My first acquaintance with the work of Alvin Lucier came through our mutual friend David Tudor. Tudor programmed and performed Lucier's Action Music during the Tudor Fest at the SF Tape Music Center in 1964. Tudor, then and now widely was a key figure not only in introducing young composers, but also in encouraging them in their work, who were interested in the phenomenology of sound and the revelation of its natural characteristics and processes in music making. Tudor's brilliance as a performer and his open minded interest in others caused an informal net work of these composer/performers who are all devoted in individual and unique ways to unwritten musical forms. Each of the highly individual members of this net work is linked by the common dilemma of natural systems, a phenomena as revealed through technological means in relation to music making versus the manipulation of materials for musical purposes traditionally understood.

Lucier and I met for the first time at Case Institute in (Cleaveland?) Ohio when we joined Tudor for a concert together in 1965. Alvin performed his music for Solo Performer.

the atmosphere was charged- & kept thinking that Alvin looked like Edison discovering the light bulb. The Concert included David Behrman's Wave Train, John Cage's Solo for Voice and my Light Piece for David Tudor. Certainly Solo for Performer was a most germinal piece in the sense that the performer must come to terms with his/her own consciousness in order to perform the piece. Thus pointing the way for an extremely important trend. It is not enough just to play the notes at the right time in the right way but to be aware of one's own mind. This places the performer in the role of explorer of the interior in order to produce. To be still in order to be active.

I heard Lucier perform Music for Solo performer again in 1966 at the Boston Museum in Boston. I was again struck by the mysteriously charged atmosphere surrounding the performance perhaps brought on by the curious opposition of the apparently passive performer actively making music.

In 1967 I invited Alvin to UCSD where he began his work Chambers and we worked

on a more or less successful performance of this Whistlers which we both still joke about. Alvin had become interested in the Whistler phenomena (atmospheric sounds which result from pulses, caused by the strikings of lightening, bouncing off the ionosphere. the results are whistling glissandi which can be detected with an antenna.) Alvin had obtained a recording of whistlers with the help of a physicist and made a piece by altering the recorded whistlers with live processing. We thought a totally live performance would be more interesting. Our attempt to achieve this live performance led us into a near scrape with rattlesnakes when we attempted to find an area free of stray alternating current. Our quest finally led to the glider field on a bluff overlooking the Pacific near UCSD. the best time for results was at night when the ionosphere lifts. the problem was compounded by the lack of suitable portable amplification and the random strikings of lightening which required not only patient performers but a very

patient audience. We worked nearly all night with very little result. However I remained hooked on the idea which seemed to me very poetic. To make an inaudible phenomena audible utilizing the whole earth and the mysterious barrier of the ionosphere. To reveal that in an artistic process. In my mind Ilhan was the poet of Electronic Music. Certainly it should work given the proper technical support. How exciting it would have been to actually hear one of those whistlers. Since we didn't, the intended result of the performance was not successful but the intent was lively and I felt the same charged atmosphere as a performer as I did when I first experienced the Music for Solo Performer as a listener.

Ilhan's insistence to himself that he do work which others are not doing has led him into delicate but powerful territory. His attention to detail and to attention has brought about a coalition of technological and phenomenological forces for new music. Those who follow will find this book a firmer of processes which should be inspirational and directional.

To make an inaudible phenomenon, which emanates from such a powerful natural force as lightning bouncing ~~from~~ between earth and the mysterious barrier ionosphere, audible; and to reveal and transform that phenomenon through artistic intention.

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55 High Street, Middletown, Connecticut 06457

July 31, 1979

Ms. Pauline Oliveros
c/o Edith Gutierrez
2202 Colquitt
Houston, Texas 77006

Dear Ms. Oliveros:

Enclosed is a copy of the page proofs of Alvin Lucier's CHAMBERS, which you have been kind enough to agree to read for us. I will look forward to learning your response to this work.

Yours sincerely,

Joan Bothell

Joan Bothell
Editor

JB:br

Pioneer of sound phenomenology

Poet

Sound Explorer

Subtlety of environmental sound phenomena

Alvin is tuner – musician = one who makes finer + finer discriminations

Reveals his process

Interplay of idea phenomena

situation

Text sometimes uses first names without identification.

Pg 60 "Before the fact after the fact"

" Let the space + situation take over."

the Social (and Participation)

the special –

the technical –

the natural –

composer performer

Pg 138 global national. ecological overdetermined

"imitating one set of sounds in the another."

"improvisation isn't what people think it is" Pg 99

Brainwave piece – germinal meditation music – pg 70

" Imagery – Idea – Sound Image" pg 76

"letting sounds be themselves" from Cage –

First notice of Lucier through our mutual friend David Tudor – He programmed + performed Lucier's Action Music during Tudor Fest at SF Tape Music Center in 1964.

Then we met for the first time at Cage Institute in (Cincinnati?) when we joined Tudor for a concert together in 1965. Alvin performed Music for Solo Performer – He looked like Edison discovering the light bulb. Tudor brought many of us together through his open minded acceptance and interest. I heard the brainwave piece again at Boston Museum in Boston – Behrman + I flew together from New York – 1966

In 1967 I invited Alvin to UCSD where he began his work Chambers. and we worked on a performance of Whistler which we both still joke about.

CHAMBERS (1968)

Collect or make large and small resonant environments.

Sea Shells
Rooms
Cisterns
Tunnels
Cupped Hands
Mouths
Subway Stations
Bowls
Shoes
Hollows
Caves
Suitcases
Ponds
Stadia
Water Spouts
Bays
Tombs
Conduits
Canyons
Boilers
Pots
Ovens
Barrels
Bulbs
Bottles
Cabins
Wells
Bells

Capsules
Craters
Empty Missiles
Cacti
Beds
Webs
Pools
Boats
Cones
Funnels
Bones
Stills
Gins
Draws
Tubes
Theatres
Cars
Springs
Flumes
Trees
Others

Find a way to make them sound.

Blowing
Bowing
Rubbing
Scraping
Tapping
Moving
Fingering
Breaking
Burning

Melting

Chewing
Jiggling
Wearing
Swinging
Bumping
Dropping
Orbiting
Creaking
Caressing
Bouncing
Jerking
Flipping
Levitating
Hating
Skimming
Ignoring
Talking
Singing
Sighing
Whistling
Walking
Snapping
Cracking
Snoring
Boring
Praying
Loving
Spraying
Bowling
Channeling
Freezing
Squeezing
Frying

Exploding
Poking
Screwing
Lowering
Shaking
Impeding
Dancing
Others

Sounds of portable resonant environments such as sea shells and cupped hands may be carried out into streets, countrysides, parks, campuses, through buildings and houses, until outer limits are reached where minimum audio contact can be maintained by a player with at least one other player.

Sounds of the outer environment encompassed by the players may be heard with reference to the sounds of the portable resonant environments carried by the players. Sounds of determinate pitch in the outer environment may be heard in simple or complex relationships to the pitches of the portable resonant environments. Sounds of indeterminate pitch in the outer environment may be heard to take on the pitch, timbral, dynamic, and durational characteristics of the sounds of the portable resonant environments.

Sounds of fixed resonant environments such as cisterns and tunnels may be made portable by means of recordings, or radio or telephone transmission, and carried into inner or outer environments. When carried into inner environments, such as theatres into beds, the sounds of the now-portable resonant environments may either mingle with or take over the sounds of the inner environment. When carried to outer environments, such as boilers into parks, the sounds of the now-portable resonant environments may be treated as original portable environments.

Mixtures of these materials and procedures may be used.

Increasing and lessening of any characteristics of any sounds may be brought about.

How did I happen to write the piece? Well, it happened in various stages . . . let me see . . . I remember a film of a Jules Verne book, I think it was a Jules Verne book, something like **Twenty Thousand Leagues Under the Sea**, or one of those books. There's a wonderful scene where men have built an underwater boat, and to get from the shore to the boat, which is moored under the water, several of them are walking along the floor of the ocean with huge conch shells over their heads, as if filled with air. This was nineteenth-century science fiction and the image struck me as something wonderful, walking on the floor of the ocean with those conch shells. I thought of making a piece with instruments, tubas or French horns, in which the players would do something like that, just an idea. And then I thought of actually getting conch shells, huge ones which I could make into bass instruments, conch shells three or four feet high, bass shells, and the openings could be bowed.

About that time Pauline Oliveros invited me to San Diego to perform **Whistlers**, a piece in which I tried to get ionospheric sounds in real time with a radio receiver and antenna. There's something about California, being from the East, palm trees and all that, so I asked Pauline, "Can we get any conch shells?" and she answered, "Well, we'll see." Every day we drove along the ocean front, and we used to pass a funny little store that had a sign that said "Sea Shells." One day I asked her to stop the car. The store was filled with hundreds of seas shells of different kinds and sizes, and the man who owned the store said, "You know, people who live in the Islands have blown conch shells for centuries." Where did I just see in a film, someone blowing a conch shell?

Lord of the Flies?

