to make people resent sound in general. It's cheaper to build a building without good sound reduction, and it's not harder to sell: it doesn't look any different. Because the aural component isn't noticed at first, many people end up with apartments where, although their bodies are sitting in their own living rooms, their ears are in the middle of the street or their neighbor's living rooms. We need both aural and visual privacy.

Q. What do you think about BG music?

A. Well, I don't know. I know that BG is a background music company here in Japan, but I'm not sure what their music sounds like. In America we have something called Muzak. It disseminates highly digested melodies from the popular music culture into public spaces. Its advertising claims that these melodies raise production in factories and calm people; and it supports those claims with dubious scientific studies. I've heard of many cases in America where Muzak has been installed and the workers within the space itself have demanded its removal.

I think that sound is one of the most important factors in our environment, even though we may not realize it. It affects the way we feel about a space more than the way a space looks. One should be very, very careful about putting sounds in spaces where people live and work.

Q. You have talked a lot about technical equipment and acoustics tonight. I am not sure whether you are an artist or an engineer.

A. Yes, most of our discussion here has been about technique, the particular pathways and routes I have found to accomplish what we call an artwork.

People who work with sound seem to have always been at the edge of the technology of their time. The precision machining required for a flute stretched the metal-working technique when it was first made; the technology necessary to make a piano was quite extraordinary when it was invented; and the large pipe organ with its many stops and orchestral accessories was an ultimate achievement of the mechanical age. Our need to be able to shape sound seems to be so great that it pushes the technology. Perhaps it's because, unlike a

visual image, we have not been able to make a sound 'mark' from the earliest times. The finest technique we have today to make and shape sound is to model it electronically.

I have chosen sound as a carrier of my ideas, so the audio technology which creates and shapes this carrier is something I have to be intimately involved with; and I have felt it necessary to acquire many of the skills of the engineer because I feel the need to be able to mold my material directly, without mediation.

In some phases of a project I put on another hat and pretend to be an engineer or engineering manager. But it's like taking a break, the relief of doing something so simply practical, a vacation from building a work.

But also, our idea about what an artist is and what kind of things he can do seems to have become narrow. I usually manage to find a way to do whatever I am interested in. Sometimes I get interested in inventing things that have nothing to do with a sound work, like making new sounds for police cars. Of course I am not the first artist to do this. At other times artists have done many different kinds of things. There was an Italian named da Vinci who designed tanks and canals, among other things. He was an exceptional painter as well.

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I think we have to move on here if we're going to finish. There are two more works I would like to talk about.

The next one was done at the Museum of Modern Art in New York City, in its sculpture garden. It's an outdoor space with trees and water enclosed by buildings and walls, which is used to exhibit conventional sculpture in changing exhibitions. I was asked to do a work in the garden, and chose to utilize again a ventilation chamber.

I formed a subsonic loudspeaker horn by adding a concrete panel above a slanted side of the chamber, and added four acoustic drivers to the end where they met. It formed a huge loudspeaker with a mouth opening of three meters. Contrary to common sense the size of a horn does not determine its loudness; it determines its frequency limits. The bigger it is the lower it can go. The size of this horn allowed me to generate pitches which were below where we have a sense of pitch, subsonic frequencies.

I again thought of this space as a block of air, but this time the block consisted of the whole garden defined by its buildings and the wall along 53rd Street. I tried a number of low, subsonic resonances and identified one particular one to form a topography of highly defined areas where this subsonic pitch was active.

Even though this sound itself was inaudible, its effect was a slight change, a slight coloration, to every other sound in the environment when one was in one of its highly defined areas. It wasn't heard directly; its effect on the environment was the only evidence of what it was.

I'll talk about another work now, and then we can have some questions. This one is a permanent installation at the Museum of Contemporary Art in Chicago. I was commissioned to do it at the time of the construction of a new addition to the museum. They asked me where in the museum I wanted to put the permanent work and were surprised that I chose a space which was a stairway; they hadn't thought of it as an exhibition space.

One of the reasons I did was that this particular stairway doesn't touch the walls; it leaves the space intact and forms just a three dimensional path through this vertical block of air defined by the walls of the stairwell. Behind a panel in one corner I installed a column of thirty speakers, each with a separate amplifier - thirty channels of sound, forty six feet high.

When one is in the work, it doesn't seem to emanate from the corner where the speakers are. But one enters definite areas, which feel as if they are an entity within themselves; they don't emanate from any particular point within the space.

I'll take some questions.

Q. Are the speakers directional horns?

A. No, here they are large base-reflex boxes. They serve as the means to activate the column of air at any point within its height. The topography formed in this case isn't the product of a directional speaker, but results from how these particular pitches act within this particular space.

Q. I find it very frustrating to hear all this talk about sound and not be able to hear one of these works.

A. I have no works in Japan at this moment. This is my first trip to Japan. Perhaps something will come out of this trip, but I don't know. I'm sorry that he's frustrated. But there's not much that I can do about it.

I can go ahead and describe one work which is in progress. The space is in the Paris Metro. It's a tunnel two hundred meters long. It's used to connect two subway lines. So far, I've only selected the site.

The space itself has three moving sidewalks in it; people move through it constantly in two different directions. It has an arched ceiling throughout its length, which provides a long acoustic lens.

At this time I have no conception whatever of what the sound content of the work will be. The next step is going in with a sound and, in a sense, illuminating the space acoustically.

One can't take a photograph of the acoustics of a space. The only way to find out about what is going on in it, acoustically, is to make a sound in it.

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