Performance Practice in the Presentation of Electroacoustic Music

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> "Listeners can only apprehend music if they discover a perceptual affinity with its materials and structure. Such an affinity depends on the partnership between composer and listener mediated by aural perception. [. . .] The primacy of perception is unassailable since without it musical experience does not exist." (Smalley 1986, p. 62)

In something as rich and diverse as electroacoustic music, the basic carriers of musical meaning may be ambiguous and difficult to identify, leading to a lack of comprehension on the listeners' part. As with any music, we need to know what aspect of the material defines structure; such a basic understanding is absolutely necessary to its effective communication. I would like to propose that the "gentle art" of sound diffusion over a carefully designed and installed array of loudspeakers should be recognized as a necessity rather than an option in the public presentation of electroacoustic music, as it is only through careful performance that such "carriers of meaning" can be effectively communicated.

One reason for the limited appeal of electroacoustic music is cited by Jeff Pressing (1994 p. 27),

> "... we know that one of the reasons that listeners show limited liking for contemporary art music is their inability to code it either on the basis of simple pitch or rhythmic structures, and hence assign it meaning."

As the meaning in electroacoustic music often lies in other parameters, this is hardly surprising. He goes on to suggest, however that,

> "... we are making computer music "unphysical" in failing to tap basic cognitive motor designs used in human communication. [...] Mainstream computer music seems to harbor a resentment towards things dance-like or motoric, [which] seems to stem from intellectual positions that de-emphasize the importance of the body."

This is simply not true of much (good) electroacoustic music. Very often electroacoustic music does indeed "tap basic cognitive motor designs," often in simple and direct ways, though not, perhaps, in the rhythmic sense that Jeff Pressing seems to be suggesting. Nevertheless, these physical aspects of the music are often not articulated in concert because of poor performance practice.

To see this, we must clarify our understanding of the materials of electroacoustic music. How do we, composers and listeners, comprehend the potentially baffling range of sound material? What are these physical attributes that which go unnoticed? What is the nature of the intended aesthetic experience?

When we listen to sounds over loudspeakers, we are dealing with illusion. The illusion may be of something real, surreal, or abstract. It may simply be the illusion of stereo—that a sound seems to emanate from somewhere in between the positions of the loudspeakers over which it is, in fact, being played. This is the key to our understanding; we are dealing with the articulation of illusory objects in virtual space, and this understanding of the critical importance of space is taken up by several writers.

Trevor Wishart uses the term "landscape" to describe the "virtual acoustic space" that is the imagined source of the sounds we hear, and goes on to describe four types based on the combinations of *real* and *unreal*, *objects* and *spaces* (giving the permutations: real object, unreal space; unreal object, real space; real space, unreal object; unreal space, real object) (Wishart 1985).

John Young (1994) offers the "reality-abstraction continuum" along which we perceive sounds, and Denis Smalley talks about levels of surrogacy relating to source-cause relationships (source bonding).

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"We [should] hardly need reminding that in an acousmatic music, behavioural relationships are carried by spectromorphology alone, and that in mixed work [works for tape with instruments] the perceived behavioural relationships between the visible, gesture-bearing performer and the surrounding acousmatic context will be crucial to the work's understanding. [...]

Spatial perception is inexorably bound up with spectromorphological content. [...] Space, heard through spectromorphology, becomes a new type of 'source' bonding." (Smalley 1994, p.23)

What these writers have in common is a perception of the materials of electroacoustic music based on patterns of human perception that extends beyond traditional musical parameterization. This perception allows an overview across the range of possibilities, and suggests a model of how these diverse materials can generate musical meaning. Most significantly, it suggests that we try to make sense of a (new) sound by attributing a source object with an associated action or cause, that we interpret its perceived location and spatial behavior, and that our responses are based on our instincts and real-world experience.

Wishart observes that when we hear a sound we infer something about what physical action caused it; for example, we hear the difference between a plucked and a scraped sound, or a struck and a blown sound. Furthermore, we instinctively try to infer such actions/causes even for sounds we do not recognize—even those which may be completely synthetic. While we can choose to ignore our everyday experience and suspend the inference of "reality," we do so "in the knowledge that this background exists." (Wishart 1985, p. 98)

Denis Smalley (1994, p. 9), too, notes,

"Not only do we listen to the music, but we also decode the human activity behind the spectromorphologies through which we automatically gain a wealth of psycho-physical information."