Tibet! I heard a recording of Tibetan chants on which they played conch shells. Now how do they get conch shells up in Tibet? But that's one of their instruments anyway. So I thought it would be wonderful to make a piece using conch shells as musical instruments, either blown, or bowed, or struck. It struck me as very beautiful that the organisms that produce these gorgeous shells are somewhere down on the bottom of the ocean. What a wonderful origin of a musical insturment, to have it be made for a functional purpose, to protect some animal. When the animal dies, it is a remainder, there it is, it's left in the world, and it's such a beautiful thing it should be put to some use.

My first idea was just to have people blow them. I wouldn't compose it very much but would let the natural pitches of each horn, of each shell, be themselves, although for the sake of some change you could let the players vary the pitches a little by putting their hands in the shells, the way French horn players lower and raise the pitches of their horns. I remember that two of the shells that I bought were almost an octave apart but not quite, so they were slightly out of tune and produced beautiful beats, and I was perfectly delighted to let the chords or simultaneities that the shells produced when played together depend on the pitches of the shells themselves and not on anything I did. I thought of asking the players to spin slowly so that the sounds from the openings of the shells would be beamed out in different directions. Then I expanded that idea to have the players actually disperse.

When we first performed it in La Jolla, we did it outside without any announcement but in an environment with people going here and there. The players began playing in a circle, changing their pitches slightly, turning their horns this way and that, spinning around slowly, and then at a given signal, dispersing outward from the central circle to outer points in the environment, moving as far as they could from one another until they reached the threshold of hearing at least one other shell. At that point, the whole area through which they had moved had been described by the sounds of the shells. By the end of the performance, the players must have moved almost a half mile apart.

Later, when we did it in Steinway Hall in New York, we didn't have that wide open situation. We started inside and moved downstairs and went outside onto Fifty-seventh Street. And what I discovered was that by concentrating on the pitches and timbres of the conch shells, the environmental sounds—buses, trucks, people talking, other urban sounds—got perceived in terms of the sounds of those shells. For example, you're trying to hear another shell player who's aiming his or her shell at you or who's trying to keep in contact with you. Then, as you hear trucks pass, the sounds of the tires take on the pitch of the conch shell on which you're concentrating. It's the old idea of the percussion instruments in the orchestra. The bass drum will take on the pitch of the fundamental of a chord that the orchestra is playing. I was also struck by how space intrudes its personality on the sounds that you produce. We're all aware of that, if not consciously, subconsciously. When we talk here, our voices aren't the same as they are in other rooms—they just aren't—because the space

does all kinds of processing due to its dimensions and materials. I became very aware of that in **Vespers**, the piece I did with those echo guns in which you make the audience hear the acoustic characteristics of the performance space. Good performers have always known these things, for example if the reverberation time is such-and-such, it affects the speed at which you play.

When I was asked to write a score of **Chambers** for publication I decided to expand it. I wanted to make it bigger in the sense that it would imply more, so I extended it to include any resonant environment, large or small, that performers could use to produce or alter sounds in the same way that this room we're in alters our sounds. If a room can intrude its personality on whatever sounds occur in that room, then any other size environment can do the same thing, so for the sake of performing I decided that performers could collect resonant objects into which they could put sounds, and the acoustic characteristics of the objects themselves—shells, pots, pans and so forth—would alter the sounds with their own characteristics. I was making a lot of rooms, but bringing them down to a size with which you could perform. But I didn't say you'd have to use only those objects that you could carry into a performance; you could use environments that you'd find outdoors such as oceans, caves, and football stadia.

You know if you're at a football game you're always impressed by the sound. I used to play in the Yale Band, and we used to form ranks inside the entrance to the Yale Bowl. Everyone would be tuning up and of course the reverberation of that place! Then when we started playing and marched out onto the field, the sound situation changed completely. That experience later gave me the idea that

you can do almost anything in a performance of this piece as long as you think of it in terms of physical environments that alter sounds because of what they are.

When we did it at the Museum of Modern Art we used, as you remember, little pots, paper bags, suitcases, ashcans, all kinds of resonant objects; then the problem was to find portable sounds that you could put into them. We used small battery-operated cassette tape recorders, transistor radios and mechanical toys that would operate on their own power, anything that you didn't have to plug into a wall.

Did you feel as if you wanted to tell the audience about resonant environments? Was that a reason for doing the piece?

Yes! I want them to open up their ears to their environments, I certainly do, more now than before I did this piece. I hear a lot of reverbs now when I listen to TV or the radio, or listen to someone walking on the street. I perceive more now than I ever did, sounds coming from walls, the echoes from them, or when you walk down from the administration building here, how the sounds of your footsteps change when you pass, or when there's a tree or a wall and then you pass the wall and go into an open space, how your footsteps change because of the architecture all around.

Do you feel better about using . . . we used a teapot with a radio in it. . . .

What? A teapot?

We used a teapot in the performance.

Oh yes.

Do you feel better about using a found environment like a teapot, as opposed to something you could build, perhaps with specific characteristics?

Yes, I like found environments more. You can find teapots all over the place, and when you go to a town for a performance, you don't have to bring all your resonant environments with you. One could conceivably build an environment that would do something specific to sounds but I'm not interested in that. I don't want to change anything. I simply want to find out what these environments do to sounds, so it's to my advantage not to make them but to take what I can find, and in that way each performance will teach me something.

Do you feel any different toward the objects being used because this is happening in a concert situation?

Oh yes—your idea about a pot. The little teapot now becomes an instrument or part of an instrument, like part of an oboe. You now think of the teapot as something else.

How do you feel toward the audience in a piece using found objects; do you expect the audience to feel different toward the objects too?

Well, I like pieces that are odd, that do something that you don't ex-

pect them to do. It's extremely odd to hear a Beethoven symphony coming out of a little pot. You don't perceive all of it because the pot is so small that the low frequencies don't get played, but I like that situation very much. A Beethoven symphony implies a large space, the orchestra has a hundred players and it's tape recorded in a big hall, but when it comes out of a two-inch loudspeaker, it's very strange, when you think about it. On the other hand, to try to recreate an environment and put it into another one is like taking something that belongs somewhere and putting it somewhere else, so you make connections between things that you wouldn't ordinarily make. Doesn't an artist do that anyway? Well, some artists do, I don't know about all. Some of art is that you make connections between things that no one else would ever make.

But are you interested in making connections that only Lucier would make between objects? Or are you taking advantage of connections between found objects? For example, radios happen *to fit into teapots.*

Right! That's the reason I used the radio, because it goes into the teapot.

But you probably wouldn't be tempted to reduce a Beethoven symphony to a little transistorized device unless it had been done before, or unless people carried around transistor radios.

I would never have thought of it, no.

Are you trying to tell the audience something beyond what they hear?

Yes, I'm trying to make them . . . it's just an extension of what you do when you're a little child at the beach and you put a shell up to your ear and hear the ocean. Then you stop. You don't do that as you grow older. Your ear stops doing that because you've got to think about other things, how to make a living and how to speak to people, how to communicate verbally. I guess I'm trying to help people hold shells up to their ears and listen to the ocean again.

VESPERS (1969)

for any number of players who would like to pay their respects to all living creatures who inhabit dark places and who, over the years, have developed acuity in the art of echolocation, i.e., sounds used as messengers which, when sent out into the environment, return as echoes carrying information as to the shape, size, and substance of that environment and the objects in it.

Play in dark places, indoors, outdoors, or underwater; in dimly-lit spaces wear dark glasses and in lighted spaces wear blindfolds. In empty spaces objects such as stacked chairs, large plants, or human beings may be deployed.

Equip yourselves with Sondols (*son*ar-*dol*phin), hand-held echolocation devices which emit fast, sharp, narrow-beamed clicks whose repetition rate can be varied manually.

Accept and perform the task of acoustic orientation by scanning the environment and monitoring the changing relationships between the outgoing and returning clicks. By changing the repetition rate of the outgoing clicks, using as a reference point a speed at which the returning clicks are halfway between the outgoing clicks, distances can be measured, surfaces can be made to sound, and clear signatures of the environment can be made. By changing the angle of reflection of the outgoing clicks against surfaces, multiple echoes of different pitches can be produced and moved to different geographical locations in the space. Scanning patterns should be slow, continuous, and nonrepetitive.

Move as non-human migrators, artificial gatherers of information, or slow ceremonial dancers. Discover routes to goals, find clear pathways to center points or outer limits, and avoid obstacles.

Decisions as to speed and direction of outgoing clicks must be made only on the basis of usefulness in the process of echolocating. Any situations that arise from personal preferences based on ideas of texture, density, improvisation, or composition that do not directly serve to articulate

the sound personality of the environment should be considered deviations from the task of echolocation.

Silences may occur when echolocation is made impossible by the masking effect on the players' returning echoes due to the saturation of the space by both the outgoing and returning clicks, by interferences due to audience participation, or by unexpected ambient sound events. Players should stop and wait for clear situations, or stop to make clear situations for other players.

Endings may occur when goals are reached, patterns traced, or further movement made impossible.

For performances in which Sondols are not available, develop natural means of echolocation such as tongue-clicks, finger-snaps, or footsteps, or obtain other man-made devices such as hand-held foghorns, toy crickets, portable generators of pulsed sounds, thermal noise, or 10 kHz pure tones.

Dive with whales, fly with certain nocturnal birds or bats (particularly the common bat of Europe and North America of the family Vespertilionidae), or seek the help of other experts in the art of echolocation.

