2012

Performance Space for Niche and Emerging Artists

Bradford S. Hutchison
University of Massachusetts Amherst, bhutchis@art.umass.edu

Performance Space for Niche and Emerging Artists

A Thesis Presented

by

BRADFORD S. HUTCHISON

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

MASTER OF ARCHITECTURE

May 2012

Architecture + Design Program

Performance Space for Niche and Emerging Artists

A Thesis Presented

by

BRADFORD S. HUTCHISON

Approved as to style and content by:

Joseph Krupczynski, Chair

Kathleen Lugosch, Member

Kathleen Lugosch
Graduate Program Director
Architecture + Design Program
Department of Art, Architecture,
and Art History

William T. Oedel
Chair, Department of Art, Architecture,
and Art History

DEDICATION

For Jennie and Juliet.

ABSTRACT

PERFORMANCE SPACE FOR NICHE AND EMERGING ARTISTS

MAY 2012

BRADFORD S. HUTCHISON, B.S.L.A., UNIVERSITY OF MASSACHUSETTS

M. ARCH., UNIVERSITY OF MASSACHUSETTS

Directed by: Joseph Krupczynski

While large performance spaces fulfill important cultural, civic, architectural and artistic needs, few performing artists begin their careers playing in large halls. As in professional sports, the "minor leagues" play a critical role for professional performing artists by allowing them to both reach out to new audiences and hone their performance skills. Niche and emerging performing artists, therefore, rely on small performance spaces as their principal means exercising their craft. In addition to size, one important difference between large and small performance spaces is the criticality of the social experience. Small performance spaces are often informal, with entertainment being secondary to social functions - as in the case of the neighborhood coffee house, bar or restaurant that offers periodic performances in addition to their standard fare. The hybridization of social and performance functions offers a "ready-made" audience for niche and emerging performing artists, engendering the new and random audience-performer connections that are so critical to nurturing performing artists and the performing arts in general. The disparate social and attentive programmatic functions of these hybrid spaces offer a challenge to architects and designers. Providing a hybrid social/performance space that is optimized for niche and emerging performing artists is the central design problem that this thesis seeks to address.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER I

BACKGROUND RESEARCH

A. Introduction

Throughout history, much architectural attention has been lavished on the large, iconic performance spaces that define the pinnacle venues for performing artists. However, few, if any, performing artists start their careers performing in such halls. As is the case with professional athletic organizations, a "minor league" for performing artists exists and provides the essential venues for the honing of performance skills and the building of audience bases that are critical for emerging performing artists. Additionally, the 21st Century has brought with it huge changes in the landscape of live performance. Large performance halls, although a critically important part of our civic and cultural life, are only a part of the necessarily diverse mosaic of performance spaces that can accommodate 21st Century musical tastes. Niche and emerging performing artists have venue needs that are distinct from artists that perform in large halls. This thesis seeks to answer how architecture can contribute to the nurturing of the performing arts and, more specifically, how to define an idealized venue for niche and emerging artists.

Chris Anderson's 2006 book *The Long Tail* predicted that the internet economy would shift demand from a relatively small number of "hit" products at the head of the curve to the huge number of "niche" products on the long "tail" of the curve(Anderson, 2006). As both the "head" and "tail" of the curve have equal areas, the book came with the subtitle of *Why the Future of Business is Selling Less of More* . Applied to book sales, this theory

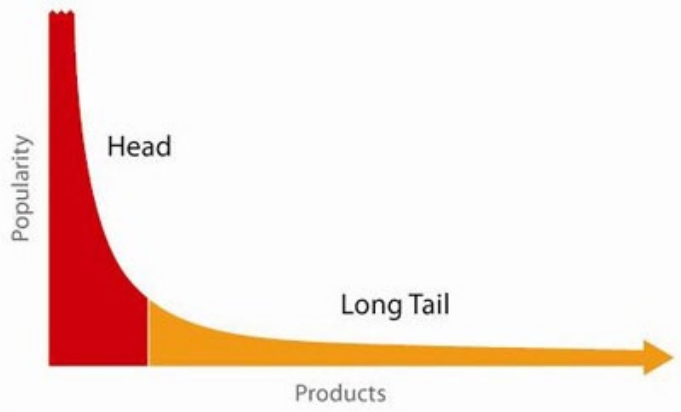

Figure 1. The Long Tail Curve. Image from: http://thelongtail.com/the_long_tail/about.html

seems to hold up quite well, as a recent study concluded that by 2008, niche books accounted for almost 37% of Amazon's book sales(Brinjolfsson et. al, 2003). Applied to on-line music sales, the theory has found some detractors. A study by Will Page (2009), chief economist of the MCPS-PRS alliance found that for the online singles market, 80% of all revenue came from just 52,000 tracks. Further, of the 1.23 million tracks available, only 173,000 were ever bought, meaning that 85% of all offerings did not sell at all. This study is sometimes cited as "debunking" the long tail theory but this criticism seem to miss the larger point. Regardless of how many singles niche artists are selling, there are a huge number and variety of music tracks available and these tracks were recorded by a correspondingly huge number and variety of musicians. The same authors of the study of Amazon's niche book sales concluded in an earlier paper that the principal benefit of the internet economy to consumers is access to increased product variety(Brinjolfsson et. al, 2010). While one can question how much revenue niche musicians are generating from online sales, the fact that such a large number and variety of niche or "long tail" recording artists now exist cannot be argued. Certainly not all of these niche recording artists are also live performing artists, but it is likely that a substantial percentage are. Additionally, even in the case of performers of genres that would be considered “mainstream”, or the “short head” of Chris Anderson’s curve, it is almost always necessary for even these performers to begin by playing in small venues in front of small audiences. And so the necessity for performance spaces that cater to the distinct needs of niche and emerging artists seems inarguable. This thesis will focus on three principle areas of inquiry in examining small performance spaces: adaptability, acoustics and, perhaps most importantly, social function.

B. Adaptable Versus Purpose-Built

The degree to which a performance space for niche and emerging artists can and should be adaptable is an important consideration for the designer. There is a saying that

"the multi-purpose hall is the no-purpose hall"(Everest & Pohlmann, 2009, p. 377). Yet to be successful, financially and otherwise, small performance spaces need to be able to host extremely diverse acts with their attendant diversity of audience size. In attempting to answer the purpose-built versus adaptable question it is useful to consider two very different, yet complimentary, written works that address this issue; *How Buildings Learn; What Happens After They're Built*, by Stuart Brand and *The Other Tradition of Modern Architecture, The Uncompleted Project*, by Collin St. John Wilson.

It is not unusual, and this is true across many different professions and academic disciplines, for some of the most insightful polemical writing to come from people who are , in fact, "outsiders" to the discipline about which they are writing. People who have not been educated within the bounds of the chosen pedagogics of a given profession are often able to bring perspective that is unencumbered. Such is the case with Stuart Brand who brings his varied, but non-architectural, experience to bear on the interesting and unique issue of how architecture exists in the temporal landscape. It seems somewhat incredible that, before Brand, no one had tried to systematically answer the question "What happens anyway in buildings over time?" (Brand, 1994, p. 2) *How Buildings Learn*, like Reyner Banham's *The Architecture of the Well Tempered Environment*, attempts to apply performance-based observation to architecture and is representative of a sort of a performance-based "re-awakening" that began in the 1990's. Like *The Architecture of the Well Tempered Environment*, *How Buildings Learn* is populated with case studies, which in Brand's case are photographs and rephotographs of buildings through time. The use of temporal case studies and performance-based observation would be a revealing strategy to apply to performance spaces that have had long, active lives that have transcended fashion and technology changes.

Brand(1994) finds much to criticize in the status quo. "Almost no buildings adapt well. They're designed not to adapt...whereas 'architecture' might strive to be permanent, a 'building' is always building and rebuilding" (p. 2). While there is much to criticize in architects' lack of acknowledgement of adaptability and future use, the profession must exist

within and serve a society that, sadly, is not particularly known for being forward thinking. The realities of professional practice and the difficulty in educating clients that are rarely thinking more than ten years into the future makes it very difficult to design buildings that can adapt over the course of many decades .

Brand (1994) quotes Frank Duffy, former president of the Royal Institute of British Architects who says "...there isn't such a thing as a building, a building properly conceived is several layers of longevity of built components."(p. 12) Brand defines these components as the six S's: Site, Structure, Skin, Services, Space Plan, and Stuff and notes that they all change at different rates, with the rate of change being slowest with Site and Structure and fastest with Space Plan and Stuff (p. 13). When considering these systems as a whole, "an adaptive building has to allow slippage between the differently-paced systems...Otherwise the slow systems block the flow of the quick ones, and the quick ones tear up the slow ones with their constant change."(Brand, 1994, p. 20) This is a particularly important observation that can be "built-in" to an approach to design, across building types and typologies, without changing any of the fundamentals of design as we have come to understand them as architects. Brand (1994)further notes that different building typologies change at different rates and in different ways. Commercial buildings have to adapt quickly to respond to fast-changing market conditions and are "forever metamorphic" (p. 7). Domestic buildings (housing) change at a slow and steady pace defined by their owner's needs and whims. While institutional buildings "act as if they were designed specifically to prevent change for the organization inside."(p. 7) It is interesting to note that performance spaces straddle all three of these typologies in that they are, in many cases, both institutional and commercial as well as exhibiting the deeply personal and intimate qualities of the domestic. Iconic performance spaces, in particular, seem to exist in their own unchanging universe in that we (the public) think of them as consecrated ground and are offended by the idea of changing them at all. There is a notion of the performance space as a sacred shrine that, much like a church, is expected to exist apart from the changing demands of a fickle society. Brand (1994) notes

that we have "affection for [a building's] evident maturity, for the accumulated human investment it shows, for the attractive patina it wears..."(p. 10) In a metaphysical sense, the "ghosts" of performances past accumulate and inhabit performance spaces with history, imbuing them with a certain "wisdom".

The detailed exploration and documentation of building change and adaptation begs the question "can adaptability be designed-into a building?" Brand seems to argue that, yes, it can. Brand notes that the modernist approach to programming or inside-out design can, in actuality, produce buildings that are very resistant to change. The integration is such that slippage between the six S's is difficult, if not impossible. Brand introduces the idea of scenario planning, common in the business world, as an alternative or amendment to programming and says

> The great virtue of programming is that it deeply involves the users of a building and makes it their building. The great vice of programming is that it over-responds to the immediate needs of the immediate users, leaving future users out of the picture, making the building all too optimal for the present and maladaptive for the future... The iron rule of planning is: whatever a client or an architect says will happen with a building, won't....The only reliable attitude to take toward the future is that it is profoundly, structurally, unavoidably perverse(Brand, 1994, p. 181).

Scenario planning, according to Brand, seeks out and celebrates perversity. Clients are encouraged to imagine and name possible future scenarios - the wilder and more dire the better - that would impact their building needs in different ways. These scenarios are further filtered and the take-away is a building strategy that anticipates the future. That strategy, as in chess, should "favor moves that increase options; shy from moves that end well but require cutting off choices; work from strong positions that have many adjoining strong positions"(Brand, 1994, p. 186) Brand includes some Christopher Alexandrian suggestions for moves that increase options including "overbuild structure, ...provide excess service capacity; go for oversize rather than under size. Separate high- and low- volatility areas, ... work with shapes and materials that can grow easily, ...medium small rooms accommodate the widest range of uses, ...when in doubt, add storage, design loose and generic around

high-tech"(Brand, 1994, p. 186)

While employing a generic strategy of favoring moves that increase options has its advantages, moves that limit options can be desirable under certain circumstances. One could argue that certain buildings actually benefit from a lack of adaptability. Many purpose-built concert halls and opera houses would seem to fit into this category. The Bayreuth Festpeilhaus, for example, was not only purpose built for opera, but specifically for Wagner's operas. It could be said, though, that the Bayreuth Festspielhaus successfully fulfills its intended purpose as a vehicle for Wagner's work and here we begin to touch on one of Collin St. John Willson's central themes.

Both Stuart Brand and Collin St. John Willson seem to believe that the performance and ultimate success of a building can be objectively measured and feel that a building's longevity is a good indicator of that success. Ultimately, however, they reach very different conclusions as to what this means for the practice of architecture.

St. John Wilson dedicates the first third of *The Other Tradition of Modern Architecture: The Uncompleted Project* to outlining Corbusier's dominance in early Twentieth-Century architectural philosophy and, in his opinion, the resulting damage. Le Cobusier's "machines for living" are very much at odds with what St. John Wilson feels is the true teleological order of Classical architecture which is based upon the fulfillment of purpose rather than elegance of performance (St. John Wilson, 1995, p. 39-45). In other words, the superficial notions of "style" and "order" are contrary to the Kahnian approach of answering the question "what does a building want to be", or as St. John Wilson puts it, "the extent to which [a building's] form is generated and inspired by the particular way of life that called it into being rather than by the emulation of precedent or the exploration of some abstract exercice du style."(1995, p. 63) Here we can see where Brand and St. John Wilson begin to occupy some of the same philosophical space. Answering the question "what does a building want to be" is essentially an exercise in the objective. It assumes that there is a rational answer against which the resultant building can be measured. Indeed, as St. John

Wilson himself says "it is in the discrimination between the various levels of use in terms of propriety and context that the 'task' to be served by any building can be defined and the degree of its success in matching that task can be judged in an objective way" (1995, p. 63) Similarly, when Brand asks "What happens anyway in buildings over time?", (1995, p. 2) he is asking a question that he feels can be answered objectively, in his case through the use of photographic case studies showing buildings' metamorphosis through time. In essence, both would agree that a building's value can be measured in some way by how well it is serving its occupants' needs. This alignment in thought only goes so far, however.