He continues,

"I define source bonding as, the natural tendency to relate sounds to supposed sources and causes, and to relate sounds to each other because they appear to have shared or associated origins."

And he goes on to show that these relationships hold for all musics.

"One might think that in more abstract 'instrumental' music[,] source bondings do not exist, but they are there in force, revealed through gesture and other physical activity involved in sound making. [...] The listener's experience of listening to instruments is a cultural conditioning process based on years of (unconscious) audiovisual training."

"A knowledge of sounding gesture is [...] culturally very strongly embedded. This cannot be ignored and denied when we come to electroacoustic music. It is particularly important for acousmatic music where the sources and causes of sound-making become remote or detached from known, directly experienced, physical gesture and sounding sources." (1994, p. 7)

So how does this recognition of our subconscious understanding of this material help us? In what ways do imaginary objects in virtual space articulate musical structure?

John Young (1994) suggests that our instinctive response along a "reality-abstraction continuum" becomes a powerful tool for structural interpretation of a work for both composers and listeners. In addition to the implied source,

"'abstraction' is a measure of the psychological distance between a sound which displays a source-cause ambiguity and a surmised source-cause model." (Young 1994, p. 23)

He goes on to propose "juxtaposition and mediation" as structural tools.

"As soon as sounds are articulated in a tangible three-dimensional spatial field, an important aspect of environmental reality has [to] be analogised. [...] Although [a] sound itself [may not be] specifically from a particular environmental or cultural source, it [may] neverthe-

> less serve to define a 'realistic' acoustic space and behave as though it were a physical entity...." (p. 25)

So it is in perceiving the distances—physical, psychological, etc., analogous, for example, to harmonic distance in tonal music—that we infer structure.

Trevor Wishart, too, discusses the creative possibilities of using "landscapes" for making structure (Wishart 1985).

> "The acoustic space which we represent need not be real and we may in fact play with the listener's perception of landscape. This aspect of sonic architecture was not an aspect of the traditional craft of the musician. [...] It is therefore easy to dismiss it by linking it with the somewhat cruder and culturally circumscribed procedures of associationism (programme music) and mimicry which exist as a somewhat marginal aspect of [...] Western art music. This, however, would be foolish [...]. Not only does the control and composition of landscape open up large new areas of artistic exploration and expression, in the sphere of electroacoustic music, [but] it will enter into the listener's perception of a work regardless of the composer's indifference to it." (p. 73)

As we noted above, sounds heard over loudspeakers are essentially illusory. They all have perceived spatial location and behavior in relation to a listener; some are particularly clear, whereas others, at the opposite extreme have "nowhere in particular" as their location and "stasis" or "drift" as their behavior. The listener is aware of his or her position in space relative to a sound or environment. Our response, however, goes beyond simple recognition of apparent location and behavior of a sounding object and our location in relation to it. Other psychological, sociological, and aesthetic responses are triggered. Trevor Wishart (1985) identifies the principal, or most obvious spatial opposition as,

> "'in front' and 'behind' [...]. Sounds coming from behind [...] tend to be more stressful, mysterious, or frightening. [...] This separation of 'in front' and 'behind' also has a social dimension for most higher animals." (p. 108)

Similarly, sounds at extreme left and right positions suggest dialogue or opposition, and the distinction between "present" and "distant" suggest levels of engagement from participation to observation, as do a sense of envelopment as opposed to a single-point source.

Speed of movement and regularity and shape of motion, too, are important factors in the characterization of space. Faster motions convey more energy; slow movement, passivity. Regular motion may suggest something mechanical, while angular motion may imply hesitancy or uncertainty.

So, to sum up, there are a number of ways of expressing structural distance: perceived physical distance, distance of recognition, transformation distance between different recognized objects/sounds, or distance of observation versus participation and psychological or social distance. We also know that characteristics of spatial behavior play a crucial part in our interpretation of sound morphologies, contribute to our recognition of materials, and give significance to unfamiliar materials.

If musical structure, then, relies so heavily on spatial factors, it becomes obvious that careful public presentation is essential to preserve musical meaning in an acousmatic work. For even if the composer carefully considers space and spatialization in the compositional process, experience shows that as soon as a piece is played in another room, many aspects of the sound are subject to the acoustic qualities of that room and the numerous varied positions of the audience members. Spatial details become unclear; the effect of dynamic range is reduced by reverberation, background noise, and other factors; and subtle timbral relationships can be severely affected.