Activities such as billiards, squash, and water-skimming may be considered kindred performances of this work.

Based on the work of Donald R. Griffin.

When was **Vespers** *written?*

Let's see, I got the idea for it in 1967, and like most of my pieces I thought about it for a long time before I actually made the final realization. I thought it was final, but the other day as I was resting in the middle of the gym, I started listening to the footsteps of a runner as he ran around the oval track. At first you'd hear a single echo, but then as he circled and got in a different place, the echo would begin to multiply—not really multiply but add—so that there would be three echoes for every step. This gave me the idea that perhaps I should keep the idea of the piece open. That's a funny thing for me to say because in the original version, you know, the one with the Sondols, I don't care about the speed at which the players play. I'm not interested in what goes out, I'm only interested in what comes back. But if I ever made a version of **Vespers** using runners, I would want to have runners of different styles and speeds—long distance runners, milers, sprinters. Whereas the Sondol version is for anyone to play, I'm beginning to feel that I ought to utilize the specialties that people have.

I know that one of your instructions in playing the Sondols is rather than to play in a certain way, just not to change the way you play too quickly.

The reason is so that the players are not self-conscious about trying to make the outgoing pulses interesting. I always tell them that if I wanted to make interesting rhythmic figures, I'm certainly prepared to do so. Often I find that people who have never played a musical instrument before, people I get off the street, so to speak, a few hours before the concert, do the best job because they don't have

preconceived ideas. You see, I want to make the space be the interesting thing, not the personalities of either myself or the people playing it; what goes out into the space, therefore, has to be neutral.

It's a curious performance piece though, because the point of it, it seems to me, is the way the environment responds to the ticks from the sound guns, and yet the sound guns themselves are such an unusual product. The idea is very general, playing your environment, but the instrument that you use is very specific.

Yes, but I don't enjoy stipulating that one has to use Sondols, I'd like to leave that open. They're very expensive anyway. I don't mind sending them around, but I only have four of them and that means that only four people can play the piece at the same time. Do you know these little tin toys called "crickets"?

Oh, clickers.

I think they're called "crickets" after the insects. They make beautiful sharp sounds which, although not terribly directional, produce fairly clear echoes from reflective surfaces. A few years ago I bought a thousand of them to use in performances because I thought audiences might enjoy participating. The first time I tried using them was at the Concord Academy for Girls in Massachusetts. I had been asked to give a lecture-demonstration and thought that it would be educational for the girls to participate. The night before, I had instructed four of the girls how to use the Sondols. My plan was to have them start performing and at a certain point the girls with the "crickets" would gradually join in. During the performance, a trans-

formation took place from the very sharp pulses of the Sondols to the more diffused echoing sounds of the "crickets." The texture changed from one in which you could hear isolated echoes to one in which you could hear the room begin to ring or sing.

Later that year I tried it in Helsinki. While my four Sondol players were playing, I passed out a hundred or so "crickets" to members of the audience who then began playing them. And while many of them undersood that the piece was about echoes and echolocation, some students from the conservatory who were there started making banal rhythmic figures. Instead of trying to hear the room, they played childish patterns. After the program was over, we packed up all our equipment and went into the town. It was early spring in Finland, that period of time when the sun finally comes out after a long period of darkness, and as we walked through the streets of Helsinki, we could hear people, singly, or in groups of two or three, playing their "crickets." It was beautiful. Perhaps they got the point of the piece more after the concert than they did during it.

The piece brings to mind all sorts of animal features and it's whimsical to use cricket toys because they do sound like real crickets, but just how naturalistic were your ideas? Did you have animal ideas before you found out about the sound guns or vice-versa?

All I remember is that I did—oh, I remember how it all happened! Mary was trying to find a studio where she could work on her sculpture. She put an ad in one of the Cambridge underground newspapers saying she wanted to form a communal studio and she got an answer from a fellow who had an empty garage. We both went over to see him. I started to talk with him and he mentioned that he

worked for Listening Incorporated, an electronics company in Arlington, Massachusetts that was involved in sound research and deciphering dolphin speech. He told me that they were developing, among other things, small, hand-held echolocation devices for boat owners, acoustic engineers, and the blind. He loaned me a prototype of one of these devices, called Sondols, and I began experimenting with it, learning how to interpret the echoes it made off objects and reflective surfaces. At about that time, I began reading **Listening in the Dark**, Donald R. Griffin's wonderful book on acoustic orientation by animals and men. He describes how bats and other nocturnal creatures survive exquisitely by identifying objects and obstacles by the echoes that come back from them. They can discriminate between the sounds that go out and those that come back, which carry information about the environment. Actually, the title, **Vespers**, comes from the North American bat of the family Vespertilionidae.

If your purpose is sound, a bat is a useful creature to imitate because his purpose is entirely useful. He wants to play his environment so that he can move around in it.

Yes. It's not to leave our environment now to go under the ocean or into outer space, where we could find ourselves without information coming into our eyes. In that case, we would have to rely on our ears and we haven't done that very well as far as I can see. So **Vespers** is in part an educational piece. You'd be surprised how many people don't know about echoes; some very fine musicians have been at performances and they think it's about phase relationships. They just don't hear the echoes, and I want people to hear those echoes.

40 1/2

They don't always sound like what you usually think of as echoes; I mean, sometimes it's the timbre of the click from the gun that seems to change. I know when I was performing the piece I wasn't especially aware of a return click for every outgoing click because it's much too complex; what you do hear is that what seems to be coming out of the gun changes as you move it to different areas in the room.

Yes. I know that if four people are playing in the same space, the echo situation is so complex that the players cannot read their own echoes; therefore, they have to stop. So the task that I set them, that is, to orient themselves in space and to move from one place to another, regulates the texture of the piece; I don't have to compose that.

So again it imitates the usefulness of a bat's equipment. You perform the piece in the most practical manner; when you can't do what you're trying to do, you don't do it.

Right, I am satisfied not to compose terribly much but to let the space and the situation take over. In other words, I don't intrude my personality on a space, I don't bring an idea of mine about composition into a space and superimpose it on that space, I just bring a very simple idea about a task that players can do and let the space push the players around. In that way, I always learn something about a space and never forget one in which I've done the piece. It's as if I take very slow audio photographs of that space.

The Sondols have their task to perform and they do it with clicks that sound like insects. In the versions of the piece where you handed

out the little toy clickers, what relationship do they have to the people playing? Are they sort of a responsorial chorus from the environment? How are they supposed to respond to the mix in the air?

To the what?

To the mix of the ticks in the air.

Well, I remember last September Mary and I drove down to North Carolina from Ann Arbor, and as we were going through Kentucky, we stopped at a gas station. Out back, there was a whole field filled with cicadas, I think they were cicadas anyway. They were producing a great deal of noise and I don't know what intent they had, whether it was social or sexual. Even so, I enjoyed the situation that thousands of them were producing these marvelous sounds at the same time. I also remember a bush I used to pass by. One day, it was August, I heard an insect in it, maybe a cicada or some other insect, but anyway it was alone and was producing a tremendous amount of sound, which echoed within the bush and off a cement wall, and I couldn't help but superimpose my idea that it must have heard the echo that came back. Now perhaps its sound was for another use, but with my understanding of echolocation, I thought that, well, I'm sure it heard that echo. So whether the single insect in the bush or the thousands in the field were actually involved in the process of echolocating, I got the idea of having members of audiences participating in some way. It would do two things: one, relieve the anxiety or tension built up during a performance in which there are only four Sondol players and, two, while each person wouldn't actually have an experience in echolocating, the room would buzz and ring in the same way that that field in Kentucky seemed to ring.

Would you agree that the bias of most people who feel themselves familiar with music toward expecting instruments probably hides the point of the piece from them? They expect the sound guns themselves to be of interest, when what you're trying to do is to elucidate the particular place they happen to be.

Well, after performances people come up and play with the Sondols, a situation that I like very much, but one of the first things they do is put their hands over the loudspeakers and pretend they're playing a trombone or some other brass instrument. They make wah-wah sounds or speed the pulses up and slow them down in rhythmic effects; they try to do old things with new means. Perhaps that's strange for me to say because I'm tuning in to a very old activity, bats and other nocturnal creatures have been using echoes for years, so I'm more old-fashioned than anybody.

It seems a very social idea, a friendly idea, to have the audience be able to do something too.

Yes.

Do you think that the time will come when you can give a concert and the audience won't be anxious, when they can accept it that an aspect of the concert is taking advantage of the social situation of being together, and so won't feel left out?

I think so. It seems to work pretty well when I explain the piece before the performance, that is, when I tell the audience what is going to happen and how it's going to happen. But even so, there's often anxiety when a blindfolded performer bumps into something.

Once in Zagreb, Mary Ashley got completely disoriented and ended up in a corner, but if the audience understands that, they will feel concern. I'd like to keep that in the piece.

Do you think that audiences that get uncomfortable perhaps feel they're not getting any information from the music and are therefore gathered together for no purpose?

Perhaps if they don't hear the echoes very much. I just did the piece in Cambridge for the Harvard School of Education, and for the first time, an audience that wanted to participate didn't make banal rhythmic patterns. Individuals in the audience made clucking vocal sounds that imitated the sondols fairly accurately, and it didn't bother me.