When St. John Wilson writes that "the gratification of some living purpose must be the grounds of [a building's] necessity and the source of its inspiration..."(1995, p. 63) he inadvertently concedes Brand's point with the use of the qualifying word "living" in conjunction with the word "purpose". In Brand's view, things start to get really interesting when a building's "living purpose" has outlived its original life. And if "living purposes", like all other living things, must eventually die, then for Brand it follows that a building that is too steeped in its original purpose will fail the test of time. For Brand, resistance to change is bug, not a feature. If we grant Rawn's assertion that a perverse future is a given, then the programming approach of "serving the end that called it into being in the first place" that St. John Wilson advocates is bound to bump up against those future perversities. Indeed, when Brand says of programming: "...The great vice of programming is that it over responds to the immediate needs of the immediate users, leaving future users out of the picture, making the buildings all too optimal for the present and maladaptive for the future."(1994, p. 181) he is really striking at the heart of St John Wilson's polemics. If we are programming for current users and current users are not long for this world, then programming can be thought of as built-in obsolescence. As all buildings must exist in a temporal landscape that transcends the short life span of humans -and the even shorter life spans of business cycles, technology and fads- then Brand would argue that answering the question "what does a building want to be?" will yield an answer that cannot keep pace with

the world. Brand sums up his feelings on the matter by saying "many a building is a brilliant (or pedestrian) design solution to the wrong design problem"(1994, p. 178).

St. John Wilson does not discount the temporal, though. He begins to address Brand's argument when he writes "the fact that the desire that brings [a building] into existence is generated from powers that lie far outside the discipline of the art itself exposes each enterprise to the unpredictable."(1995, p. 63) Ultimately, however, St. John Wilson would likely argue adaptability is only one small measure of a building's true worth. In perhaps his most effective rebuke of Brand's notions of adaptability he writes "it may be that a building is demolished because the purposes that called it into being in the first place have themselves become obsolete, but more often than not, demolition is the price paid by a building that never fulfilled its true calling in the first place, never drew its inspiration from life but played instead a silly game with itself"(1995, p. 76). While St. John Wilson is likely referring to the obsession with "style" when he refers to "silly games", it is not a stretch to imagine that he would give a similar disapproval to Brand's scenario planning. Brand, for his part, would likely be untroubled by the idea of scenario planning being a game. In the end, the two would disagree on the necessity of designing a building with its future lives in mind. St. John Wilson would argue that a building that "fulfilled its true calling in the first place" would stand the test of time and Brand would point to photographic studies of buildings that had fulfilled their initial true callings and then fulfilled additional callings by changing, sometimes radically, their initial designs. In this regard, they can both be said to be "right".

If Brand's book has a central weakness it would be his lack of flexibility in calling for maximum flexibility. While there is much to recommend the strategy of favoring moves that increase options, if buildings were based around this strategy a certain blandness would be pervasive. Some of the most iconic and best loved architecture has exhibited very maladaptive qualities. Similarly, St. John Wilson's desire to discard formal stylistic cannons such as "axis", "symmetry", "poche", and "mosaic", as well as a willingness to categorize buildings on a continuum that is "...calibrated by degrees of complexity and significance of

purpose between the physical and the metaphysical-a frame work for action or an object for contemplation"(1995, p. 62) discounts the notion of duality. He seems uncomfortable with the idea that all things can be more than one thing. Can a building not be a both a framework for action and an object of contemplation? Is pure stylistic ornamentation really wrong?

If we concede that both Brand and St. John Wilson are essentially correct in their respective polemical arguments, what does this tell us about purposefulness and adaptability of performance spaces? If a performance space's living purpose is to host a wide range of performances and audience sizes, to a certain extent its purpose changes nightly with the divergent performers and audiences that come and go. And so the successful fulfillment of those divergent purposes involves at least some degree built-in flexibility. The degree to which that flexibility is built in and the nature in which it is physically manifested is critical, though. An overly adaptable space loses its own sense of identity and place while an overly static space resists the nightly ebb and flow of the life of a performance space. Key to establishing the right balance is identifying what areas or components demand the most amount of flexibility and "slippage". A certain degree of "slippage" is necessary, particularly if attentive and social programmatic functions are to be combined. Too great a degree of "slippage" , however, will result in conflicted and muddled usages as well as a space that is lacking in identity. Furthermore, many of our most beloved performance spaces, be they large or small, have a high degree of resistance to "slippage". There is something in our humanity that responds to architecture with strong personalities or identities in that it allows our responses to be unambiguous and instinctual. Spaces that are "wishy-washy" or demand too much of our own participation arouse our subconscious suspicions and fail to establish a sense of place. If the actual performance is only a part of the event of performance then a strong sense of place is an important component in establishing a memorable event in that all of our five senses are important for the establishment of memory. And for the performing artist, "an event to remember" is the

gold standard against which all performances are measured.

C. Acoustics

While a great amount of the techniques and technology utilized by large performance spaces are scalable, certain factors, particularly in the realm of acoustics, are particular to small performance spaces. The necessarily smaller room sizes establish background acoustic conditions - and associated problems - that are different from large halls. Low and low mid frequency sounds generated by room geometry, known as room modes, are often the most problematic for smaller rooms. However, they are easily calculated and are constant for a given room size and shape and unchanging with different program material. Therefore, an acoustic treatment strategy that provides a baseline level of absorption in the low and low-mid frequency bands that is tailored to the strong room modes is desirable. Adjustability of the acoustic response of a small performance space is more practical in the mid to upper frequency bands, since program material and audience size will have more of an effect on reverberation time and degree of need for high frequency attenuation. Therefore, static acoustic devices that are tailored to the space's low and low-mid frequency room modes coupled with adjustable acoustic devices that can vary the degree of mid and high frequency absorption would be an ideal acoustic strategy to pursue for a small performance space.

1. Background

Even if the physics involved was not always understood, Helmholtz type resonators have been used for centuries. In *The Master Handbook of Acoustics*, Everest and Pohlmann (2009) note that:

> Bronze jars have been found in ancient Greek and Roman open-air theaters. Large jars may have been used to absorb sound at lower frequencies. Groupings of smaller jars may have supplied sound absorption at higher frequencies. In medieval times, resonators were used in a number of churches in Sweden and Denmark. Pots ... were embedded in the walls, presumable to reduce low-frequency modes. Ashes have been found in some of the pots, perhaps introduced to lower the Q of the ceramic pot and thus broaden the frequency of

its effectiveness. (p. 209)

Helmholtz resonators take their name from Herman Von Helmholtz, who performed experiments with metal spheres with narrow necks to identify sound frequencies by using the spheres as resonant cavities. These resonant cavities can also function as tuned sound absorbers. Everest and Pohlmann (2009) provide the following explanation of the physics:

Figure 2. Original Helmholtz Resonators. Photo from http://physics.kenyon.edu.

> Blowing across the mouth of any bottle produces a tone at its natural frequency of resonance. The air in the cavity is springy, and the mass of the air in the neck of the bottle reacts with this springiness to form a resonating system, much as a weight on a spring vibrating at its natural period. ..Change the volume of the air cavity, or the length or diameter of the neck, and the frequency of resonance changes. The width of this absorption band depends on the friction of the system. A glass bottle offers little friction to the vibrating air and would have a very narrow absorption band. Adding a bit of gauze across the mouth of the bottle or stuffing a wisp of cotton into the neck, the amplitude of the vibration is reduced and the width of the absorption band is increased. (p. 209-210)

The ability to easily tailor Helmholtz resonator's resonant frequency make them ideal devices to use for reducing room modes and for this reason they are a logical choice for static acoustic treatment of small performance spaces.

2. Types of Helmholtz Absorbers

The perforated panel absorber is a common type of commercially available Helmholtz absorber. In a perforated panel absorber "each hole acts as the neck of a Helmholtz resonator, and the share of the cavity behind belonging to that hole is comparable to the cavity of a Helmholtz resonator." (Everest & Polhmann, 2009, p. 212) Hybrid surface acoustic panels sandwich a perforated panel (usually hardboard, plywood,

aluminum or steel) with an absorptive panel (usually semi-rigid fiberglass panels). Hybrid surface panels allow for some retention of higher-frequency reflections while shifting the noise absorption coefficient curve towards the bass frequencies. Currently, Owens Corning produces a Low Frequency Tuner Panel (CDC Corporation, 2009) utilizing a sandwich assembly of semi-rigid fiberglass and a special un-perforated vinyl plate that reflects higher frequency sound. The Metro Wood Panel (CDC Corporation, 2009) is another Owens Corning product that uses a resilient perforated co-polymer face-sheet wrapped around semi-rigid fiberglass. RPG Diffuser Systems developed and patented the Binary Amplitude Diffsorber ™(RPG Diffuser Systems, 2007), a tuned absorber/diffuser panel that utilizes a metal plate with numerous perforations that have been acoustically optimized using 2D binary sequences(D'Antonio et al, 2005). However, like many other acoustical products currently on the market, these products rely on a traditional glass-fiber material for the absorber and metal or petroleum-based products for the plate, making them less suitable for use in situations where a "green" product is desired.

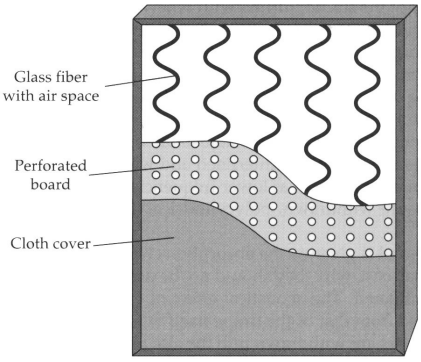

Figure 3. Hybrid Surface Panel. Image from Everest & Pohlmann (2009), *Master Handbook of Acoustics*, p. 278

Traditional glass-fiber semi-rigid insulation uses petroleum-based products as a binder and there are concerns about the health effects of these binders as well as from the shedding of the glass-fibers themselves. Fortunately, there are some new products on the market that address these concerns. Knauf Insulation produces a glass-fiber based product that incorporates Ecose™ technology in its binder material(Knauf Insulation, 2011). Ecose™ technology is based on renewable bio-based products and has lower embodied energy than petroleum-based binders and does not contain phenol, formaldehyde or acrylics. However, the Knauf insulation still relies on glass-fibers which have their own associated health risks. American Micro Industries produces a product call Echo Absorber™

(American Micro Industries, 2005) made from 80% recycled cotton products that is thermally bonded, and so does not contain any volatile organic compounds. Echo Absorber™ has a density and noise reduction coefficient comparable to glass fiber-based products without any of the associated health risks and non-bio-based components.

Many other bio-based materials exist as possibilities for acoustic absorber material in hybrid surface panels. Zulkifli et. al. (2009) investigated the use of coir fiber (derived from coconut husks) bound with latex as an absorptive material in a hybrid surface acoustic panel. The conclusions of the study were that natural fiber absorber material could be used in hybrid surface panel assemblies and that by manipulating perforation opening percentage and air gap thickness, different assemblies could be tailored to different locations or applications. (Zulkifli et. al., 2009)

A difficulty with perforated plates that use round (or square) holes is that currently available commercial products such as peg board have hole open areas that are too small to be effective, making custom fabrication an expensive necessity (D'Antonio et al, 2005). Using planks with slots between them (a slotted Helmholtz device) can be an attractive alternative that has the added benefit of being able to use solid wood instead of plywood, eliminating a potential source of VOCs and non-bio-based binders. The width of the slots, the thickness of the planks and the thickness of the air gap can be tailored to suit the desired acoustic attenuation properties of the panel allowing for easy tuning to resonant room mode frequencies. Furthermore, Kristiansen and Vigran (1994) demonstrated that the absorption coefficients of slotted Helmholtz absorbers can be predicted mathematically with excellent correlation to experimental results.

3. Precedents in Adjustable Acoustic Devices

Ever since Wallace Sabine's pioneering work in acoustics allowed us to understand reverberation time as a function of geometry and amount and type of absorptive material for a given room, architects and acousticians have sought to design devices that could tailor

the acoustic properties of a given space to the needs of the moment. In the 1920's, radio broadcasting studios began using drapes to "deaden" the sound. However, it became "apparent that this radio studio treatment was quite unbalanced, absorbing middle - and high - frequency energy but providing little absorption at low frequencies" (Everest & Pohlmann, 2009, p. 277). In the rebuilding of Studio 3A of the National Broadcasting Company in

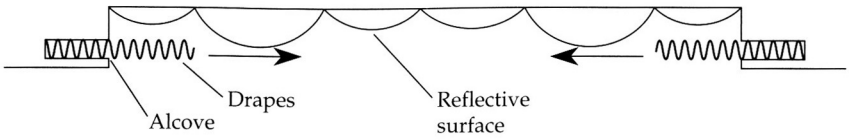

Figure 4. Acoustic Treatment at NBC Studio 3A. Image from Everest & Pohlmann (2009), *Master Handbook of Acoustics,* p. 278

New York City in 1946, drapes were used in concert with polycylindrical elements to achieve an adjustment in reverberation time over a two-to-one range (Everest & Polhmann, 2009, p. 277).

