

Composing Space: The Integration of Music, Time, and Space in Multi-Dimensional Sound Installations

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Abstract

The creation of art to be situated within an architectural setting, landscape, or other three dimensional space offers an artist the opportunity to consider relationships beyond those normally associated with any individual art form. The art work will be experienced within the context of the total environment and its success will depend upon how it interacts with or integrates into its surroundings. When the art work utilizes sound as its primary material, the possibility for integration is extended beyond the consideration of architectural and visual space to include both temporal and pitch space. The need for developing a creative approach which, within its design, integrates all aspects of the experience, becomes fundamental to the creation of the work and to the work's integration into the space. In my own work, 39 Bells, physical space, temporal space, pitch space, and musical structure are integrated through a process which unifies all aspects of the experience around the symmetrical nature of the original environment. This integration will be discussed at length. The experience of a mile long soundwork constructed from 39 bells hung along a public street offers interesting perceptual challenges. The role the body plays in parsing, measuring, sensing, and relating to the reality of the full scope of the constructed site will be discussed with the intent of understanding how a listener can find meeting points between his or her position within the work and the physical presence of the work itself. In conclusion, Between...Beyond, my recent temporary gallery installation, will be described with

reference to how these larger principles effect a more local experience through the use of sound, image, and object to manipulate space, time, memory, and imagination.

Keywords

soundworks, perception, public art, symmetrical structure, musical structure, installation, site-specific

1 The Experience of Listening

Traditionally concert music is performed in a setting optimized for listening, the underlying assumption being that music is primarily an aural experience, but for centuries composers have shaped their music using the structural language of spatial art forms applied to temporal relationships. The music theory literature documents many examples of composers, from Dufay (Powell 1979) to Debussy and Bartok (Howat 1986) drawing on the golden section as a means of structuring durational form and pitch space on all levels from the smallest scale to the entire work.

The 20th century has seen an increase in the application of spatial relationships to musical structure through the influx of technology. Earlier experiments with the spatial placement of performers throughout the concert hall have given way to the multiple speaker electroacoustic projection of works created with and by computers, and the “home theater” 5.1 surround-sound system. In all cases the music is distributed spatially but the architectural construct still takes place at the perceptual level as it always has in traditional music. Music is perhaps inherently architectural in its structural manifestation

but through the process of listening alone the construct is inevitably a mental one. In this sense there is little difference between experiencing a Beethoven string quartet, a spatially distributed acoustic composition by Henry Brant, or an abstract multi-channel computer music work. As long as music is defined by the abstractions of pitch/sound structure and confined to the space in which it is presented, its architectural character is destined to represent only a musically “simple” space and to occur only at the perceptual level. Until a listener moves through a work physically and experiences it from different spatial and locational perspectives or, through the experience of referential sounds, mentally perceives other spaces beyond the confines of the physical space itself, music remains simply music.

2 Perception as Spatiality

In The Phenomenology of Perception (1962/92), French philosopher Maurice Merleau-Ponty puts forth the treatise that

“... all senses are spatial if they are to give us access to some form or other of being . . .”

This clear and in some ways simple statement reinforces our understanding of the relationship of music experience to spatial structure. Merleau-Ponty posits a philosophy of perception where “all (senses) open on the same space”, a space experienced as spatiality. Each sense provides its own window on this space and its own particular embodiment of spatiality. He says, “sensation as it is brought to use by experience is no longer some inert substance or abstract moment, but one of our surfaces of contact with being, a structure of consciousness,” and “. . . as the universal condition of all qualities, we have with each (sensation), a particular manner of being in space and, in a sense, of making space.” (Merleau-Ponty 1962/92)

Maurice Merleau-Ponty sees the experience of music, as he does all sense experience, as spatial. “Music is not in visible space, but it besieges, undermines, and displaces that space . . .”. He sees the interaction of all perception within the spatial domain as a “primary organization” of experience. Perception brings all senses together in the meeting

point of spatiality and at that point creates a unique, shared space of experience (Merleau-Ponty 1962/92).

3 Composing Space – 39 Bells

In 1993 I received a commission from the Public Art Program of the city of Philadelphia to create a permanent soundwork for the Avenue of the Arts, a mile long section of south Broad Street that extends north and south from the City Hall to Washington Avenue. I had previously completed a large-scale soundwork for the Oregon Convention Center (Bell Circles II, 1987-91) and was actively seeking opportunities to expand my creative interest in site-specific, spatially distributed soundworks.

The city of Philadelphia’s intention was to centralize arts activity along the Avenue of the Arts and create a focus for the downtown area that would enliven the city. Arts organizations along Broad Street include the Academy of Music, the Philadelphia Orchestra, the Opera Company of Philadelphia, the Pennsylvania Academy of Fine Arts, the Clef Club (a prominent venue for jazz performance), the Brandywine Workshop and gallery, the Merriam Theater and many others. The city was seeking a site-specific artwork that would identify the unique nature of this mile long arts area while unifying the diverse elements along the street.