You mentioned that you wanted as neutral a sound as possible . . .

Right.

. . . from the clicking guns, and of course the patterns they make when they're being played together are indeterminate, so it might seem as if you're not getting any intentional information from the guns. Yet you can form a clearer picture of the environment because they're not trying to tell you stories.

Right.

So I wonder what you think about the concept that musical performance is sending messages, because in this case, though no specific message appears to be sent, it's paradoxical in a way, you do obtain specific knowledge about your environment.

Well, you know the old story about art as communication!

What do you think about that story?

We composers always denied it, but if you make a picture in sound about the space you're in, you're telling people something. The performers are spread out in the space when they start, and each of them can tell the others where he or she is and what the echo situation is in that geographical location. The audience receives the same information, so I suppose you'd have to say that **Vespers** is a communication piece.

It's curious that by giving up your prerogative as a composer of sending information, you're allowing the environment to reveal itself.

Exactly.

By having minimal content in your end of the process, you're performing a service for the audience.

Right, that's what I try to do.

And what's also strange is that audiences who aren't satisfied with that state of affairs feel cheated because they think you're not giving them information.

They would say that I'm not communicating. Perhaps I'm not communicating but the particular room that they're in, is. And I think people should find out about that, don't you?

"I AM SITTING IN A ROOM" (1969)

for voice and electromagnetic tape.

Necessary Equipment:

1 microphone
2 tape recorders
amplifier
1 loudspeaker

Choose a room the musical qualities of which you would like to evoke.

Attach the microphone to the input of tape recorder #1.

To the output of tape recorder #2 attach the amplifier and loudspeaker.

Use the following text or any other text of any length:

"I am sitting in a room different from the one you are in now.

I am recording the sound of my speaking voice and I am going to play it back into the room again and again until the resonant frequencies of the room reinforce themselves so that any semblance of my speech, with perhaps the exception of rhythm, is destroyed.

What you will hear, then, are the natural resonant frequencies of the room articulated by speech.

I regard this activity not so much as a demonstration of a physical fact, but more as a way to smooth out any irregularities my speech might have."

Record your voice on tape through the microphone attached to tape recorder #1.

Rewind the tape to its beginning, transfer it to tape recorder #2, play it back into the room through the loudspeaker and record a second generation of the original recorded statement through the microphone attached to tape recorder #1.

Rewind the second generation to its beginning and splice it onto the end of the original recorded statement on tape recorder #2.

Play the second generation only back into the room through the loudspeaker and record a third generation of the original recorded statement through the microphone attached to tape recorder #1.

Continue this process through many generations.

All the generations spliced together in chronological order make a tape composition the length of which is determined by the length of the original statement and the number of generations recorded.

Make versions in which one recorded statement is recycled through many rooms.

Make versions using one or more speakers of different languages in different rooms.

Make versions in which, for each generation, the microphone is moved to different parts of the room or rooms.

Make versions that can be performed in real time.

What's your attitude toward a performance that consists of playing a tape?

Well, all of us who have made pieces with electronics started with tape because it enables you to play with sounds in ways that no other medium does, but you soon get tired of that because live performances are more interesting than taped ones. Tape led us to discover things about sound that had hitherto been unknown and prepared us to go on and do more interesting things without it, but we always kept tape as a way to store sounds to bring into a live performance.

Now in **"I am sitting in a room,"** I didn't choose to use tape, I had to, because in order to recycle sounds into a space, I had to have them accessible in some form. Tape, then, wasn't a medium in which to compose sounds, it was a conveyor, a means to record them and play them back one after another in chronological order. Without tape I wouldn't have been able to do the piece.

When you worked on materials for the piece, there was never a moment until all those generations had been spliced together that the piece was complete.

Yes, because the form is linear and cumulative; it changes from generation to generation until it reaches the point of diminishing returns. And it's funny because if I had consulted an engineer, he or she would probably have found a way to get the end result in one process, one fast process, or one generation. There are ways to by-

pass erase heads on tape recorders or make large loops which could get the end result very quickly, but I was interested in the process, the step-by-step, slow process of the disintegration of the speech and the reinforcement of the resonant frequencies. Actually, when Mary and I visited the Polaroid Company in Cambridge—Mary, as you know, did a visual analog to the tape by subjecting a Polaroid snapshot to a similar reproductive process—the art director, when he saw the end result, said, "I could do that in one step." He just didn't understand that what we found interesting was the gradual process itself. Often, people don't understand the process. They think that the same speech is dubbed from one recorder to another and each time the quality of the copy degenerates a little bit. But it's not that at all, it's playing the speech back into the space. The signal goes through the air again and again; it's not processed entirely electronically, it's also processed acoustically.

You've discarded one of the goals of electronic information storage. By reproducing the thing acoustically so many times, all the parameters that manufacturers strive to achieve in their tape recorders, such as linear frequency response, are bypassed.

Actually, I used two Nagras in the original version. I recorded fifteen generations of the same text and you don't hear much distortion or disintegration of the tape matter. In fact, the machines did a marvelous job of maintaining it.

What I meant to say was that an engineer would probably say you've done a poor job of reproducing the sound. Of course what you had

in mind from the start was to get out of the machines, to submit the material to a purposely non-neutral medium on its way to being re-recorded.

Yes, the space acts as a filter; it filters out all of the frequencies except the resonant ones. It has to do with the architecture, the physical dimensions and acoustic characteristics of the space.

As you know, every musical sound has a particular wavelength; the higher the pitch, the shorter the wavelength. Actually, there's no such thing as "high" notes or "low" notes, we simply borrowed those terms from the visual world to describe something we didn't understand. A musical sound as it is produced on an instrument, in a column of air or a vibrating string, causes oscillations at a certain rate of speed. For example, the A that an orchestra tunes to vibrates at 440 times per second and can therefore be considered "faster" than Middle C on the piano that vibrates at about 262 times per second. But as those sounds move out into space they can be observed as various sized wavelengths, so you can see how directly the dimensions of a room relate to musical sounds. If the dimensions of a room are in a simple relationship to a sound that is played in it, that sound will be reinforced, that is, it will be amplified by the reflections from the walls. If however, the sound doesn't "fit" the room, so to speak, it will be reflected out of phase with itself and tend to filter itself out. So by playing sounds into a room over and over again, you reinforce some of them more and more each time and eliminate others. It's a form of amplification by repetition.

Thinking of sounds as measurable wavelengths, instead of as high or

low musical notes, has changed my whole idea of music from a metaphor to a fact and, in a real way, has connected me to architecture.

My first impulse was to use various musical instruments playing a wide variety of sounds, but I tossed that idea out because it felt too "composerly." Instead I decided to use speech; it's common to just about everybody and is a marvelous sound source. It has a reasonable frequency spectrum, noise, stops and starts, different dynamic levels, complex shapes. It's ideal for testing the resonant characteristics of a space because it puts so much in all at one time. It's also extremely personal. And since I've been acting in George Manupelli's **Dr. Chicago** films, I've started paying attention to the characteristics of my speech which are original to my personality and don't sound like anybody else's; you know I'm a stutterer. So instead of trying to invent interesting speech patterns, I discovered that I have interesting speech patterns anyway; I don't have to invent them. Of course I have invented, when you think about it. A person who stutters or who has a lisp invents that or makes it up; it's not put on him from an external source. And while not everyone stutters, everyone has a certain amount of anxiety about speech. I've met many people who think they stutter. Bob Ashley, for instance, thinks he stutters. I wouldn't say so, but if he thinks he does, perhaps a lot of people think they do, and in that case, I feel that I'm in touch with people.

I am not as interested in the resonant characteristics of spaces in a scientific way as much as I am in opening that secret door to the sound situation that you experience in a room. For example, I made a preliminary version of **"I am sitting in a room"** in the Brandeis University Electronic Music Studio, a small, bright, somewhat antiseptic room in which I never enjoyed being very much. It was filled with electronic equipment, and one wall consisted of several large

glass windows. The resonant frequencies got reinforced very quickly after the fifth or sixth generation, resulting in harsh, strident sounds. But the version I did at 454 High Street, in Middletown, took a longer time because it was a softer, friendlier room with a wall-to-wall carpet and drapes on the windows. When I first moved into the apartment I never dreamed that I would come to enjoy wall-to-wall carpeting, but I soon learned that if you do have it, people enjoy sitting on the floor. After some of the evenings we've had there, people have even gone to sleep on the floor, which they would never have felt like doing in the Brandeis Studio. Anyway, the carpet and drapes cut down on the production of the resonant frequencies so they took longer to achieve, but it gave us a more beautiful result. Didn't we get a different set of intervals in the Brandeis Studio than we got in this room? Do you remember what they were?

We got two sets of fifths in both of them but they were much more complex in this version.

Did you notice that tunes seem to start? Every room has its own melody, hiding there until it is made audible. You know, I feel as though we're in the same situation as composers were when they first began perceiving overtones. Musicians were always aware of their effects, I think, but timbre was mysterious until someone could demonstrate their existence. Now we're just beginning to compose with architecture in mind, and I'm very pleased to be in on these first experiments.

Is it an extension of the idea of personal relevance that you chose the particular text you did?