Removable, wall hung absorber panels (like the one shown in Figure 3) can provide "on" or "off" adjustable acoustic treatment but, as noted by Everest and Polhmann (2009), "there is some compromising of the effectiveness of the panels as low-frequency resonators because the units hang loosely from a mounting strip. Leakage coupling between the cavity and the room tends to degrade the resonant effect." (p. 278) The other problem, from a practical standpoint, is that a fair amount of storage is required for the panels when not in use.

Hinged panels arrangements offer a very flexible and inexpensive form of adjustable acoustics. There are many variations of the theme "when closed, all surfaces are reflective. When opened, all

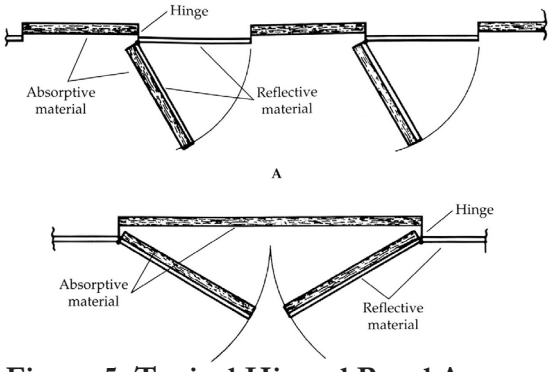

Figure 5. Typical Hinged Panel Assembly. Image from Everest & Pohlmann (2009), *Master Handbook of Acoustics,* p. 280

surfaces are absorptive." (Everest & Polhmann, 2009, p. 280). However, providing baseline tuned low frequency absorption with this strategy would be difficult since, if the resonators were behind the hinged panels, they would only function when the panels were open. If they were the hinged part of the assembly, their depth would be limited and when opened their effectiveness would be greatly diminished. Also, having any sort of gradation of exposed material is difficult with a hinged arrangement since the panels would have to be either fully open or fully closed.

"Louvered panels can be of reflective material (glass, hardboard) or of more absorptive material (soft wood) and they can be solid, perforated, or arranged for slit-resonator operation. In other words, almost any absorption frequency characteristic can be matched with the louvered structure with the added feature of adjustability" (Everest & Pohlmann, 2009, p. 280). The main disadvantage with the louvered panel arrangement is that if we consider the case of the slit-resonator option when closed, when opened, the low frequency absorption would be lost, although the louvers allow for a more graduated exposure of the absorptive material behind than the hinged panel arrangement.

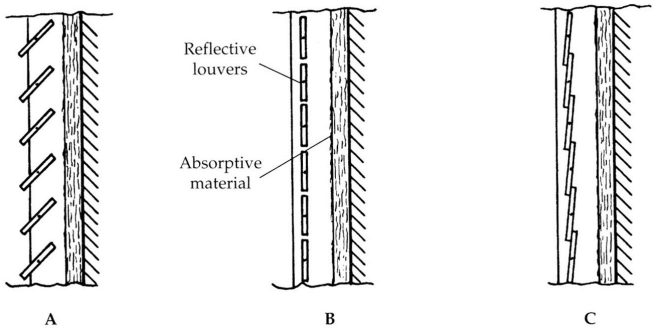

Figure 6. Possible Louvered Panel Assemblies. Image from Everest & Pohlmann (2009), *Master Handbook of Acoustics,* p. 281

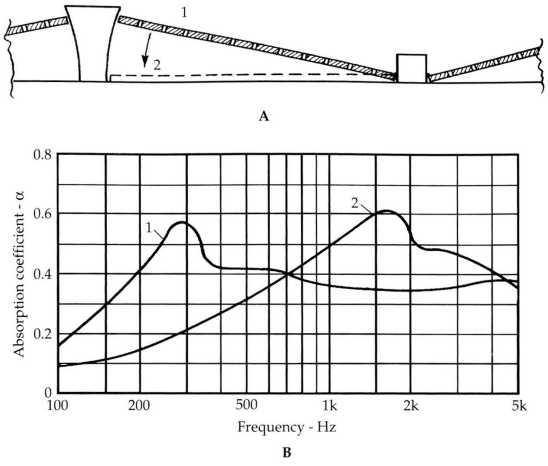

Figure 7. Variable Resonant Device. Image from Everest & Pohlmann (2009), *Master Handbook of Acoustics,* p. 283

Variable resonant devices allow for the variation of one or more parameters that effect the tuning of resonant devices. Hinged panel

arrangements allow the depth of the air cavity behind a perforated or slotted panel to vary, shifting the absorption characteristics either up or down depending on the panel position. As can be seen by the graph, though, baseline low frequency absorption is not maintained, making this device "either/or" with respect to low frequency absorption. Higher frequency absorption is maintained in either position, however. More complex hinged panel configurations are possible like the one shown used at a Hollywood dubbing studio. Again, the hinged arrangements don't allow for gradations of exposure of absorptive material, only "open" or "closed".

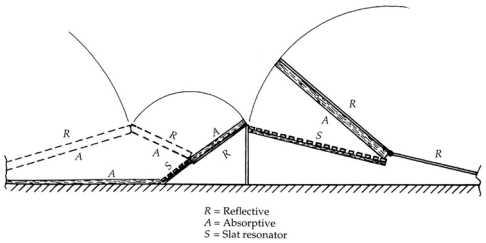

Figure 8. Hollywood Dubbing Studio Acoustic Treatment. Image from Everest & Pohlmann (2009), *Master Handbook of Acoustics,* p. 283

Rotating elements like the ones shown in Figure 9 offer similar "either/or" scenarios for adjustable acoustics. "In this particular configuration, the flat side is absorbent and the cylindrical diffusing element is reflective. A disadvantage of this type of system is the space required for rotation."(Everest & Pohlmann, 2009, p. 284). With the possible exception of NBC Studio 3A, none of these schemes, as stand alone devices, allow for baseline tuned low frequency absorption coupled with adjustable mid and high frequency absorption.

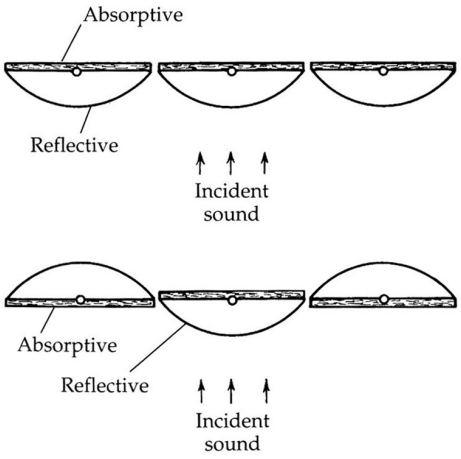

Figure 9. Typical Rotating Elements. Image from Everest & Pohlmann (2009), *Master Handbook of Acoustics,* p. 283

4. Conclusions

For static low and low-mid frequency absorption tailored to a small performance space's room modes, slotted hybrid-surface Helmholtz devices utilizing solid wood slats and natural fiber as absorptive backing have numerous advantages. They are easy to construct

and can be easily tailored to very specific frequency bands. They can be fabricated from readily available "green" materials and have the added bonus of being architecturally attractive as assemblies. For adjustable mid and high frequency absorption there are many options, but acoustic curtains are perhaps the simplest and least expensive to install and maintain and the mechanism for adjusting is a simple track, which can be easily motorized. The fact that they can be adjusted without impinging on the amount of useful floor area available is probably their most attractive feature, though, with regards to a small performance space.

D. Social Function

Perhaps the most important difference between large and small performance venues is the degree of criticality of the social experience. Niche and emerging artists have a particular need to connect with new audiences. In order to connect with new audiences it is necessary for performing artists to play for people that have never before seen that artist's act. The people that have never before seen the artist's act need an ulterior motive to go to a performance space to begin with. Luckily for musicians and other performing artists, the pursuit of alcohol and sex has provided that motive for centuries. The hybridization of the social and entertainment experience has occurred for as long as humans have congregated to eat and drink. Musicians have long provided the merriment, however informal, for such gatherings.

Figure 10. The Timeless "Corner Musician". Image from Sallee & Chauveau, (1985) *Music Hall et Cafe Concert*, p.10.

Peter Baily (1986), in his book *Music Hall; The Business of Pleasure*, provides an

interesting -and very "Brandian"- history of a hybrid social and performance space in its various stages of development in 19th Century Great Britain that can also serve as a cautionary tale for the designer of the modern small performance space.

> Phase 1 is the prehistoric 'convivial meeting' stage. Mr. Wilkins, licensee of the Swan, has a parlour which is used twice weekly by a dozen hearty drinking companions calling themselves the Harmonious Stevedores, the Nightingales or the Warblers. It matters very little whether the cronies are comfortable tradesmen, priding themselves on their alto, tenor, baritone and bass voices and working their way through a favourite glee book, or workmen with a part-oral tradition, enjoying a 'free and easy' and taking turns with a verse and a chorus. Their needs are simple. Almost any room will do provided it is not too large and is adequately furnished with table and chairs. An overriding necessity is, of course, access to refreshment. The time could be any time upp to the present day, but let us say that it is about 1820 to 1830. The geography of such a self-made entertainment is almost entirely dependent on the shape of the room, the position of such features as the door and the fireplace and the character of the landlord's furnishings. A round table at the centre of the room would not be uncommon. Otherwise, and particularly if there a fixed settles, a long table may be drawn up to one side. Once a chairman has taken his

Figure 11. "A convivial meeting of tradesmen" Image from Baily, Peter, (1986) *Music Hall; The Business of Pleasure* p. 3.

Figure 12. "A small dockland music and dancing hall" Image from Baily, Peter, (1986) *Music Hall; The Business of Pleasure* p. 23.

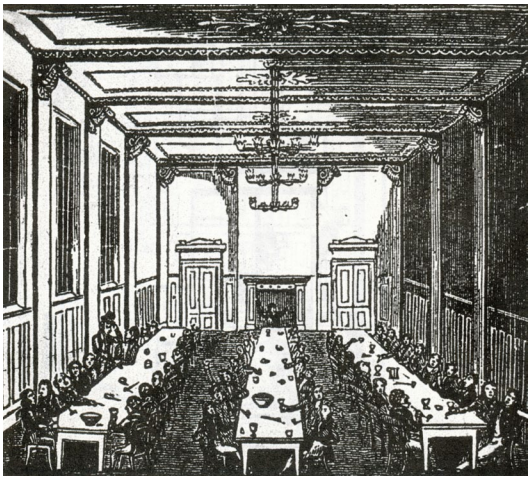

Figure 13. Cyder Cellars' Purpose-Built Supper Room. Image from Baily, Peter, (1986) *Music Hall; The Business of Pleasure* p. 14.

place and the glasses are full the entertainment may commence. (p. 2-3)

Phase 2 ...Wilkins, observing that a song has a capital effect on drink sales, knocks two rooms into one to provide accommodation for as many as may be attracted to attend... (p. 3-4)

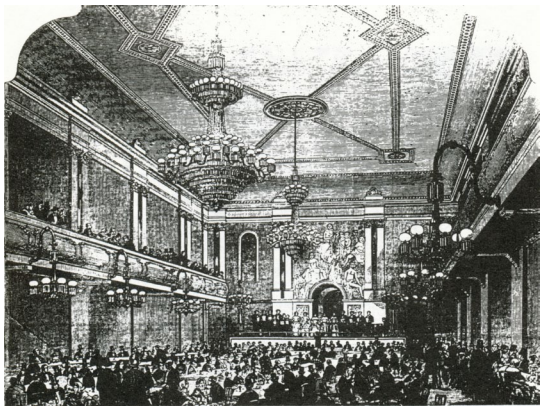

Figure 14. Canterbury Hall, "a classic phase 5 music hall". Image from Baily, Peter, (1986) *Music Hall; The Business of Pleasure* p. 18.

Phase 3 is the beginning of an evolution towards professionalism. .. Professional 'room singers' are engaged who work a number of such establishments...The professional singers have actor's skills and their character impersonations need to be seen as well as heard. Wilkins provides a low dais for the purpose, alongside the singer's table. The Swam still has no purpose-built room, but it is a proto-music hall. (p. 4)

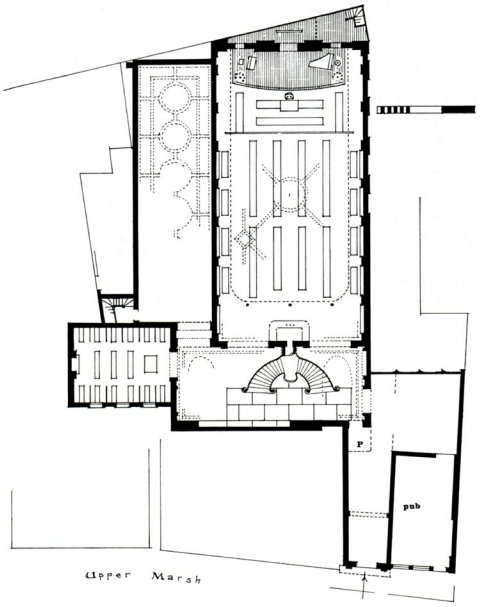

Figure 15. Plan of Canterbury Hall. Image from Baily, Peter, (1986) *Music Hall; The Business of Pleasure* p. 17.