This problem has been tackled by composers in many ways. Some have used multi-track formats to translate particular 3-D spatial movement into the concert hall, and others have used ambisonic encoding/decoding, which can compensate for the problems encountered with making even simple four-channel presentation work with any degree of

success. However, these solutions usually involve compositional decisions that are not always consistent with the real possibilities of performance spatialization. They tend to impose a fixed view of spatial location and often require specific equipment—technically complex solutions make a piece of music much less "portable." Control of spatial location does not necessarily solve the problems of making the *spatiomorphology* of sound real in a performance space. The very specificity might actually emphasize problems of, for example, audience orientation.

Even if we were able to deliver a perfect stereo (or other) image to every member of the audience, we would still avoid the social aspect of a concert presentation in a particular situation. The translation of a piece of music into a listening space is not only a set of technical problems, but also an opportunity to interpret the virtual space in the actual acoustic by a performer and for a particular public.

> "Both the grammatical details and the psychological messages of spatial apprehension are unstable because they depend not only on space as composed, but on the relationship between the composed space and the space(s) in which listening takes place. [...] Both the personal listening space and the diffused listening space are open to widespread abuse which undermines spatial perception." (Smalley 1994, p.24)

So, how should we respond to this in performance? In simple, practical terms, what should we do?

In the absence of a complex technical solution, a simple one offers a number of possibilities for a wide repertoire. Multi-speaker diffusion can ensure that the space composed on tape is clearly conveyed, and can also clarify the way both realistic and abstract events are perceived.

What follows, however, is not intended to be an exhaustive discussion of performance problems. Neither is it intended, for reasons which should be clear from the foregoing, to be technical. Rather, I would like to make some general suggestions and observations based on experience of concerts in many spaces over a variety of performance loudspeaker arrays, small and large.

First, let us define the parameters we wish to control in performance: volume; spatial dimensions; spatial location; depth; height; motion and spatial behavior; distance and presence (related to a perceived notion of observation versus engagement); and reverberation (of the performance space). Next, let us assume that the composer has made a work in stereo, and that there is a clear stereo image to be conveyed.

If we were to start with one pair of loudspeakers, where should they be placed? If they are put at the extreme left and right of a typical stage in front of an audience, there will usually be a significant "hole in the middle" for much of the audience. If we move the speakers in from the sides to compensate for this, some listeners will be situated outside the stereo image. While the listener might be able to perceive the movement in the stereo stage from this vantage point, the level of engagement compared to a listener within the stereo stage will be completely different. This idea of engagement is an important parameter, and is often significantly different from our usual experience of abstract instrumental music where we are mere observers of action on a stage.

Staying with our single pair of loudspeakers, distance from the front of stage to the front row of audience may be many times shorter than the distance to the back row. And what about height? Is the front row of the audience below or above stage level? Is the auditorium itself flat or sloping? Both of these factors will significantly reduce subtle—though critical—details of space and perspective for large numbers of an audience, and therefore change (or destroy) musical meaning.

We can begin to solve these problems with multiple pairs of loudspeakers, each replicating the stereo signal, and each independently controlled.

Given two pairs of loudspeakers, my own preference would be one wide-of-stage pair, with another pair toward mid-stage. In combination, these two pairs could provide a single image for most of the audience across the sound stage with no "hole."

Used independently, we can emphasize width or focus.

Given more loudspeakers, one could emphasize distance with a pair as far upstage as possible. Perhaps only as a fourth pair would one use loudspeakers behind the audience, since (unless specified by the composer) this is not a dimension used in stereo, and, as noted above, it has a particular social and psychological significance (not to be used lightly). Other speaker placements would depend more on the particular space. If possible, one would use height, perhaps placing overhead speakers in the front, side, and rear, and possibly something with a less-definable overhead location as well. Additionally, one could use other spatially vague placements to contrast ones mentioned and perhaps provide a sense of envelopment or added presence.

Obviously, performance complexity increases with the more speakers one uses, and different techniques are needed for different locations and different musics. It should quickly become apparent, however, that many aspects of spatial location and behavior can be articulated with carefully placed and mixed pairs of loudspeakers. Sound becomes an almost palpable plastic object in the concert environment, and the sense of space implied so strongly in the medium takes on a real three-dimensional quality.

> "[There is a] fragile art of sound diffusion. In a medium which relies on the observation and discrimination of qualitative differences, where spectral criteria are so much the product of sound quality, this final act becomes the most crucial of all." (Smalley 1986, p. 92)

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