Well, the text that I wrote and used in the Middletown recording was personal to me, but was also meant for anyone else who wanted to use it. I guess I was suggesting that everyone's speech has irregularities. I also said in the finished score that other texts may be used. Perhaps that was a mistake because I don't want what goes into the space to be too poetic. I want it to be plain so that the space becomes audible without distractions; that's why I decided to describe the recording process so that the audience could more easily understand what's going on. I guess you could say that the score is built into the performance.

I'm interested in how far your idea about the piece extends into the mechanics of achieving it. In other words, if someone uses one of the other procedures you mentioned, a loop for example, can you accept that as really the same piece?

Well, the piece is subject to many versions; I heard of a twenty-four-hour one made in a chapel in Oberlin, Ohio. Now I've been asked to make a version for the Pepsi Pavilion at Expo 70 in Osaka. The Pavilion is a large dome with interesting acoustics, and David Tudor and Gordon Mumma designed the sound system. It has loudspeakers deployed all over the space, arrays of microphones, and a flexible mixing console. I'm planning to use it to pick up and record the voices of the people walking through the Pavilion, and then to recycle them back into the space from many separate loudspeakers. But I must admit that I prefer the monophonic version; it more clearly reveals the features of the processes that I find fascinating. First of all, there is the superimposition of two very simple repetitive

processes, tape recording and talking, but the mixture of these two ordinary activities in an acoustic space, with amplification by repetition, yields an extraordinary result, the evocation of the resonant frequencies of the space. Even though the form is repetitive as far as the recording and recycling procedure is concerned, the listener hears something quite different, and that is the climactic point at which the speech goes from intelligibility to unintelligibility, or from words to music. What's beautiful is that this point is different for each listener; it's kind of a sliding fulcrum on a moveable time scale. The rate of transformation isn't constant either. For the first few generations it moves at a seemingly constant pace, then, in one or two generations, the movement speeds up, then slows down again. It seems to operate on its own set of rules. It's very mysterious.

When Mary did the visual part, she took a Polaroid snapshot of the chair that I sat in when I made the tape and subjected it to a copying process in which she copied the original, copied that copy, and so on. And because it was virtually impossible to align the copying camera and the pictures absolutely accurately, a slight error in size crept in, so that every time she made a copy, it made the image slightly enlarged. But of course the size of the picture stayed the same so the image began to move off the picture. There was a dark shadow behind the lamp which grew on each reproduction, until finally the fifty-second one is completely black; the shadow behind the lamp grew until it took up the whole image. Some dirt got on the reproductions too, and what you think you see at the end is a star map. And indeed, a friend of mine who was at one of the performances said the last slide looked just like "Job's Coffin," which is apparently a part of the stars.

(HARTFORD) MEMORY SPACE (1970)

for any number of singers and players
of acoustic instruments.

Go to outside environments (urban, rural, hostile, benign) and record by any means (memory, written notations, tape recordings) the sound situations of those environments. Returning to an inside performance space at any later time, re-create, solely by means of your voices and instruments and with the aid of your memory devices (without additions, deletions, improvisation, interpretation) those outside sound situations.

When using tape recorders as memory devices, wear headphones to avoid an audible mix of the recorded sounds with the re-created ones.

For performances in places other than Hartford, use the name of the place of performance in parentheses at the beginning of the title.

Perhaps a good way to start would be to ask what "memory space" means in the title.

Well, it's an awkward title because it's just putting together three words, three ideas in which I was interested. One was the idea of space, not so much articulating it as I did in **"I am sitting in a room"** or **Vespers**, but simply in asking players to go to an outside space and observe it. The word "memory" was used because the players would have to remember it as accurately as possible. I was interested in the time delay, the lag between when they went out to observe the space and when they came back to play it. What would happen in the meanwhile? What events or experiences would the players have that would change or influence or alter their perception of the original sounds? And the first word, "Hartford," was simply the place in which the first performance took place.

I had had an unpleasant experience in downtown Hartford a few years before when filmmaker Takahiko Iimura and I went there for a concert. Two men had tried to steal an amplifier from the back seat of my car. We were having hamburgers in a luncheonette and could see them plainly through the plate glass window. It was broad daylight. To stop the crime, I simply walked across the street toward the car, slowly enough to give them time to move away from it gracefully. After that incident I began thinking, along with so many other people, about the frightening quality of our urban environments. I started thinking about survival in a hostile environment and how certain insects, fish, and animals imitate the physical characteristics of their surroundings in order to survive. Then I remembered the street musicians in Rome and how their playing changed one's feelings about living in a city. So I mixed these ideas of animal mimicry

and street music and decided to make a piece for players in which they would have to disguise themselves, go into an unbenign environment, and play in such a way as to blend in sonically and socially with the sounds around them. They would have to imitate the environmental sounds directly and cut the art out of their playing. Then I modified that idea and decided to make a safer piece with environmental sounds as source material.

How do the artistic re-creation and the urban environment relate to one another?

You mean how do the players relate to one another?

No, how does the re-created environment relate to the original environment?

Well, it's supposed to be as faithful as possible to the original, insofar as it's possible to re-create it on conventional instruments. I hoped that there would be spin-off from this procedure, I hoped the players would extend their technical resources, that is, extend what they were able to play on their instruments. For example, if a 'cellist were trying to imitate the sounds of automobile tires, and she heard a predominance of high harmonics, she would have to play *sul ponticello* or in some more unconventional way. She would then have learned something about the sound of tires and something about what she can do with a bow and a string. You see, I was asked to provide a piece for students at a conservatory, which pleased me. It had been a long time since I had written anything for instruments, and I thought it was too bad to be a composer and to have all these

young people who want to play their instruments and not have anything for them to play, but the thought of composing a score in the traditional sense was, for me, out of the question. I was thinking that good players like to play difficult things, good players enjoy difficult tasks, and this would be an impossible task, but the attempt to accomplish it, if only partially, was an interesting thing, and a challenge that I thought these young players might find interesting.

There's an odd correspondence between the artistic event and the urban environment. If you think of the urban environment as the threatening place, the artistic re-creation of the environment eliminates the threat.

Right.

So the artistic situation must be . . .

Yes, but you don't need the camouflage anymore. . . .

Right, because it's a friendly place. . . .

. . . because you're in a concert hall.

How does the composer fit into this whole thing?

Well, my ideas about composition don't have anything to do with the environments into which they went. If I had composed anything it would just get in the way. Also, I had to warn the players against improvising because that would get in the way, and I didn't want

anything to get in the way. I envisioned the piece for some future date when people's brains would be more developed than they are now and they could remember all the audio events. It would be inconceivable to expect a player now to remember an hour's worth of sound activity because there's just too much going on, so I gave them alternatives. One was to make some kind of visual sketch, or to go several times to the same place and get a general idea, or to concentrate on just a few events. Of course, I really would have been pleased if they could re-create the whole thing. Another alternative was that they could record these events with a tape recorder, come back to the concert hall, and with earphones on, use the tape as an audio score. In other words, the player would play his or her instrument by imitating the tape. It struck me that tape is now memory; you can store information on tape just like you can store it in your brain, only it's more accessible. So tape for me was a substitute for using your brain to remember.

If you strip away the urban environment, so you're suddenly performing in the concert hall, it's actually a visual transposition also. You take away the buildings and what you have is a clean white concert hall.

Actually we didn't play the piece in a concert hall, we played it in an art gallery in which an artist and his students had made an environment with objects taken from the city, although he wasn't doing what we were trying to do. I guess I wanted the players to learn something, and I thought that if they all played, it would be like looking at a map. Each of the players had gone to a different geographical place in the environment and when they came into the

performance and played everything simultaneously, it was as if you had a composite sound map, a displaced remembrance of the downtown.

Do you expect the audience to feel differently about the downtown after hearing the piece?

Yes.

Are they actually experiencing the downtown in some way when they hear the piece?

They're hearing it once removed, somewhat like a copy or a photograph is a more or less faithful image of a real thing, although the photograph is a real thing. The performance was a real thing too; it was a musical event.

In what way do the performers and the audience share the experience? Are they sharing the same experience, or are the performers telling something to the audience?

I don't know about that. I was concerned, though, that the performers didn't share anything among themselves before or during the performance, since they weren't supposed to improvise. I wanted them to stick as closely as possible to their remembrance of the environment, so I isolated the players from one another. It was as if each of them were on an island but the audience could see and hear all those islands. The islands could be parts of the town, or places in the streets, and the audience would see and hear a composite of

which the individual players were only a part. But even though they tried to play it as faithfully as they could, I'm sure that they influenced each other, because nobody's absolutely perfect, and players are influenced by any sonic activity around them. And that situation I find all right, too.

Then how social is the idea of a performance of **Hartford Memory Space**? *In what way is it a social event if the players are separate from one another in what they do?*

Well, they do come together and they each have a part in a larger thing. People come and witness what these performers are doing and can go from one performer to another. You go from one street to the other and you hear different things at each street. If I ever made a recording of this piece, I would have microphone handlers walk around from one player to another so you would be able to visit one player at a time, each representing one part of town.

Did Ives' music have anything to do with this idea?