[Phase 4] ...Wilkins sees profit in going farther along this road and, following the example of others, he knocks down his skittle shed and back yard urinal [and] puts up a purpose-built hall covering the whole of what was once the pub garden... The new hall is a plain, oblong room with a fireplace on either side, an open platform across one end and a little balcony at the other end. No architect has been involved...Before the concert room is a year old, Wilkins is engaged in buying two or three houses adjoining the Swan in order to obtain additional backland. (p. 4-5)

Phase 5 ...The 'grand music hall' has arrived. Wilkins, running with the leaders of the race, employs an architect to design an enormous new room, several times bigger than (but entirely concealed behind) his pub. The architectural precedents for a performance room of this kind are not difficult to find. A galleried church has similar requirements of audibility and visibility - but the mid-century music hall also

has much in common with the grad ballrooms and polite concert rooms...
we have now arrived at a new building type. Disused and stripped of its furnishings it could, as we have already observed, be taken for a ballroom or respectable concert hall. But this is a true music hall, a huge supper room in which the principal source of income is the sale of liquor..(p. 5-6)

[In phase 6]... he reduces the number of tables and corrals them into half of the flat-floored auditorium. An 'area' like a theatre pit, with rows of bench seats, fills the rest of the space. This not only increases the notional capacity but also has a beneficial effect on total evening attendances, since the benches, like the promenade, accommodate stays of varying durations. Many people 'drop in' to the music hall during the course of the evening. There is good value to be had in any sampling of the programme, however brief. (p. 8)

[Phase 6a] ...The supper tables disappear, to be replaced by comfortable stalls seats. Mahogany bar counters with beer pumps and rows of bottles remain in the auditorium for the time being, but pressure from the licensing authority will eventually force drinking out of the auditorium and into separate bars. There is still a promenade, but the greater part of the audience will probably remain seated, as at a theatre, for the whole of the advertised programme. The chage seems logical but it is

Figure 16. Oxford Hall, "climax of the grand music hall". Image from Baily, Peter, (1986) *Music Hall; The Business of Pleasure* p. 25.

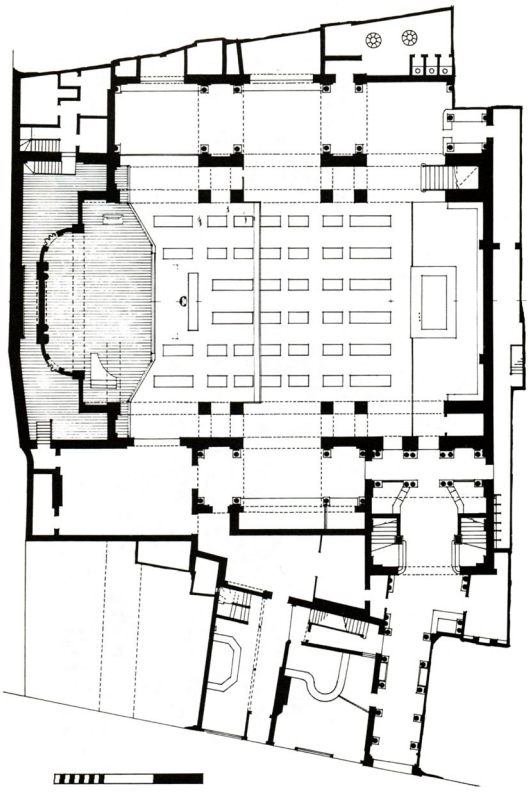

Figure 17. Plan of Oxford Hall. Image from Baily, Peter, (1986) *Music Hall; The Business of Pleasure* p. 24.

> mistaken. The 'improved' hall is an uncomfortable hybrid. A rectangular flat-floored room with long side balconies is far from ideal for the ever more ambitious stage scenes now being attempted. The audience begins to dwindle. (p. 8)
>
> [Phase 7] The local Empire Palace, which has already given its name to a tram stop, belongs to a different world. Magnificently enriched, with comfortable tip-up seats and padded gallery benches, it offers an excellent view from any part of the house. With this development we have reached the end of the road. No further evolution is to be looked for, since the building types appropriate to the rival entertainments, theatre and music hall, have converged. This is in fact a theatre in all but name and programme. The stage is equiped like a theatre stage for any kind of performance. The audience for the twice-nightly entertainment is as static as a theatre audience. Standing is permitted but promenading in the old sense is not encouraged. The bars are separated from the auditorium and there is neither viewing from the one nor drinking in the other. The practice of lowering the house lights is becoming universal. And this is, perhaps the most telling evidence of what has happened to the music halls. They have turned their backs on their own most durable tradition. They are no longer brilliantly lighted rooms where friends meet to drink and listen to a song. They are theaters where audiences assemble to be entertained.(p. 9)

We can see from this history that in the evolution from the informal to the purpose-built, the Swan lost its initial social vibrancy and liveliness. Ultimately, neither the owners of the Swan nor the musicians and entertainers that played their benefited from the loss of patrons that accompanied the more "professional" nature of the performance space in its later stages. Clearly, there was a point at which the Swan began to evolve into a place that was less accommodating of the hybrid function of performance and socializing. Peter Baily seems to feel that this change occurred around phase 6a, with the replacement of supper tables with stall seats and the segregation of bar and performance space. This well-meaning architectural act had grave implications for the success of the Swan and serves a cautionary tale for the designer of the small performance space. There seems to be a necessary degree of informality and programmatic bleeding between performance and social spaces for a"critical mass" of vibrancy to occur. It is this vibrancy that niche and emerging artists can most benefit from, with the attendant opportunities to expand the fan base and reach out to new audiences. And so the social nature of a performance space can be very dependant

upon the architecture of the space and the degree to which it is "purpose built". Allowing for at least some programmatic bleeding between social and performance areas as well as providing areas for "promenadading" seem to be necessary ingredients for a successful performance space for niche and emerging artists.

CHAPTER II

ARCHITECTURAL CASE STUDIES

A. Mobile Performance Spaces Considered

If we are to reduce the act of performance to its most basic elements, we are left with performer and audience alone. A physically manifested performance space is not at all a requirement. Before examining architectural case studies of physical performance spaces, it is useful to consider the idea of performance spaces that are not fixed to any one geographic location. Musicians, actors, comedians and other performers have a long tradition of "venueless" traveling performances. In America, tent shows began in the late 1800's and "by 1927 the New York Times estimated that 400 tent theatre companies had visited 18,000 communities and played to 76,800,000 customers while 500 legitimate theatres across the U.S. had played to only 48,000,000 customers." (Wikipedia, 2011) Early folk music performances were often package affairs with multiple musical and comedy acts. These package shows persisted well into the Twentieth Century, and as the automobile supplanted the railroad, and as more roads and highways were built, more and more towns became possible tent show hosts. Bluegrass music pioneer Bill Monroe, who ended up investing in his own tent and equipment, made tent shows a substantial part of his early touring career. Traveling in a 1941 Chevrolet stretch limo, Bill Monroe and his Bluegrass Boys toured almost constantly in the 1940's (Smith, 2000).

Figure 18. Bill Monroe and his Bluegrass Boys. Photo from Smith, Richard (2000), *Can't You Hear Me Callin'*.

At its peak, Bill Monroe's tent show was a marvelous enterprise, not simply a band under canvas

> but a circuslike total entertainment experience. The advance person was first in town, getting the necessary permits, renting a field or lot, putting up posters and window cards, and taking out newspaper ads. About sixty-five dollars would cover it all, and to Monroe it was money well spent. ' After you got a lot permit for the show, there was nothing anybody could do to give you any trouble,' he said. 'It was like owning your own house, until you left the next day.'
>
> The crew soon arrived to set up the tent and the concession stand, lights, sound system, and generator. In addition to the stretch limo, the show had five separate trucks to haul the tent, the tent poles, the seats and bleachers (nearly a thousand seats in all), an electric generator, and a rolling kitchen. Of course the procession drove through each new town to promote the show. (Smith, 2000, p. 69-70)

The tent show had as one principal advantage the fact that all that was required was a vacant lot. Thus, small or remote towns that could not otherwise support a purpose-built performance hall could host travelling performers. Although there was the added work of promoting, setting up and striking a tent show, for the musician, not having to depend on a network of disparate venues had its advantages. It was the difference between "owning your own house", as Bill Monroe put it, or just renting for the night, as was -and continues to be- the standard venue-artist arrangement.

With the advent of amplification and the public address system, the tent show was cut loose from the moorings of the limits of natural sound travel. Amplification introduced the notion of scalability since one could play to tens or tens of thousands, simply by adding or subtracting equipment. While the physical manifestation of the tent may have given way - housing tens of thousands under one tent is not practical - the 1950's and 1960's saw the spirit of the tent show incorporated and transformed into the outdoor music festival. Event promoters realized that they could host tens -even hundreds- of thousands of music fans and make a substantial profit in the process. Festivals such as the

Figure 19. Bob Dylan at the Newport Folk Festival. Photo from: http://abraxas365dokumentarci.blogspot.com/2010/02/bob-dylan-other-side-of-mirror-2007.html

Newport Folk Festival, the Monterey Pop Festival and Woodstock made their mark on musical - and cultural - history during these decades and many of the festivals that originated in this time period continue today. Modern day variations like the Coachella and Bonnaroo music festivals continue to draw many tens of thousands of attendees, putting the lie to the notion that the internet is degrading live performance. What has been lost in the newer incantations of "venue less" live performance, is the itinerant and travelling nature of the earlier shows. Events that draw 75,000 attendees must be planned months, or years, in advance and not just any vacant lot can host such an event. By their nature they are fixed in geography and their names often reflect their locations. Modern day traveling performers, whether they are "long tail" or marquee acts, rely on "fixed" performance spaces, be they indoor or outdoor.

The tent or mobile performance space continues to fascinate architects, however, even if the current practical implementation of such "structures" is dubious. Zaha Hadid, in her mobile JS Bach Chamber Music Hall, incorporates a translucent white fabric ribbon wrapping around itself to define a space for performers and audience. The fabric membrane is stretched over a steel framework with a highly tensioned effect on the exterior of the space and a soft, billowing effect on the inside (AI Archinnovation, 2009). It should be noted, however, that this structure was intended to be erected in a large indoor space (the original installation was in a gallery space) and is not a "tent" in the truest sense of the word. Acoustically, the baseline response of the gallery into which the tent was to be installed was analyzed by the

Figure 20. Zaha Hadid's J.S. Bach Chamber Music Hall. Photo from Tuvie.com.

acousticians Sandy Brown and Associates, and solutions to enhance the acoustics were devised. Due to the nature of Bach's intricate music, reverberation times of 1.4 to 1.7 seconds are considered optimal (AI Archinnovations, 2009). The existing room had a high ceiling with a large void behind it that provided a fair amount of baseline acoustic absorption. It would be necessary to not add too much additional absorption to the space to avoid overly dry acoustics and this impacted the choice of materials for the tent. A lightweight synthetic fabric with a density of 150 gm/m2 was selected for its ability to provide the flowing, sensual shape desired by Hadid while minimizing acoustic absorption (AI Archinnovations, 2009). In project acoustician Mark Howarth's words:

> The shape of the frame and fabric acts to scatter sound reflections between parallel walls within the gallery to eliminate flutter echoes and provide a more even diffuse sound for audience members. Around the stage, specially shaped acrylic reflector panels have been carefully positioned and hidden within the fabric of the installation. These are designed to reflect sound with a short delay back towards the performer and out towards the audience to increase the clarity and strength of the music while maintaining the reverberant response of the room. (AI Archinnovations, 2009)

Thus, the "tent" was a clever way to provide a liquid and dynamic space within a space while improving the acoustics of the host space. In Zaha Hadid's words "The design enhances the multiplicity of Bach's work through a coherent integration of formal and structural logic. A single continuous ribbon of fabric swirls around itself, creating layered spaces to cocoon the performers and audience with an intimate fluid space."(Tuvie, 2011) While the notion of modern architecture "enhancing the multiplicity of Bach's work" is a little specious, the notion of a structure within a structure is appealing and, in theory at least, this admittedly

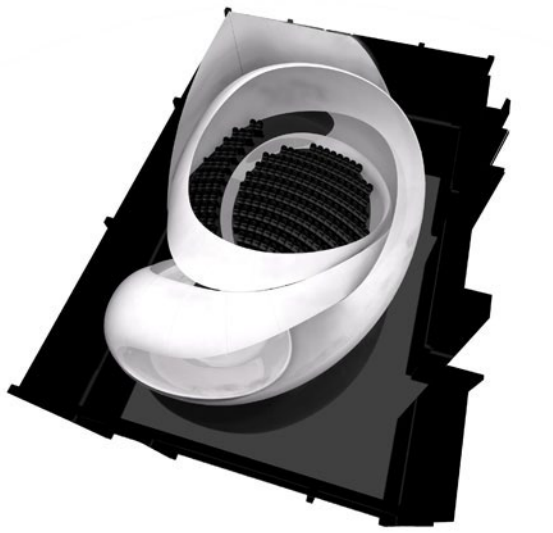

Figure 21. Computer Rendering of J.S. Bach Chamber Music Hall. Image from Tuvie.com.

visually striking structure is mobile. It was purpose-designed for a particular room, however, and it is unclear how successful it would be, from an acoustical perspective, in other rooms with different baseline acoustical characteristics. A traveling performance space within a space with adjustable acoustic qualities could have practical uses for the many sub-par performance spaces that are, essentially, indoor "vacant lots". However, without a good working knowledge of acoustics and some means to analyze existing spaces, it would be difficult for the average traveling musician to manage such a complex undertaking. It would seem that relying on the acoustics of a "fixed" indoor venue is the only practical option for most travelling performers.