When working on an expanded physical scale sound offers many unique aspects not found in other art forms. Sound objects can be located to define specific points in the environment while the sound disperses in all directions to fill a much larger space than the object itself occupies. Depending upon the needs of the site, sound objects can either provide significant visual elements in the environment or practically invisible ones with only their sound identifying their presence. Sound objects can create a presence that activates a space and/or defines a place of sanctuary. And, most importantly, sounds themselves distributed throughout a larger environment make possible a link between physical/spatial relationships, temporal relationships, pitch relationships, and musical structure.

3.1 Site-Specific Considerations

Any site-specific project must develop directly from the needs and opportunities of the site itself and the community that inhabits it. In the case of the Avenue of the Arts project the area covered one mile running north to south. The northern half, starting at the city hall, was predominately well established businesses, restaurants, and arts organizations (orchestra, opera, theater), and actively represented the heart of an historically old but modern city. The southern half was less affluent with apartments, gas stations, fast food restaurants, some deserted buildings, and a surrounding residential neighborhood. One of my first decisions was to incorporate this north/south division in a way that would equally represent the two halves of the environment while also delineating the difference in current use. This led me to the decision to use symmetrical structures and mirrored relationships as a means for representing and unifying these two spatially equal but environmentally different areas as one.

3.2 Symmetrical Relationships

Mirrored, symmetrical relationships are a common structure in traditional music often represented as an A B C B A arch form. This structure is symmetrical across the center section and can be mirrored at the same point. It can reflect this relationship at various levels of structure often including similar mirrored symmetries within smaller musical sections and, at times, within the choice of pitch and rhythmic material as well. For this project I chose to hang 39 bells from lampposts installed along the length of the street and to represent both the differences between the use of the north and south halves and their unification as one community by symmetrically mirroring the pitches of the bells across the axis dividing north and south. Bell pitches begin at the north end of the avenue with g4, ascend chromatically through 19 bells to d6 at the center of the area and then reverse, descending back down to g4 at the southern end. The choice of G as the fundamental pitch served to relate the street to the site because of the presence of an existing bell (low G) at the top of the PNB building which anchors the

north end of the street. The pitches along the street ascend over one and a half octaves from the northern end of the street to the mid-point and then reverse order and descend back down to the starting pitch at the southern end creating a symmetrical mirror of pitched material and sounding objects. This initial site-specific decision, growing out of the nature of the environment itself, became a determining factor for all subsequent structural choices made in the design of the physical, musical, and temporal aspects of 39 Bells. The existing environment provided the key to the integration of all elements within the site.

With the physical/spatial aspect of the work determined, the temporal and musical structures developed in close integration to the physical structure. 39 Bells rings musical patterns on a daily basis. The musical activity of these patterns reflects the usage of the street at the time of ringing. The temporal structure of these patterns across the day is based on a symmetrically mirrored arrangement of ringing times. The work day naturally assumes a symmetrical pattern of activity. Ringing times are shown in figure 1.

8 a.m.	opening
8:15	Ia
8:30	Ia+b
8:45	Ia+b+c
9:00	Ia+b+c+d
10:00	II
11:00	III
12:00	IV
12:15	Va
12:30	Va+b
12:45	Va+b+c
1:00	Va+b+c+d+c+b+a
1:15	Vc+b+a
1:30	Vb+a
1:45	Va
2:00	IV (retrograde)
3:00	III (retrograde)
4:00	II (retrograde)
5:00	Id+c+b+a
5:15	Ic+b+a

Figure 1. Schedule of daily ringing times.

The ringing schedule is organized to mirror times across 1 p.m., the center of the business day. Each ringing between 8 a.m. and 1 p.m. has a corresponding symmetrically mirrored time for ringing between 1 and 6 p.m.. Ringings reflect the use of the street with more ringings occurring during the hours of 8 to 9 a.m. when people are on their way to work, 12 to 2 p.m. when they are out of their offices for lunch, and 5 to 6 p.m. when they are leaving work for home.

The musical structures of these ringings are also organized by symmetrically mirrored relationships. The pattern of each ringing is composed of one or more modular section. These modular sections accumulate between 8:15 and 9 a.m. and 12:15 and 1 p.m., and disperse during their corresponding mirrored ringings between 1 and 1:45 p.m. and 5:00 and 5:45 p.m. reflecting the higher level of street activity during these times. At times of less activity the ringings are made up of single sections. The musical structures are shown in figure 2.

8 a.m.		1:15
8:15		1:30
8:30		1:45
8:45		2
9		3
10	1 p. m.	4
11		5
12 noon		5:15
12:15		5:30

Figure 2. The musical structure of ringing patterns across the day in 39 Bells.

All ringings that occur after 1:00 p.m. are reversed ringings of the patterns prior to 1:00. In some instances both pitch and rhythm are mirrored while in others pitch is mirrored but rhythm is not. The central ringing at 1:00 contains within itself a retrograde of its first half. The closing at 6:00 p.m. is a retrograde variation of the opening at 8:00 a.m. allowing for the different experiential nature of the time of day each occurs.