Well, I suppose it's somewhat like pieces such as **Central Park in the Dark** and **The Housatonic at Stockbridge**, but they're programmatic. Art is in those. The idea is not to imitate, but to give an artistic impression of a particular place. My idea is to cut that art out and to just have the direct imitation.

Suppose the players hear music in the environment, do they try to re-create the music? What kind of music do they make out of music?

Well, we had that problem with conversation. The players said, "If we hear people talking, can we talk?" But the idea was to have the conventional instruments do all the work. The idea of what is conventional on an instrument came into play too, because what is conventional on an instrument changes all the time. Players now use electronic aids in performance, but I didn't want them to do that. I wanted them to use what I think is almost an obsolete state of affairs, the instruments of the nineteenth-century orchestra. I wanted to find a way to put those in my art because so many electronic composers imitate conventional instruments with electronic devices and I was thinking of reversing the situation. I would have players imitate an environment which is pretty much electronic and mechanical by playing their own old-fashioned acoustic instruments.

But you're not trying to imply that people can't survive in the urban situation, even though you've taken away their powers of speech.

Well, if they imitated speech by speech then there wouldn't be any medium displacement and I wanted **Hartford Memory Space** to have to do with that, with imitating one set of sounds with another. And the fact that I'm imitating a contemporary set of sounds with old instruments was a parallel to having a time lag between the players' observation of the sounds and their performance of them. In both cases, it was a question of time delay.

It seems as if the purpose of the players, first in the urban situation and then in the concert hall or museum, is to become the environment.

Right. It's the old story about prehistoric man, who when he was afraid of an animal, drew pictures of it on the wall and thereby controlled his fear of the animal, if not the animal itself. At first, most of the players said that they found the sounds of the city disagreeable, but by the end of the performance, they all agreed that they enjoyed them because they had to take them seriously. They learned to deal with them by playing them.

QUASIMODO THE GREAT LOVER (1970)

for any person who wishes to send sounds over long distances through air, water, ice, metal, stone, or any other sound-carrying medium, using the sounds to capture and carry to listeners far away the acoustic characteristics of the environments through which they travel.

Use one or more microphone-amplifier-loudspeaker systems to lengthen the distance over which the sounds may be sent. In large, single places such as prairies, glaciers, or ocean basins, use single systems of great power or several weaker systems in series. Connect small, separated spaces such as rock formations within faults, detached railroad cars on sidings, or the rooms, foyers, and corridors of houses, schools, or municipal buildings with relays of systems, adding shorter distances to make longer ones. For example, the spaces of a three-story American high school may be connected by a four-stage system in which the performer's first stage is located as far from the listeners' last stage as possible and in which the microphone-amplifiers of each stage are placed as far as possible from their respective loudspeakers. If the first stage microphone-amplifier is located in a classroom on the third floor, its loudspeaker may be placed outside the classroom door facing down the corridor at the end of which is located the second stage microphone-amplifier whose loudspeaker may be placed facing down the stairwell to the corridor below at the end of which is located the third stage microphone-amplifier whose loudspeaker may be placed in the first floor lobby in which is located the fourth stage microphone-amplifier whose loudspeaker may be placed inside the gymnasium/auditorium. All sounds that move through this system, from loudspeaker to microphone and so on, are processed by the physical characteristics of the classroom, corridors, stairwell, lobby, and gymnasium/auditorium. Longer distances and further processing may be brought about by deploying additional relay systems in libraries, laboratories, cafeterias, offices, and boys' and girls' locker rooms.

The distance from one system to another should be maximum, depending on the sound-sending power of each system or on the physical limits of the given environments. Whole systems, however, should span enough

distance so that, given the medium, the sounds must travel for at least one second of time through that medium, or for a shorter time provided that the environment is of such a quality that it is capable of processing the sounds in the time given to the extent that they are perceived as being of different origin by the listeners at the last stage of the system.

Isolated from the listeners at the last stage, sing or whistle, or play any large or small musical instrument through the system.

Using the music of the humpback whale, *Megaptera novaeangliae* of the family Baleanopteridae as a model, compose a repertory of simple sound events such as single pitches of short or long duration, simultaneities of various densities, upward and downward sweeps, and sounds with different envelope shapes, or compound events made from combining two or more simple events to produce such combinations as accelerating or decelerating pulse trains, upward sweeps followed by tones of short duration, or motives seemingly modal in character.

Extensions or modifications of the range, timbre, envelope, or duration of any sound by electronic, mechanical, or any other means may be made at the performer's first stage only. Further extensions or modifications should be made only by the environment or environments through which the sounds travel.

Design formal structures with sets of successions of sound events in which each event within a set is subject to gradual, repetitive, and cumulative variation with respect to pitch, timbre, amplitude, envelope, or any other aspect of sound and time in order to amplify in time the relationship between the original sound event, its change, and the environment through which it travels. Starting anywhere on a minimum-maximum continuum, vary one aspect of the sound event and move to an extreme situation with respect to this aspect. For example, a sound of short duration may be lengthened, little by little, so that the reverberation time of the environment may be perceived, at first in terms of the discrete sound events and their echoes, then with more and more complete overlappings, until finally the lengths of the events are too long for either practical performance or measurement. In each subsequent set, vary one other aspect of the sound event, retaining throughout that set the extreme situations

arrived at in the preceding sets, taking care not to reverse the direction of a variation between two adjacent sets. When the variation of one type of sound event has been exhausted, move to sets of successions in which an additive procedure is followed, that is, where one sound event is followed by another, those two repeated and followed by a third, those three repeated and followed by a fourth, and so on.

Performances may be considered finished either when all the variations of sound events have been exhausted or when it is felt that all the acoustic characteristics of the given environments have been fully explored, tested, and articulated.

Multiple systems may be constructed in series or parallel that crisscross or interweave with one another, loops may be made to re-cycle sounds through the same spaces, and sounds may be sent through two or more systems of dissimilar media in order to discover their acoustic characteristics, their ability to process the sounds that travel through them, and the relationship between the speeds of sound in each.

Two or more players of similar or dissimilar instruments may send sounds through one or more systems from one or more geographical locations. For example, a trio of double bass players, isolated from each other in separate Quonset huts, may send sounds via interlocking relay systems out into canyons and cafeterias, across lawns, through wooded areas, administrative offices and aquaria, and onto a glider park.

Systems may be set up in public or private places on permanent or semi-permanent bases for people to move through and use freely. Ambient sound events such as footsteps, door slams, and explosions may also be welcomed for processing.

I know you've spent some time just recently preparing a score of **Quasimodo**, *and I wanted to ask what sort of relationship composing music and preparing scores enjoy in your professional activity.*

Well, I'm in the middle of the score now, or I should say I've just begun. I'm finding it difficult to proceed because I'm not yet sure in my mind about what I want or what can or cannot serve the purposes of the piece; **Quasimodo** can be performed in a variety of large, unusual spaces, and I'm still experimenting with ways to set up the equipment. Then, and this sounds like an old-fashioned idea, I always want to let things gel, because if you try to finalize them too soon, you aren't taking into account other things that might enter your experiences later. Earlier in my life, I would not have wanted really to finalize things, but now I do. You want to get certain pieces out of you and off your mind even though they're not quite done, especially since you can build into the final score all the conditions in which the piece doesn't have to be final, you can specify those parts of the piece that are still open to experiment. But I don't want to leave it open in every area, only some areas, because if I left it open in every area, it wouldn't be the piece that it is.

I notice you use the word "compose" as opposed to what one would expect, "realize." Did you really consider the piece to be still in the process of composition during those different performances?

What I think you really mean is: "What relationship did the performing of the piece and the making of it have to your present project of composing the score?" They're rather different in many ways because I'm adding things to the score that I didn't think of when

we first performed the piece. It was just a physical idea then, and the possibilities that came up were dependent on the actualities of the performances—when we were doing them, how much equipment we had available. There were only certain possibilities open to us. Now, when I try to write out the prose score, I don't merely want to make a description of what I've done so far because it would be confined to the corridors of buildings, and I've often dreamed of doing it in steel, or in rock, or in earth, or underwater. And of course I haven't had time to try those, but I can imagine them and leave room for them in the score. In traditional scores you write down what you want someone else to do. . . .

Before the fact.

. . . before the fact. I'm composing it after the fact of those performances we did, but before the fact of many other versions I want to do.

Is there any emotional difference for you between the performances after the score and the performances before the score?

Did you say "emotional"?

Yes.

Well, when I first performed it in Clinton, New York, I used whistling sounds. My first idea as I got before the microphone at that first stage in the relay system was to make vocal sounds, but I decided against that because they sounded awkward and grotesque. They

sounded too psychological; the upward and downward sweeps sounded like moaning.

You wanted to avoid human expression.

Yes. So I used whistling sounds, perhaps because whistles are simpler wave forms than vocal sounds, and it seemed to me that we needed something simple at the beginning of the microphone-loudspeaker systems if we were to capture the acoustic characteristics of all those corridors and stairwells. If we had started with complex sounds, there would have been too much confusion at the end. Now I have no scientific evidence to prove that; it just seemed to me that whistling sounds were appropriate.

Were you improvising while you were whistling?