With outdoor spaces, there is still the possibility, in theory at least, of bringing your own "hall" with you. Norwegian based Various Architects, designed a large mobile performance venue(MPV) that could almost be called a mobile stadium. Intended to hold 3500 standing occupants, it would be the largest mobile performance space ever built (Various Architects, 2009). To date, however, it has not made it past an initial partial mock-up phase. An inflatable exterior skin of open hexagons wraps around a closed volume that defines the performance space that houses five large screens and a centrally located stage. A six meter tall bicycle wheel truss provides lateral stability and support for two interchangeable roof coverings, one of mesh for shade and one of PVC for rain protection. It is intended to fit in 30 standard shipping containers and is estimated to take two weeks to erect and one week to disassemble. The structure is modular and can be configured in several sizes ranging from 1500 to 3900 square meters. The inflatable skin and light-weight

Figure 22. Mobile Performance Venue. Image from Variousarchitects.no

structure are intended to decrease shipping weight in an effort to reduce carbon foot-print (Basulto, 2009). Clearly this is not a structure for "long tail" or do-it-yourself independent performing artists. The cost and logistical coordination required to tour with such a structure limit its use to upper tier artists and promoters, and even a smaller scale version of the MPV would likely be beyond the resources of the average band or theater group to manage on their own. Even someone as physically vigorous as Bill Monroe eventually gave up the tent show business and stuck to ready-made venues. Package shows, under the umbrella of a promoter who would have the time and resources necessary for such and endeavor, would seem to be the only way for niche or emerging artists to tour in anything other than "fixed" venues. The mobile performance space continues to hold the imagination of architects, though, for obvious reasons. Additionally, the continuing disappearance of small and medium sized clubs and performance spaces may force emerging artists to take matters into their own hands at some point, and some variation of the tent show could become necessary, if not entirely practical. For this, and other reasons, continued architectural explorations of mobile performance spaces are worthy and necessary.

B. Large Performance Halls

As iconic structures and as sources of civic pride, large performance spaces have often enjoyed - and continue to enjoy - lavish budgets, allowing for ground-breaking architectural experimentation. As such, large halls have at times been drivers of architectural technology change. In *The Architecture of the Well Tempered Environment*, Reyner Banham (1984) notes that

> There were, in practice, few situations where simple human comfort offered a profit margin proportionally large enough to make investment worth-while, and large enough in absolute terms , too, to make investment possible, given the plant then available. Hotel dining rooms and ball-rooms came within this class, as did Pullman cars and -above all- theatres. The concentration of large audiences in places of entertainment - where they will normally expect to be made comfortable as part of the service for which they have paid - has always posed extreme environmental problems. (p. 175)

And so the theater has had a tremendous impact on the development of environmental management technology, from heating and air-conditioning to lighting and acoustics. Transporting audience members, both physically and metaphorically, to another environment has always been an integral part of performance spaces. Indeed, the physical transportation was often central to enticing the public to enter and be transformed as Banham (1984) notes that "Most commercial theatres also developed, at an early date, the habit of deliberately spilling some their conditioned air out of the foyer on to the side-walk, thus offering tangible proof that it was, indeed, 'cooler inside"'(p 178). The concept of using conditioned air to transport could be taken to absurd extremes as Rem Koolhaas points out in *Delirious New York* (1997) that Samuel Rothafel, owner of Radio City Music Hall, "consider[ed] adding hallucinogenic gasses to the atmosphere of his theater, so that synthetic ecstasy can reinforce the fabricated sunset. A small dose of laughing gas would put the 6,200 visitors in a euphoric mood, hyper-receptive to the activity on stage. His lawyers dissuaded him...." (p. 210) It is important to note that not all of the technology that is employed in large performance spaces is scalable in such a way that it could also be utilized in small spaces. Nevertheless, the small performance space designer can learn much from precedents set by large, iconic halls.

1. Beyreuth Festpielhaus

The Beyreuth Festpielhaus is notable in that it is was conceived by its composer, Richard Wagner "to satisfy his own image of how a an opera house should look and sound" (Beranek, 1996, p. 231). It is perhaps the most purpose-built concert hall in the world and Wagner's final opera Parsifal was written specifically for the Festpielhaus. If, in Collin St. John Wilson's (1995) words, "the gratification of some living purpose must be the grounds of [a building's] necessity and

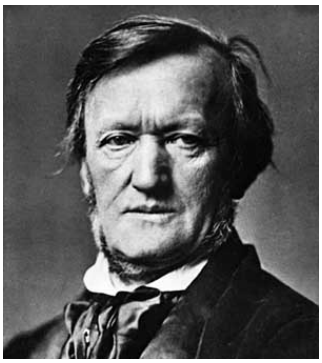

Figure 23. Richard Wagner. Photo from Wikimedia Commons

the source of its inspiration..."(p. 63) then we must judge the Festpielhaus to be a success, since it is inarguably the best place in the world to hear Wagnerian music. In Leo Beranek's (1962) words it is "a house for his music only, and his music is at its best only in that house!" (p. 243)

Seating 1,800 with a reverberation time of 1.55 seconds (Beranek, 1996), the most notable feature of the Festpielhaus is the sunken orchestra pit with a wooden cover over the violin section and conductor.

> The sunken-pit design is the center of endless controversy. One purpose of the sunken pit is to give greater balance between the singers and the orchestra. But this was not the only feature Wagner had in mind. He desired the unusual and dramatic effect of a "mystical abyss." He expected to create acoustically a mysterious sound, emanating from an invisible orchestra, with a modified, somewhat uncanny timbre (Beranek, 1996, p. 231)

The "mystical abyss" that Wagner sought is an interesting architectural manifestation of the

Figure 24. Bayreuth Festpielhaus. Photo from Wikimedia Commons.

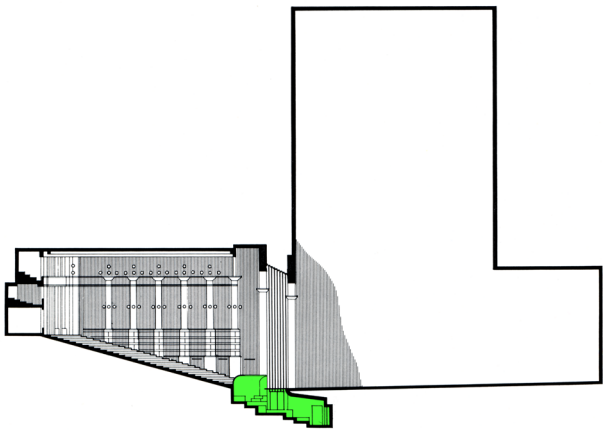

Figure 25. Cross Section of Bayreuth Festpielhaus. Image from Beranek, Leo (1962), *Music, Acoustics and Architecture*, p. 246. Altered by author to highlight orchestra pit (green tone).

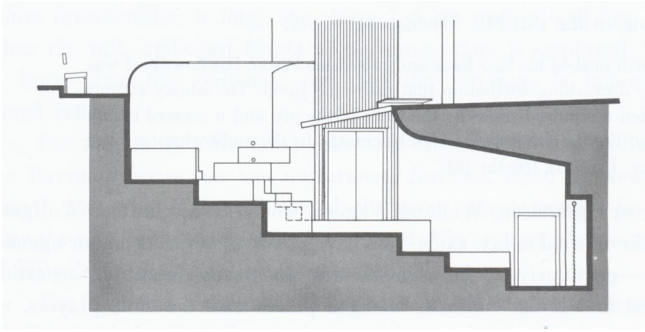

Figure 26. Cross Section of Orchestra Pit Image from Beranek, Leo (1962), *Music, Acoustics and Architecture*, p. 247.

transportative possibilities of performance. The gulf between audience and performer and the "mysterious" qualities of sound endeavor to make witnessing an opera at the Festpielhaus a transcendental experience. This is a hall that could certainly be considered maladaptive in the Brandian sense, since it is tailored to the music of one man only, yet, for fans of Wagnerian music, it is an architectural treasure. A building so specific in intention that its "purpose" - its only purpose - is to support the composer's own vision of his music. It does not strive to be anything else but a vehicle for Wagner's operas and is an example of a successful building at the extreme end of the adaptable/purpose-built continuum.

2. Boston Symphony Hall

In many ways, the story of the creation of Boston Symphony Hall is also the story of the creation of modern acoustics. When Charles McKim was commissioned by Henry Higginson to design a new symphony hall to replace the old in 1897, Wallace Sabine was a professor of physics at Harvard University. Sabine had been tasked by Harvard's President Charles Eliott to improve the faulty acoustics of the lecture hall in the Fogg Art Museum. Although not an acoustician by training, Sabine, in the manner of the experimental physicist he was, undertook a very methodical approach to measuring the reverberation time of both spaces, as well as other spaces around Cambridge and Boston. The Sanders Theater had seat

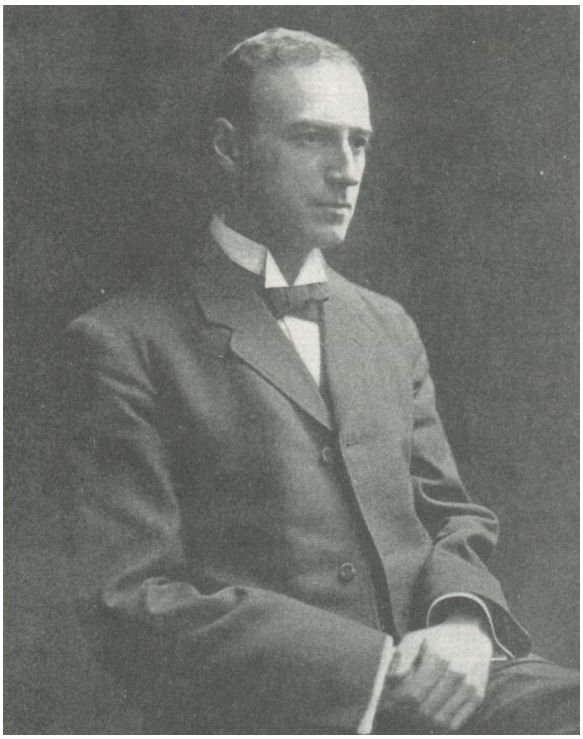

Figure 27. Wallace Clement Sabine. Photo from Stebbins, Wallace (2000), *The Making of Symphony Hall, p. 48*

cushions that functioned well as sound absorbers and had the additional advantage, for Sabine, of being easily removable. By removing the seat cushions at Sanders and carrying them across campus to the Fogg (always late at night, when the buildings were not in use and the least amount of background noise was present) , Sabine was able to measure reverberation time as a function of number of seat cushions. Sabine's late night investigations went on for two years until President Eliot's patience finally ran out. Pressed for action to fix the Fogg, Sabine prescribed sound-absorbing felt hung on various wall surfaces, a sufficient response, if not enough to bring the Fogg up to the level of the Sanders. (Thompson, 2002, p. 34-36)

In spite of his rigorous pursuit of acoustical data, Sabine clearly felt as though he still lacked a quantitative understanding of the architectural qualities of a room as they pertained to reverberation time. It was at this moment that Henry Higginson approached President Eliot for scientific advice on his new concert hall and Eliot referred him to Sabine. Sabine was initially reluctant, still feeling the limitations of his understanding of sound. However, the pressure of needing to respond to Mr. Higginson's request forced him to look at his data in a more circumspect and less detailed manner. This new perspective allowed him to see that his data, when graphed with number of seat cushions on the "X" axis and reverberation time on the" Y" axis, adhered, more or less, to a rectangular hyperbola. By discerning the hyperbolic constant, Sabine was able to construct an equation that calculated reverberation time as a function of room volume and sum of surface areas of similar absorption coefficients. (Thompson, 2002, p. 36-38)

For the first time, the reverberation time of a space could be predicted mathematically, before the space was constructed. Using the Old Boston Music Hall and the Leipzig Gewandhaus as acoustical models, (as dictated by Henry Higginson) Sabine was able to make design suggestions to Charles McKim that would ensure that the new hall would have the desired reverberation time, which ended up being 2.31 seconds. (Thompson, 2002, p. 38-45) From an acoustical standpoint, the results were a resounding success.

Boston Symphony Hall continues to rank as one of the three best sounding halls in the world by conductors. (Beranek, 1996 p. 79)

Architecturally, the hall is loosely modeled on the second Gewandhaus in Vienna, Austria. (Stebbins, 2000, p. 51-55). With dimensions of 125 feet long, 75 feet wide and 62 feet tall, it falls into company with other "shoebox" shaped halls like Amsterdam's

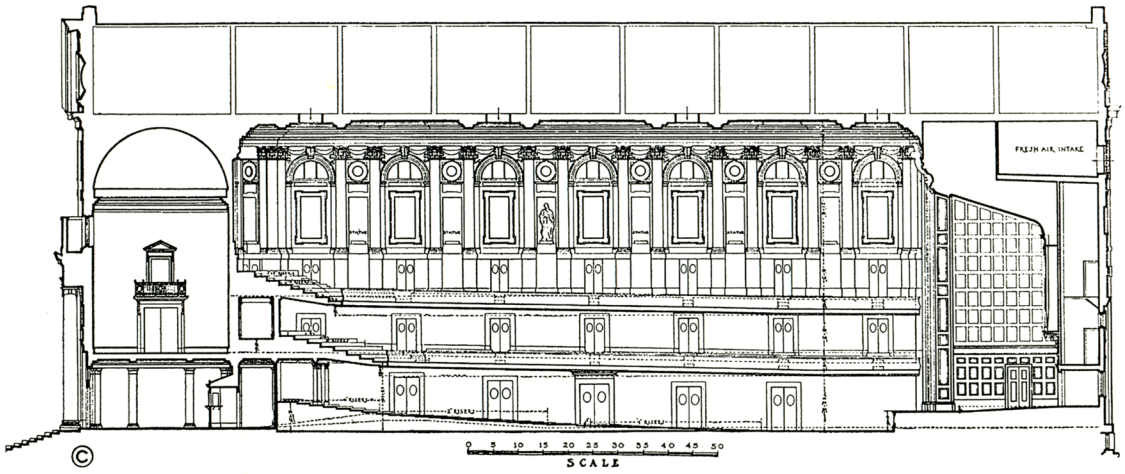

Figure 28. Longitudinal Section of Boston Symphony Hall. Image from Stebbins, Wallace (2000), *The Making of Symphony Hall,* p. 150.