The temporal structure of the ringings across the day and the corresponding musical structures represent an integration of the mirrored symmetry that occurs in the physical structure of the sounding objects and the pitch system on the street. This becomes evident when, due to the reversal of the physical positioning of the bells along the south and north ends of the street, patterns which sound on their corresponding bells at the north and south ends simultaneously play as mirrored aural images across the axis dividing north and south. At its most fundamental, all aspects of 39 Bells are related to the initial observation of symmetry evident in the existing environment.

4 Experiencing 39 Bells

Experiencing a mile long soundwork constructed from 39 bells hung along a public street offers some interesting perceptual challenges. Certainly the entire work cannot be heard from any one position. Each time a ringing pattern is played a single listener hears only a fragment of the work's greater self. This is one characteristic of 39 Bells that sets it and most other environmental soundworks apart from other forms of musical expression. The physical expanse of the work makes it necessary for an individual to assemble the experience through repeated listenings from a variety of physical locations. This can occur through an act of deliberate attention or through the slow accumulation of experience, living with and hearing the work on a daily basis. In both cases the demands of experience more closely resemble the manner in which individuals perceive and understand architectural structures. On an on-going basis the listener finds meeting points between his or her position within the work and the physical and aural presence of the work itself. The relationship of the body to the physicality of the work is fundamental. The dimensions of the work are measured and experienced only by physical interaction with and movement through the space itself.

This is often the missing element in the correlation of architectural systems and musical systems: the physical experience accumulated through time of the unseen and unheard expanses of the work. Through a slow accumulation of

information the viewer/listener assembles a larger sense of the whole which can never be perceived simultaneously. Although both music and architecture do in a sense unfold over time, the physical unfolding of architecture is seldom matched in the musical experience except through large scale installations such as 39 Bells. The vital presence of the body in experience and the role it plays in parsing, measuring, sensing, and relating to the reality of the full scope of the constructed site can only be matched in an equally expanded musical experience that requires the same active role for the body. Through the body architectural scale and structure are measured and understood. Through the body musical scale and structure may also be sensed and measured to bring an eventual experiential understanding even to the most expanded of works as music, sound, space, and environment become one.

5 Between... Beyond

How then does this relate back to the integration of all aspects of the experience of site-specific installations designed for and confined to a physically limited space? Between... Beyond is an installation piece I created for the Richard and Marjorie Reynolds Gallery. It was exhibited from March 26 to April 25, 2002. Designed for a space of approximately 24 x 24 feet square it appears to place no unique demands on the listener/viewer. All aspects of the work are simultaneously heard and seen within a confined space. But in both design and experience it shares much in common with 39 Bells and other extended works.

Between... Beyond consists of 6 boxes of varying heights placed at specific points within the space to create a balance between themselves as objects and the emptiness surrounding them. They define the spatial aspect of the room without creating any obvious division of the space. Each box is illuminated from within and houses two superimposed glass lantern slides whose images demonstrate early 20th century acoustical experiments to make invisible waveforms visible. The slides are seen on the upper surface of the boxes located and oriented on each in a unique position. Sound plays into the space from four speakers mounted high on

each wall and located along each wall in a similar relationship to that used to locate the boxes within the space. Two stereo audio cds play simultaneously into the space, their lengths, c. 27 and 30 minutes respectively, allowing them to loop back and cycle against each other to create a constantly changing layering of sound across the day. The sounds used in this installation were collected as site recordings during an extended stay in Japan. They include the sounds of temple bells, Buddhist rituals, nature soundscapes, city sounds, and some excerpts from my own computer music performance piece, PatternsLuminous. For the most part the sounds are presented without modification. Integration of time and space occurs through the use of a similar temporal proportion to that used to locate the speakers along the walls and the boxes within the space to distribute the sounds in time on the cds. Silence divides the extended sound passages to create a balance between the sounds themselves and the emptiness of the silence around them.

All aspects of this work serve to draw the listener into a relationship with the spaces between objects and beyond direct experience. Katherine Norman (1996) refers to real-world music, music which draws on sounds collected from the natural soundscape, as not being “concerned with realism because it seeks, instead, to initiate a journey, which takes us away from our preconceptions, so that we might arrive at a changed, perhaps expanded, appreciation of reality.” It is this sense of journey, of physical and experiential transport and expanded reality, that links Between...Beyond to 39 Bells. In the confined gallery space it is not the distribution of sounds throughout the space by a four-channel sound system that creates an expanded spatial experience but rather the nature of the sounds themselves that draws the listener into an evocative, expanded space, shaped by memory and beyond time. In the expanded physical space of 39 Bells it is not the sounds of bells alone but the physical interaction of the listener/viewer with the sounding environment that unifies the experience of time, space, and sound to ultimately create a “changed, perhaps expanded appreciation of reality”. (Norman 1996) In both works it is the

eventual renewed understanding of our place within that reality that rewards our efforts.

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