Yes. . . well, I said yes and now I say no. It's the old problem that we've talked about so much: if you improvise, it's your past and your personal preferences and your ideas about what sounds should or can be that you're thinking about. I like to pose myself the problem of deciding about the sounds on the basis of the physical tasks that they have to do, and in the case of **Quasimodo**, it was to travel through environments to test them. It would have been stupid of me to impose my personal ideas about sounds because my personal ideas don't have anything to do with the spaces. I had an idea of what kind of sounds to use; I then tried to get a process started so that I wouldn't have to think about it anymore. If I had a procedure that I could follow cold-bloodedly, then I wouldn't have to think about where my next sound was coming from. I chose a simple repe-

titive process with which the player could alter various aspects of sound—timbre, pitch, duration, envelope—one at a time and little by little, so no opportunity for the articulation of the environment would be missed by having to make artistic choices. For example, sounds of short duration are suitable for hearing echoes and delay times. If you used only one sound to test these characteristics, you would get only one little answer back, so you couldn't be sure what the whole situation was. But if you repeat the sound, lengthening it each time, then as overlappings occur, you would begin to hear all the aspects of the delay situation.

Well, let me ask a different question. You've made it clear that even if you were improvising, you weren't engaged in a process of self-expression, but do you think that working out these problems that you've set for yourself can aid you in other processes of thought? In other words, can there be a therapeutic effect to working out these environmental, external problems?

Therapeutic effect?

In the sense of solving personal problems?

Well, I've always been drawn to music that tells you about the way things are or can be. And insofar as **Quasimodo** is concerned with the influence of space on sound, one is bound to learn something about that when performing the piece. Also, if the practical part of the piece is successful, that is, if the relay stations pick up and send the sounds clearly and without distortion and thereby connect one space with another in a long chain without apparent seams or faults, that directness of purpose could be a metaphor for one's life.

When you were composing the score, were you attempting to compose the words by a process parallel to the composition of the piece? Was there a conscious attempt to produce a parallel structure between the important aspects of the piece and the way the score was . . .

You mean was I trying to make the score in the same way that I made the piece?

Either that, or would you hope that reading the score would be analogous to experiencing the performance?

Reading the score of **Quasimodo**, or any other piece of mine for that matter, can never be analogous to experiencing the music because the scores make no effort to show the passing of time. When you read the score of a Mozart string quartet, for example, you follow the continuity in the same direction as the music flows. But a score of mine doesn't show that; it presents ideas and procedures but leaves the continuity open. In making the score, I'm trying to write clear linear prose that describes a complete situation, that has balance; one thing should lead to another, the punctuation should be correct. I enjoy doing that very much, perhaps because it's difficult for me, like trying to play a sport well. I'm trying to make it very clear and simple and pristine.

Are you concerned about transforming what is essentially a general concern into a personal statement?

No, it's just that I don't want the formal design to be so perfect or. . .

Closed?

. . . so closed or so, well, beautiful that it would lead people to think that it was more important than listening to sounds travel through environments. That is the essential idea and I wouldn't want it to get confused with any ideas about form.

Is there an attempt in the score to help the performer in the way that a traditional score does?

Yes, the score for **Quasimodo** is a guidebook of sounds suitable for acoustic testing, with suggested procedures for putting them together. It uses written words instead of notes or graphs because notes and graphs are time-dependent; since there is no reason to arrange the material in any particular order, **Quasimodo** may include all the possibilities inherent in it.

Somewhere before, perhaps in conversation with me, you mentioned that many people found that they enjoyed the piece after you had told them what inspired it.

Yes, they became sympathetic. I first heard the sounds of the humpback whales in 1969 in Santa Barbara, California. Composer Daniel Lentz, who was then on the faculty at the University of California, had invited me to be Regents Lecturer for a month. While I was there, Dr. Roger S. Payne came to give a lecture-demonstration and play his recent recordings of whale music. I, like everyone else, found it very beautiful. What struck me more than the sounds, however, was the ability of whales within a species to communicate

with one another over tremendously long distances, across ocean basins in some instances. They do this by echoing their sounds within a specific temperature layer in the sea so that the sound doesn't get absorbed into the bottom of the ocean or dissipated out through the surface. I was very impressed by that. So instead of imitating the sounds of the whales, or using Payne's recordings, I imitated the feature that struck me strongest, their amazing long-distance sound-sending ability. You know, the title, **Quasimodo the Great Lover**, is a pun. It has partly to do with whales and partly with music, but it's so atrocious that it makes me upset to think about it!

Who is the piece written for? Is it for the benefit of the audience?

Well, my first idea was to make it for large instruments, double basses or tubas; since whales are the largest living things, I wanted to use the largest musical instruments. But then, as I experimented in different spaces and decided to use whistling sounds, or sounds of high frequency, it seemed appropriate to include any or all other instruments. Whales have an amazing repertoire of high frequency sounds anyway. So it became a piece not so much for a performer with a specific instrument, but for any player who wants to do it. And as far as the audience is concerned, they listen to it at the final relay stage, that is, after the sounds have been duly processed by all the acoustic spaces in the system, but I also stipulated in the score that, in some cases, the relay systems may be opened up for persons to walk through, contributing their own sounds to the performance. When you open it up, then it's for just about everybody.

26/60

MUSIC FOR SOLO PERFORMER (1965)

for enormously amplified brain waves
and percussion.

The alpha rhythm of the brain has a range of from 8 to 12 Hz, and, if amplified enormously and channeled through an appropriate transducer, can be made audible. It can be blocked by visual attention with the eyes open or mental activity with the eyes closed. No part of the motor system is involved in any way. Control of the alpha consists simply of alteration of thought content—for example, a shifting back and forth from a state of visual imagery to one of relaxed resting.

Place an EEG scalp electrode on each hemisphere of the occipital, frontal, or other appropriate region of the performer's head. Attach a reference electrode to an ear, finger, or other location suitable for cutting down electrical noise. Route the signal through an appropriate amplifier and mixer to any number of amplifiers and loudspeakers directly coupled to percussion instruments, including large gongs, cymbals, tympani, metal ashcans, cardboard boxes, bass and snare drums (small loudspeakers face down on them), and to switches, sensitive to alpha, which activate one or more tape recorders upon which are stored pre-recorded, sped-up alpha.

Set free and block alpha in bursts and phrases of any length, the sounds of which, as they emanate from the loudspeakers, cause the percussion instruments to vibrate sympathetically. An assistant may channel the signal to any or all of the loudspeakers in any combination at any volume, and, from time to time, engage the switches to the tape recorders. Performances may be of any length.

Experiment with electrodes on other parts of the head in an attempt to pick up other waves of different frequencies and to create stereo effects.

Use alpha to activate radios, television sets, lights, alarms, and other audio-visual devices.

Design automated systems, with or without coded relays, with which the performer may perform the piece without the aid of an assistant.

Edmond Dewan, Technical Consultant

I think we would both agree that the kernel of **Music for Solo Performer** *is the performance of brain waves. If you accept that, I'd like to ask what sort of ideas you have about the piece as a whole.*

Well, the fact that it is a performance of live brain waves instead of a structured tape manipulation piece was a very crucial decision for me. It all happened when I was teaching at Brandeis. I had made the acquaintance of Edmond Dewan, a very imaginative physicist who was on the faculty at Brandeis but who was then working for the Air Force doing experiments with brain waves. They thought that certain pilots who were prone to epilepsy were blacking out when the speed of the spinning propellors got to a crucial point; I could be wrong about this, but I think it was sixteen times per second. When the sunlight would shine through the spinning props, it would lock on to something visual in the brain of the pilot. They had asked Dewan to try to investigate that, so he was doing experiments with brain waves. And it's very funny because he had offered his equipment to one or two other members of the faculty at Brandeis, suggesting that they might be interested in making pieces with brain waves, but no one took him up on that.

This was 1965. I had been at Brandeis for just a couple of years, and I was at a point in my compositional life where I didn't have any good ideas. I was conducting the Chamber Chorus and I had done some electronic music in Italy when I was on a Fulbright there, but I hadn't really found anything that interested me; I certainly didn't feel like composing instrumental music. Dewan described to me this phenomenon that had to do with visualization, that by putting yourself in a non-visual state, it would be called a meditative state now, you could release the potential of the alpha that is in your

head. It's a very small amount, but it would become perceptible, at least to an amplifier. The idea of it just struck me very strongly, probably more for theatrical or visionary reasons than for sound or musical reasons, because I didn't know what it was going to sound like. Actually, it doesn't sound like anything because it's 10 Hz and below audibility; it isn't a sound idea, it's a control or energy idea.

And it's amazing because most of my colleagues at Brandeis said, "Oh, that's a wonderful idea. You ought to tape record it, speed the sounds of the brain waves up, slow them down, reverberate them, filter them"; they all wanted me to make a conventional tape piece with this idea. To realize that the electronics comes from your brain, from inside every person, that every person has a little electronic studio inside his or her brain, then ask you to make a classical tape collage piece that's cut and spliced just . . . well, they all urged me to do that. The reason you love violin music is that someone is doing the playing, it's not the timbre of the violin. That's in there and is a part of it, but that's not why music for instruments is interesting, it's because a person is playing it. So the poetic part of the piece was that at any given moment in time, some person, male or female, is sitting in a medical center with electrodes on his or her scalp, and an analysis is being done of his or her brain waves to determine whether he or she is going to live or die. This gave me terrific anxiety, you know, because all around me were compositional people who wanted me to use technique, all of the things that you learn—contrast, pacing, texture, things of that kind. I had to eliminate those in order to get at the poetry of the piece, which demanded that a solo performer sit in front of an audience and try to get in that alpha state and to make his or her brain waves come out, to emerge with enough energy to drive an amplifier and do the piece.