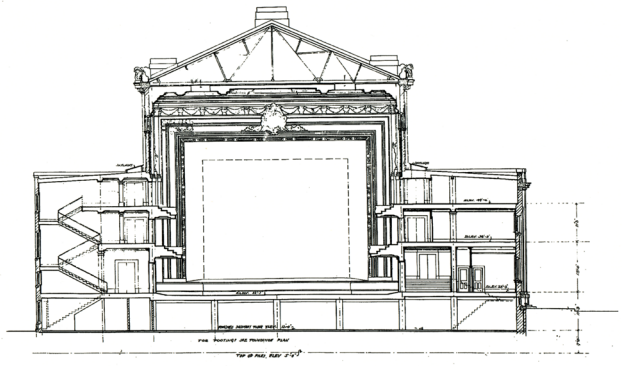

Figure 29. Transverse Section of Symphony Hall. Photo from Stebbins, Wallace (2000), *The Making of Symphony Hall,* p. 148.

Concertgebouw and Vienna's Musikverein. The construction is of brick, steel and plaster with wood floors and a high, coffered ceiling (Beranek, 1996 p. 79). As an interesting aside, being one of most highly regarded concert halls in the world, doing any sort of renovation or upkeep requires great pains to avoid ruining a good thing. In 2006, after over 100 years of use, the original concert stage was replaced. To match the same materials and installation methods as the original, three quarter inch tongue and groove

maple boards were installed over a compressed wool underlayment and hand fastened with hand cut hardened steel nails. The total cost for the stage floor replacement was $250,000. (Wikipedia, 2012)

What is interesting about Boston Symphony Hall from an acoustic standpoint is that it is, in actuality, a relatively simple structure with a simple plan and cross section. The shallow balconies, coffered ceiling and statue niches all contribute to its excellent acoustic properties, but there is no complex acoustic treatment or over-arching acoustic strategy, per se. Its venerability cannot be attributed merely to age or nostalgia, for it was considered an acoustic treasure from its opening night. Something about it just works. As the story of Sabine's involvement attests, that "something" was not haphazard or random. Clearly, when it comes to acoustics, simplicity, when properly executed, can equal or rival complexity.

From a social standpoint, The Boston Symphony hall has a couple of interesting features. During the months of May and June, the orchestra level seats can be replaced by tables and chairs for "Pops" concerts. The "Pops" concerts were originally conceived by

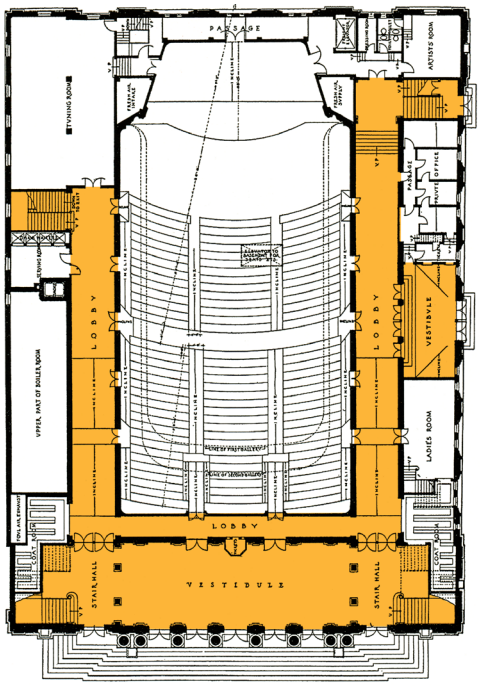

Figure 30. Orchestra Level Plan. Image from Stebbins, Wallace (2000), *The Making of Symphony Hall,* p. 146. Altered by author to highlight social spaces (orange tone).

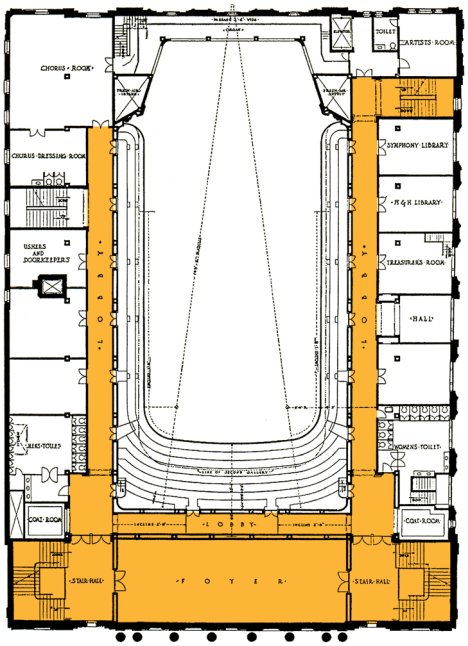

Figure 31. Balcony Level Plan. Image from Stebbins, Wallace (2000), *The Making of Symphony Hall,* p. 147. Altered by author (orange tone).

Orchestra founder Henry Higginson in 1881 as a way to present Boston with "concerts of a lighter kind of music" (Wikipedia, 2012). The use of tables and chairs in place of the orchestra level seats brings to mind the Music Hall of continental Europe, and allows for a more social and informal atmosphere than the traditional fixed-seating arrangement. Architecturally, "the amenities of Symphony Hall were thus enriched by the creation of two separate locales for promenading and social intercourse: the Hatch Room, originally known as the "Vesitbule", at orchestra level; and the Cabot-Cahners Room, replacing McKim's intended "Foyer," at first balcony level"(Stebbins, 2000 p. 68). These dedicated spaces for "promenading" are a recognition by Higginson of the importance of the social aspect of performance events and an architectural contribution to the "event of performance" that goes beyond the actual performance hall.

Figure 32. Boston Pops Sketch from Boston Harold, May 6, 1902. Image from Stebbins, Wallace (2000), *The Making of Symphony Hall,* p. 101.

3. Berlin Philharmonic Hall

Hans Scharoun's Berlin Philharmonic hall, dedicated in 1963,is notable for its pioneering use of the "vineyard" style stage and seating configuration, which arranged the seating in ascending terraces as opposed to the traditional "layer cake" arrangement of floor and balcony seats.

Figure 33. The Berlin Philharmonic Hall. Photo from: http://en.academic.ru/pictures/enwiki/66/Berlin_Philharmonic_rehearsing.jpg

The over arching theme, according to Scharoun, was "music in the center" that situated a stage in the "valley" of the hall with seating on all sides. As a result, 250 of the halls 2,215 seats are directly behind the orchestra and 350 are on either side. This arrangement allows for a scenario in which no audience member is more than 100' away from the stage, as opposed to 133' at Boston Symphony Hall (Beranek, 1996, p. 245). It is this strong desire, on Scharoun's part, to connect audience and performer and to eradicate, as much as possible, the distinction between good and bad seats, that most distinguishes the Berlin Philharmonic. It has been called the world's first socialist concert hall (Jones, 1978, p. 36), and Scharoun's own words on the subject lend some weight to this assertion:

> Here you will find no segregation of 'producers' and 'consumers' but rather a community of listeners grouped around an orchestra in the most natural of all seating arrangements. Thus, despite its size, the auditorium has retained a certain intimacy, enabling a direct and co-creative share in

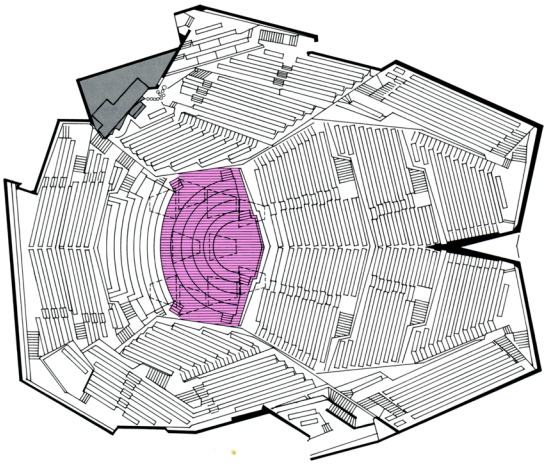

Figure 34. Auditorim Plan. Image from Beranek, Leo, *Concert and Opera Halls; How They Sound,* p. 247. Image altered by author to hightlight the stage.

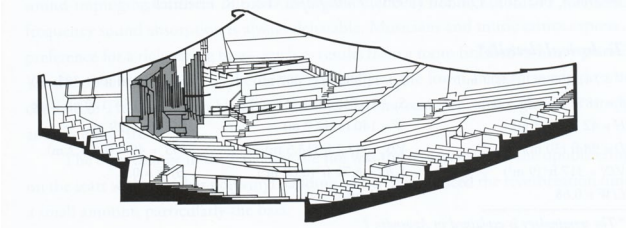

Figure 35. Section Through Hall. Image from Beranek, Leo, *Concert and Opera Halls; How They Sound,* p. 247.

Figure 36. "Music in the Center." Photo by Mark Allan.

> the production of music. Here the creation and the experience of music occur in a hall not motivated by formal aesthetics, but whose design was inspired by the very purpose it serves. Man, music and space - here they meet in a new relationship (Jones, 1978, p. 36).

Sharoun's earnest and well-meaning notions of connecting performer and audience is very much at odds with Wagner's desire to maintain a "mystic gulf" between audience and performer. The experience of being "transported" has always been an important aspect of performance and maintaining a separation between performer and audience can be thought of as a form of stagecraft to encourage the "dream-like" qualities of performance. On the other hand, in our digital age, being transported comes cheaply, and intimate human contact comes at a premium. Perhaps "hyper-reality", such as experiencing a performance in a space as ordinary as a living room, is the new transcendentalism. Ultimately, though, intimacy and ordinariness are two entirely different things that need not be co-dependent.

Clearly the Berlin Philharmonic is no "ordinary" space. Notions of egalitarian intimacy aside, Scharoun did not create a space that is bereft of grandiosity or spectacle. And, in a manner that is very important to performance spaces for niche and emerging artists, Scharoun sets up a notion of performance that also includes the audience as spectacle. Quoting Werner Sewing (2004):

> In the opulent foyers, which give access to the hall via three complex interwoven levels, this basic social motif is newly orchestrated in space by means of ramps, landings and cascading staircases. Even more strongly than the concert hall, which concentrates the senses, the abundance of viewing perspectives here makes

Figure 37. Photo of Foyer Photo from http://www.contexttravel.com/blog/

> movement through space into a public appearance, a social event. An almost Baroque delight in space transforms the audience into performers. (p. 45)

Here is an acknowledgement, made crystalline, that the actual performance is only part of the event of performance. The arrival, the finding of seats, the intermission, the leaving, these are all critical aspects of the overall event, of which the actual performance is only a piece. In many respects, the staging of social interaction at a performance is as important as the staging of the actual performance and Scharoun's attention to this matter deserves special mention. In the case of orchestral music, the delineation between performance space and "foyer" or "ancillary" space is quite stark, out of necessity, since no amplification of music is involved and a silent audience is imperative. However, in the case of many modern, hybrid spaces, the delineation between "performance space" and "social space" is very fluid, if it exists at all. Regardless, even though the Berlin Philharmonic is of a different scale and serves a limited variety of music, there is much to be gleaned from Scharoun's design of the foyer.

In plan, the shape of the hall seems

Figure 38. Ground Floor Plan. Image from Jones, Peter, *Hans Scharoun* p. 37. Image altered by author to hightlight social space.

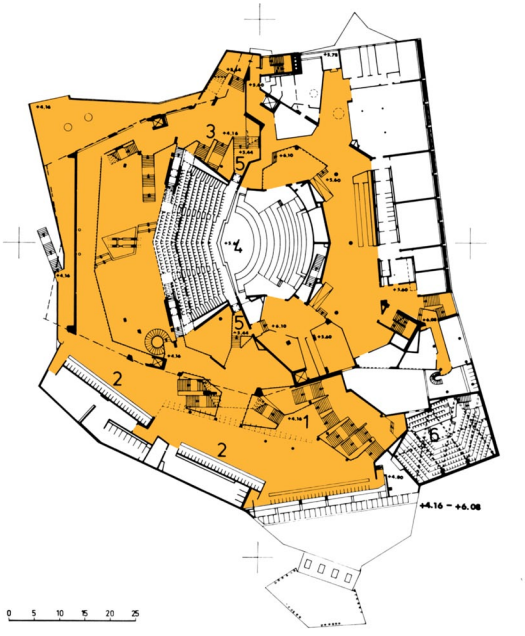

Figure 39. Upper Foyer Plan. Image from Jones, Peter, *Hans Scharoun* p. 37. Image altered by author to hightlight social space.

quite complex and arbitrary. In fact, the shape is very functional and confers many acoustic advantages, including a lack of parallel surfaces that would encourage standing waves and flutter echoes (Jones, 1978, p. 39) Scharoun elaborates:

> The construction follows the pattern of a landscape, with the auditorium seen as a valley, and there at its bottom is the orchestra surrounded by a sprawling vineyard climbing the sides of the neighboring hills. The ceiling, resembling a tent, encounters this 'landscape' like a skyscape'. Convex in character, the tent-like ceiling is very much linked with the acoustics, with the desire to obtain the maximum diffusion of music via the convex surfaces. Here the sound is not reflected from the narrow side of a hall, but rises from the depth and centre, moving towards all sides, descending and spreading evenly among the listeners below. Every effort was taken to transmit the sound waves to the most distant part of the auditorium by the shortest possible route. The diffusion is also served by the refraction of the auditorium walls, and the multi-leveled, heterogeneous arrangement of the 'vineyard terraces'.(Jones, 1978, p. 36)

The terraces, each seating around 300, further serve to break the hall into orchestra-sized chunks and aid with circulation, as each terrace has its own exit to the foyer (Jones, 1978, p. 38). Much attention was paid to the absorption of lower frequencies to balance the acoustic absorption of the higher frequencies by the upholstered seats and the clothing of their occupants during a performance. The bass frequency absorption was achieved by the use of 136 pyramid shaped combination sound-diffusing, low frequency Helmholtz resonators.(Beranek, 1996, p. 248) The result is "a commendable clarity of sound has been achieved without deadness; that dry lifeless quality which characterizes some of the less successful modern concerts halls has been completely avoided." (Jones, 1978, p. 39) The fully occupied mid-frequency reverberation time is 1.9 seconds. (Beranek, 1996, p. 245)

The strategy of balanced sound frequency absorption, like that employed by the Berlin Philharmonic, is of critical importance for smaller performance spaces that feature a wide variety of musical styles. Low frequency absorption is often passed over in acoustic treatment strategies, due to the necessity of more complex (and expensive) acoustic devices, such as Helmholtz resonators. Unfortunately, low frequencies are usually the most troublesome in smaller to mid-size rooms so acoustic treatment strategies that leave them out neglect a critical part of overall room acoustics. Similarly, the attention paid to the

ancillary public spaces will be critical in any scheme that combines social and performance programmatic functions. Providing an architectural framework for patrons to socialize, and to see and be seen serves to benefit performance spaces and to potentially enhance the place that performance has in contemporary society.

4. The Margot and Bill Winspear Opera House

The Margot and Bill Winspear Opera House, part of the AT&T Performing Arts Center in Dallas, Texas is, as the name implies, intended to function primarily as an opera venue. Designed by Foster + Partners, the theater employs a traditional horseshoe configuration. Established in Venice by Carlo Fontana 300 years ago, the horseshoe has been associated with excellent sounding opera halls ever since. "Strength, intelligibility and warmth" were the desired acoustical qualities, according to Bob Essert of Sound Space Design, the project's acoustician (Gonchar, 2010, p. 57). Clarity and intelligibility of spoken or sung consonants, necessary for opera, require evenly dispersed sound in the frequency range of 3,000 to 6,000 Hz. Wavelike relief patterns on balcony fronts and slightly convex surfaces were employed to help achieve this desired diffusion (Gonchar, 2010, p. 57). Although intended primarily for opera, like most modern performance spaces the Winspear also hosts amplified performances. In these cases, the carefully sculpted "strength,

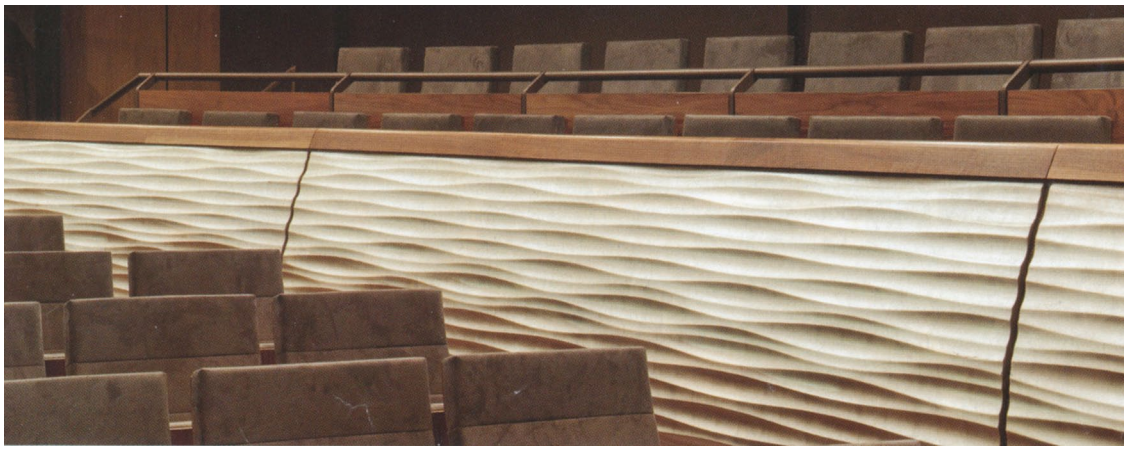

Figure 40. Patterned Balcony Fronts at Winspear Opera House. Photo from Architectural Record (2010, February).

intelligibility and warmth" would become a liability, resulting in a washed-out, reverberant mess. To accommodate these types of performances, the Winspear is equipped with retractable banners that follow the curve of the perimeter walls. These banners function as acoustic absorbers and, in theory at least, allow the reverberation time of the hall to be shortened and a "dryer" overall acoustic effect produced (Gonchar, 2010, p. 57). In practice, however, as evidenced by Foster's garbled comments on opening night, some fine-tuning may be required to accommodate amplified sound. (Newhouse, 2010). Acoustic banners or curtains, usually of velour or similar material, are an extremely common acoustic device used whenever absorption is called for. Their relatively low cost and ease of retraction have made them a "go to" adjustable acoustics device for decades. As absorbers, though, their performance is uneven, allowing excellent absorption of higher frequency sound but, below 500Hz, being much less effective (Everst and Pohlmann, 2009). This lack of low-frequency absorption makes their utility in smaller performance spaces more limited, as bass frequencies are particularly problematic with smaller room geometries. For this reason, care must be used in "scaling down" acoustic treatment strategies from large halls to small.

A strategy that is much more scalable, though, is one that promotes engagement of a performance space with the surrounding community. To this effect, the Winspear has sliding glass panels running the length of the east side of the lobby, allowing visitors to the restaurant and cafe to sit or mingle outside, thereby animating the streetscape and - hopefully - attracting crowds of non-theater goers (Newhouse, 2010, p. 52).

Figure 41. Opened Lobby of Winspear Opera House. Photo from Architectural Record (2010, February).

5. The Dee and Charles Wyly Theater

Also a part of the AT&T Performing Arts Center is the Dee and Charles Wyly Theater, designed by REX/OMA. The Wyly is a performance space so adjustable as to become, essentially, a "machine for performance"(Dillon, 2010, p. 61). The entire performance space, including stage and balconies, is configurable, allowing for a great degree of flexibility with a minimal amount of labor. Equipped with numerous winches, pulleys, lifts, tracks and numerous storage spaces in the floor and ceiling, the hall can be configured as a proscenium stage or thrust stage, balconies can be retracted into the ceiling, or the entire room can be configured as a flat-floor space, all within a matter of hours and with a handful of stage

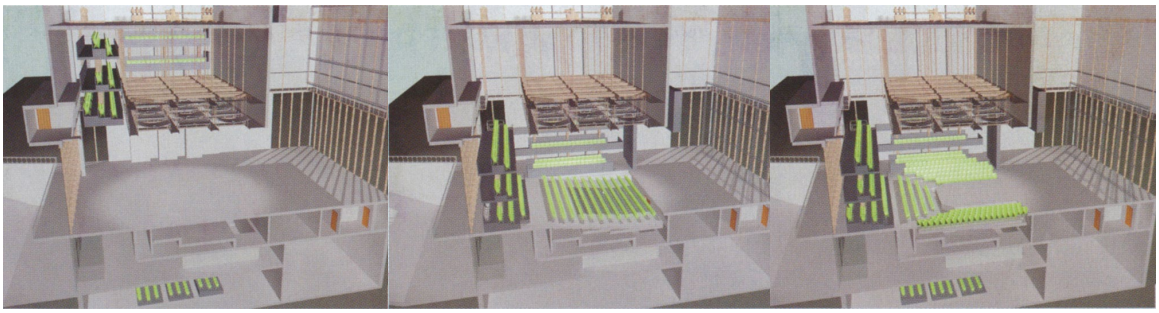

Figure 42. The Wyly Theater Can Be Configured as a Flat Floor, a Thrust Stage or a Proscenium Stage. Images from Architectural Record (2010, February)

hands (Gonchar, 2010, p. 66). This degree of configurability allows artistic directors to exercise a great degree of control over their performances, as opposed to having the performance space dictate matters, as has traditionally been the case. Drama productions place a high value on the intelligibility of speech, so shorter reverberation times in the range of 0.8 to 1.4 seconds are desired (Gonchar, 2010, p. 57). A side effect of the extreme configurability of the hall was the lack of fixed surfaces to which to apply acoustic treatment. Ultimately, the ceiling proved to be best place for such treatment and smooth fiberglass acoustic panels with a curved profile serve as the principal means of acoustic treatment. Keeping unwanted noise out was also critical in this busy part of Dallas. Specially designed insulated glazing units, featuring sandwiches of different thicknesses of glass, a 1" air space, and an acoustical interlayer bring the STC rating up to 50, compared to

35 for typical insulated glazing units. Pneumatic gaskets, inflated by a compressor, seal the 20'x27' operable glass facade panels, helping to mitigate outside noise (Gonchar, 2010, p. 66). Although the acoustics are minimally adjustable, if at all, the intended principal use for the hall, drama, is relatively uniform in its acoustical needs. It's unclear how the Wyly performs acoustically with musical or amplified program material. The reason the Wyly has already become a bench-mark for adjustable performance spaces, though, is just how centrally and critically adjustability forms the thematic guiding design element. These are not devices applied after the fact, they are integral and a part of the building's DNA. The programmatic arrangement is vertical, with the theater at the street level and all other programmatic elements either above or below. Structurally, the Wyly is supported by six perimeter concrete supercolumns, four of which are inclined, and a concrete shear wall. The super columns and shear wall are girdled by a belt truss which encompasses levels four through seven (Gonchar, 2010, p. 66). All of this serves to provide a ground floor performance space with no interior columns and little perimeter structure "allowing the blurring of audience and stage, inside and out" (Gonchar, 2010, p. 66). Further facilitating the blurring of inside and outside are the previously mention insulated glazing units. These glazing unites make up the glass facade that surrounds f the performance space on three sides, allowing for a visual connection to the streetscape when the black-out shades are retracted.

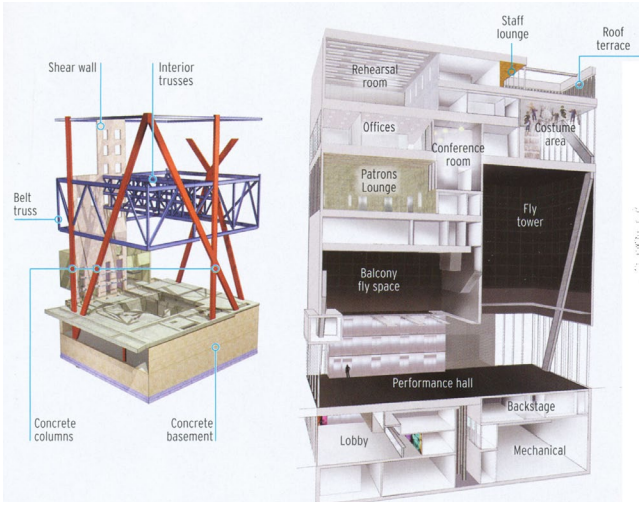

Figure 43. Structural and Programmatic Diagrams. Images from Architectural Record (2010, February).

The concept of a "performance machine" has the potential to be scalable. Many of the techniques and guiding principles employed in the Wyly could be used to good effect in a

smaller performance space. Additionally, the vertical programmatic arrangement has many interesting qualities, like a natural separation between "front of house" and "back of house" program spaces. Perhaps the weakest aspect of the Wyly is the placement of the lobby below street level. Although this allows for a direct visual connection between the street and performance space, it seems likely that the black-out shades would be drawn during performances more often than not. The resultant price paid for not having lobby spaces that can animate and spill out into the street is very steep. David Dillon describes the street to lobby to performance space circulation route as "chutes and ladders" (Dillon, 2010, p. 61). In many ways, though, this theater is a laboratory for new ideas in performance and performance spaces, and the means justify the end.

C. Modern Small Performance Space Typologies

It will be useful to acquaint ourselves with the sorts of small performance spaces that currently cater to the niche and emerging artists. Based on the author's experiences as a travelling musician, there exists three basic types of small performance spaces in contemporary America. Bearing in mind that these typologies are not iron-clad and reside on a continuum in reality - with many spaces that straddle more than one category - this list provides us with a useful starting point for understanding the role that architecture and design might play in the crafting of modern performance spaces.