Now if I had composed a tape piece, it would have been just another tape piece except for using brain waves. On the other hand, there are composers who have done it differently; instead of making tape pieces with brain waves as source material, they use brain waves to control electronics. They're doing synthesizer pieces with alpha or other waves as control signals.

So I was in the middle of that. And the anxiety I had was the anxiety not to compose but to take the existing situation, the one that every doctor knows and every person having an EEG knows, and displace it, taking it right out of the hospital and putting it into the concert hall. Then it becomes art, or at least what I thought was art. I got a lot of criticism about that from colleagues of mine who found it a boring idea, who thought it didn't amount to anything because it was just brain waves. Alpha itself is below audibility; it's too low to hear as a pitch, but that high energy, those bursts of alpha, would come bumping through the loudspeakers, making the grille cloth on the speakers bump, and I got the idea of using that energy to couple the loudspeakers to instruments. I used gongs, tympani, bass drums, anything that loudspeakers could vibrate sympathetically. So the idea is that alpha, which is produced without the person making any physical motions except the opening and closing of the eyes, which you don't really have to do if you can non-visualize with your eyes open, the idea is that that small amount of energy . . . see, it takes amplification very, very seriously. When I thought of using the alpha energy to drive the percussion instruments, that was the point at which the idea became a piece, when it went into a musical realm.

There's a wonderful contrast. The performer is performing live but not only isn't he physically manipulating the sound-producing ele-

ments in the piece, he can't move. If he moves, he loses the alpha state and there is silence. Is that an element of the theatrical appeal?

I didn't think of it as such, but it did mean I could be very still in a musical performance. You know, most music is busy, the players have to move, the actions of a pianist, for example, are important, but in this piece electronics allows you to go directly from the brain to the instruments, bypassing the body entirely. ~~Most people thought~~

Most people thought the material was too simple, and I began to think I was some kind of charlatan. I suppose it appeared that I just took Edmond Dewan's brain wave apparatus and went into the Rose Art Museum and did a concert, but there was a lot of work involved in getting the medical equipment to work for music, the amplification system designed—I think we had sixteen channels—and the instruments chosen and deployed. Even doing all that, which is just as complex as doing any other kind of music, it just didn't seem enough, and I felt anxious. Now if I had decided to make a tape piece and gone through all those technical motions, I may have felt more comfortable, but I finally did what I thought was the most honest thing. I tried to be very accurate about what the piece really meant: one person, alone, sitting very, very quietly, releasing a flood of energy which permeates the concert space. And to me, that was a beautiful idea, much more so than making a tape piece.

I think that's clear when you consider some of the alternative suggestions you mentioned. Most of them focus on the "problem" that the material you're working with is sub-audio; you can either use it as a control for other things or you can speed it up to make it audible. Instead, you accept it as is and use it as an impulsive force

to play musical instruments.

Yes, but I also did those two things that you just said I didn't do. You see, one of the inaccuracies of the title is that it's not really for solo performer. You need someone to run the amplifiers, to pan the sounds around, to turn on one loudspeaker and then turn on another, and I've always, except once in Stockholm, done it with another player, an assistant. In the score that I wrote, I stipulated that someday, when electronics became what it's now become, you could have an automatic switching arrangement, such that so many bursts of alpha would be a code to a switching device, and the alpha could control itself without an assistant.

In the meantime you have someone to turn the pages.

Right, at that time we didn't have that sophisticated switching arrangement. Also, I had pre-recorded brainwaves sped up into the audio range, and at certain times during the first performances I would have an assistant engage a switch so that as a burst of alpha came through, the tape recorder would be turned on and you'd hear a higher phantom version of the alpha. So I did use pre-recorded tapes, and I did use alpha as a control signal, but they were used as extensions of the idea and were not the essential idea.

This piece really has a theatrical flavor. How much of that had you done prior to this piece?

Earlier in Rome, in 1962, I had done **Action Music for Piano**, for which I had made a very elaborate score that described the gestures of the pianist, extraordinarily exaggerated movements of the hands

and arms and elbows. So when **Music for Solo Performer** came along, I was prepared to do that, to accept the theatrical, although when I use the word "theatrical," I feel cheapened somehow.

Because it isn't play-acting, it's real.

Well, in one sense, everything is theatrical. Do you know the . . .

Shakespeare saying?

"All the world's a stage"? No, I was thinking of the Borges story, **On Universal Theatre**. It's a marvelous story in which people ride bicycles, smoke, mail postcards; they don't do anything they wouldn't do otherwise, but they know they're doing it. If as you're doing everyday things, you think that they aren't everyday things, you'd be in the ultimate theatrical setting. So, in **Music for Solo Performer**, all I did was take the EEG situation as a whole and, by doing that, make a celebration of the event.

When the person is producing the alpha in performance, he or she is overcoming an obstacle, and the compositional mentality utilizes that in a positive way as a philosophical statement, the idea that the situation in the room is an extension of one's brain.

There are a number of paired oppositions in this piece when you start to think about it—the spatial distribution of sound controlled from one point, the performer producing sound by not moving, the unconscious control of sound. The more you go into the piece, the more strange twists you can find.

I don't think I would have done the piece if it were possible to

change the alpha by changing emotional states. One of the first things that anyone ever asks me is : "Can you change the quality of the alpha by having another thought, a different kind of thought?" They want to think that if you get angry the alpha will go up or if you get sad it will go down. And of course, that isn't the case at all; it just goes on and off, the 10 Hz pulses are irregular because it's difficult to maintain a perfectly meditative alpha state. Those bursts of alpha that go through the amplifier and drive the loudspeakers, the complexity of the signal and the fact that it is making the cone of the loudspeaker work to resonate objects, or membranes on a drum, or the cardboard in a box, those live, physical events are the composition of the piece to me.

I used to get letters from people asking about such things as formant structure and biofeedback and I just didn't know how to answer them because the piece isn't about that. I remember when I was in school it became very fashionable to regard music as a series of problems to be solved. The musical journals were filled with titles such as "*Pitch Problems in So-and-So,*" or "*Problems of This-and-That.*" The only problem I have in composing is to get the imagery, the idea and sound-image right, and if I had tape-recorded this piece. . . you know, there's a way to explain it in terms of accuracy. By tape recording it, you lose the life of the sounds because the dynamic range of tape isn't that good. Also, at that time we were concerned with letting sounds be themselves and it seemed to me that to cut and splice was not the way to let alpha be itself.

It's a matter of choosing not to control.

Yes, I remember we discussed the proportions that have existed in

previous music. The ideas of contrast and balance come from another place; they have nothing to do with alpha. It's so wonderful because the minute you say it doesn't, you find that you've done exactly that; I did have contrast between the gongs and cymbals and drums. Perhaps I chose percussion because I used to be a percussion player. I remember when I was young, studying drumming, I started practicing on a rubber pad and then moved to a snare drum. You didn't need anything else, you didn't need pitches. And after all, alpha's really a rhythm; scientists call it alpha rhythm.

It's low enough to be considered rhythm as opposed to pitch.

Yes, and although theoretically it is a continual pattern of 10 Hz, it never comes out that way because it stops when your eyelids flutter or you visualize a little and it tends to drift down a little bit if you get bored or sleepy. So I exploited that rhythmic idea and extended it to the drums. It was very natural for me to make a percussion piece; to have tried to make it a pitched piece in some way would have seemed bizarre and grotesque. It's funny, to me sharp contrast is a banal idea. If you look at a painting with contrasting foreground and background, it just doesn't seem right somehow. When you think about it, it is a very easy idea; if you don't know what else to do, you just do something different from what you did. It seems to me that the most interesting differences are small ones, slight subtle changes.

Differences that don't break the thread.

Right, it's trying to get the maximum information out of the least contrast. Those big emotional changes you find in a Beethoven sonata, for example, worry me. They seem childish; you're happy one minute and sad the next. And when people say that electronic technology is cold, they really mean that it doesn't have those self-indulgent emotional changes.

The elevator here at the Gramercy Park Hotel is an example. I go up and down it very often and I've timed the response from when you touch the button, a beautiful, light, touch-sensitive one, to when the door closes. It's usually from three to four seconds. And you'd be surprised how many people don't even want to wait that long; they think something is the matter and start pushing the button sharply and repeatedly. Now the time response of the elevator was designed by somebody, some very sensitive engineer or group of engineers who decided what would be a graceful timing, not too fast and not too slow, and generally the people who are impatient with it are not in a graceful state when they get in. I almost want to tell them that the elevator is more graceful than they are. The time response of that elevator, if you were to pay attention to it, if you were to surrender to it, would be therapeutic because your mood or feelings would change between the time you got into it and the time you got out; the ride down is very, very beautiful. I think if you let the elevator teach you something, you could step out of it feeling more graceful.