1. The Purpose-Built Performance Space (Attentive Space)

The primarily function of this space is as a music venue, with little or no patronage on non-performance nights. Being "purposeful" music venues, these sorts of clubs are optimized for performance, with proper stages, acoustic treatment, lighting and dedicated sound engineers. There are often "green rooms" and back-of-house spaces that can make a performer's life infinitely easier. The audience has usually paid to be in attendance and so these are primarily attentive spaces with socializing being a secondary function. The obvious

benefit is that the performer does not have to compete for the attention - or play over the talking - of patrons. The downside is that the band - and club- depend entirely on the band's "draw" for attendance, since the music-only nature of these venues keeps a built-in crowd from forming . For performers that are relatively new or from out of town, it can be very difficult to bring out a critical mass of people and playing to empty rooms is always a demoralizing and counter-productive experience for both performers and club owners.

2. The Incidental Performance Space (Social Space)

There are a seemingly infinite variety of venues whose function as a performance space is incidental or complementary to their primary function, which is usually to sell alcohol and/or food. These spaces are rarely optimized for performance and so stages are often non-existent or poorly situated, acoustics and lighting are poor, and back-of-house spaces are shared with bar or restaurant spaces, if they exist at all. The obvious downside to playing these types of spaces is bad sound, talkative, inattentive audience members, and overall bad logistics. The upside, however, is that for performers willing to tough it out, these venues are social spaces, and usually have a built-in crowd. As a performer, the chance to expand an audience is always greater when there is a larger audience in attendance, even if they are not there expressly for the performance. The need to animate performance spaces with social functions is not limited to small performance spaces. As we have seen, new opera and symphony halls go to great lengths to include social programmatic functions like restaurants and bars to animate their foyers and streetscapes.

3. The House Concert (Intimate Space)

The house concert, although not a new invention, has become increasingly popular in recent years. Lovers of music host musical acts in their houses or places of business and either charge admission or operate on a membership basis. Usually occurring in a space like someone's living room, these performances are very intimate, with a strong connection between audience and performer. Since many house concerts do operate on a membership

or subscription basis and performers are usually offered guaranteed remuneration, audience turnout is less of a concern. And since the audience came to hear music, they are also attentive spaces. Still, most people's living rooms, while intimate, are not optimized for acoustics and this model is not as useful for very electrified or loud bands. Also, house concerts are not really public, per se. They may be open to the general public but they are not public houses. Like modern-day salons, house concerts are somewhat cliquish, in that music host and music guests usually run in the same social circles. There is a whiff of patron-client feel to it that certainly has its advantages for all parties involved, but in the interest of incubating performers, taking the random "socialness" out of the equation can limit the outreach potential of live performance, rather like preaching to the converted. After weeks of playing in dirty, noisy bars, though, preaching to the converted can feel mighty fine, so it's no surprise that house concerts are gaining in popularity with bands and live music lovers. It's worth considering, however, that part of the reason for the resurgence of the house concert is the premium that the digital age has put on intimate human contact.

It would seem that an idealized small performance space would incorporate the advantages of all three typologies and mitigate the disadvantages. The design problems (and potential solutions) raised by grappling with social, attentive and intimate programmatic coexistence are not limited to performance spaces and the issues relating to acoustics, lighting and space planning are applicable to any and all architectural projects.

D. Conclusions

The degree to which a performance space is purpose-built, its acoustics, and the nature of its engagement with social functions are all critical architectural factors that contribute to a sense of place. This sense of place, along with human interaction and the actual performance itself, collectively become the overall event of performance. In the case of a performance space for niche and emerging artists it will be desirable to have a space that is not overly purpose-built with adjustable acoustics and a strong connection to the

social experience that allows for the audience to become part of the spectacle. It will also be desirable to incorporate the positive aspects of purpose-built, incidental and house-concert small performance space typologies while mitigating the negative aspects. Social vibrancy, intimacy, and strong infrastructure for attentive space can all be at cross-purposes from a programmatic standpoint, though. Therefore, the designer of performance space for niche and emerging artists must prioritize and make design decisions that will contribute as much as possible to the staging of the overall event of performance.

CHAPTER III

SITE

Universities, by definition, play an important role in nurturing and incubating new talent and have for many years been keystone venues for touring performing artists. While the existing performance spaces at the University of Massachusetts, Amherst fill important campus and regional performing arts roles, they function only secondarily as social spaces making them less than ideal for niche and emerging artists. The University also currently suffers from a lack of centralized, on-campus social gathering spaces and the Campus Center and Student Union are not animated

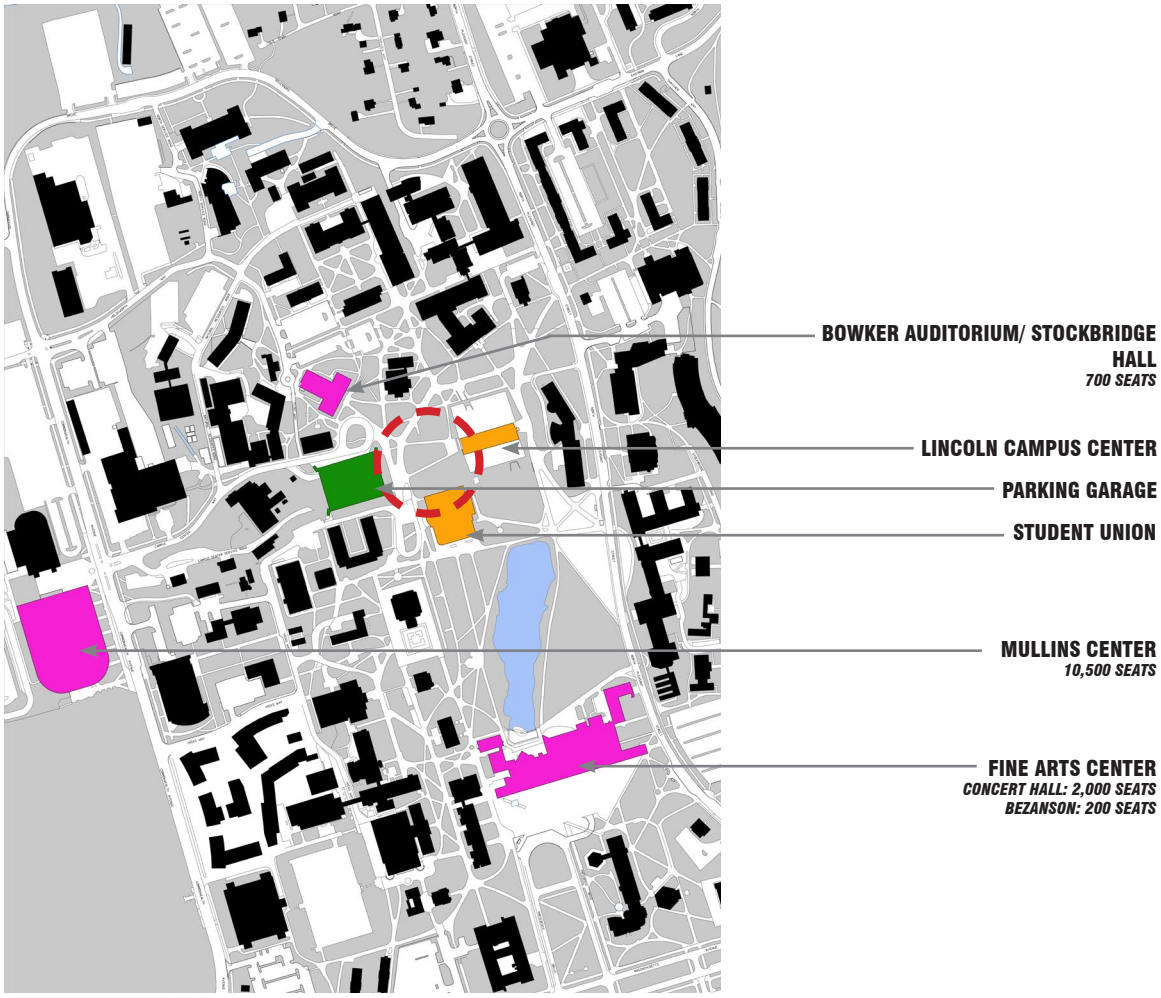

Figure 44. University of Massachusetts Campus Map. Image by author

Figure 45. Panoramic View of Site From West. Photo by author

Figure 46. Panoramic View of Site From East. Photo by author

on nights or weekends. During the day, however, there is a tremendous amount of foot traffic through and around these facilities and many student eat at one of the several dining facilities located here. This thesis project has the potential to serve both the interests of the University and the performing arts community at large, by providing a badly needed on-campus place for socializing and a venue where niche and emerging artists can reach out to new college-aged audiences.

The parcel in question is adjacent to both the Student Union, Campus Center and Campus Center parking garage and is connected to all three via a network of subterranean rooms and passages. In fact, the entire site, while looking like a grassy lot from above, sits over subterranean components of the Campus Center and parking garage. Because of this, the site poses many structural and logistical difficulties but affords the opportunity to interface with two extremely important campus social hubs. For the reasons listed above as well as for its ease of access to the parking garage, it was chosen as the site for a proposed performance space for niche and emerging artists.

CHAPTER IV

PROGRAM/DESIGN INTENT

With the establishment of the criticality of the social experience and the necessity of the intermingling of social and performance spaces we can begin to explore the implications for programmatic arrangement. The intermingling of social and performance spaces, while desirable for many reasons, has negative implications for acoustic and logistical considerations. It can be said that, in general, the more social a space is, the less attentive it is, and vice versa. For the performer, performing for a completely social room results

Figure 47. Social and Attentive Space Programmatic Gradient Diagram. All photos and images by author.

in a complete lack of attentiveness and is undesirable for obvious reasons. On the other hand, as we have seen in the case of music halls, too great a degree of separation between social and performance spaces results in a decreased overall vibrancy and the performers run the risk of performing for sparse or empty rooms. The key architectural problem, it would seem, is accommodating these conflicting programmatic needs. For this thesis, it was decided to provide multiple performance spaces with varying of degrees of social engagement to accommodate the wide range of programmatic material that would be expected to be featured at such a space. In the style of the Berlin Philharmonic and early

music halls, generous overlapping circulation or "promenading" spaces would serve as the connecting fabric for the different performance spaces, allowing for the audience to be on display and be a part of the overall even of performance. Scattered throughout the building would be small, "niche" social areas with varying degrees of engagement with the different performance spaces. A core of artist and venue support or "back of house" spaces would

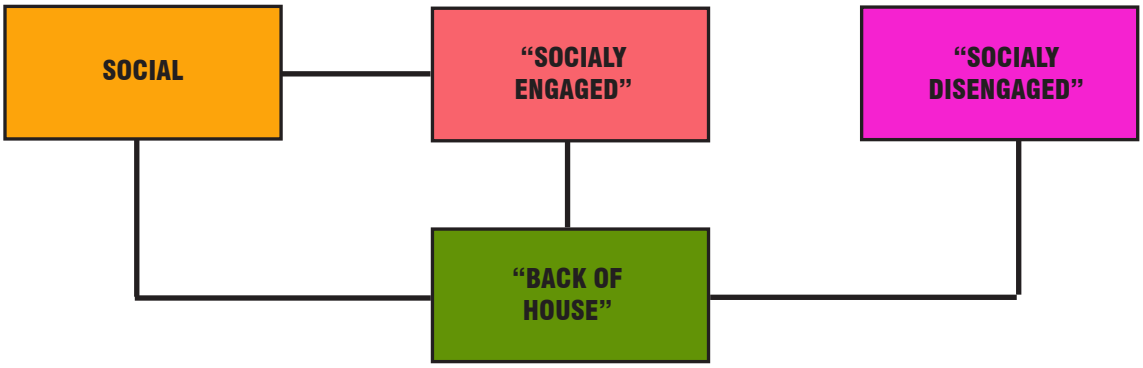

Figure 47. Programmatic Relationship Diagram. Image by author.

physically connect the various performance spaces and provide core service functions such as toilet facilities and fire egress.

It was decided that there would be three separate performance spaces. A central "core" performance space or "ballroom" would have a high degree of social engagement and would be visible from -and interact with- all of the primary social spaces and internal circulation routes. A second "socially engaged" performance space would be an exterior space that would engage external circulation routes and would provide a formal stage for the informal activity of "busking" (otherwise known as playing on the street - an act in which many travelling performing artists engage) or other campus functions

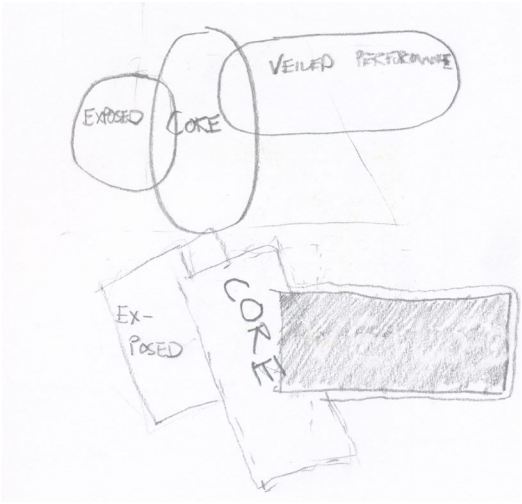

Figure 49. Early Programming Sketch. Image by author.

such as rallies. A "quiet" or "socially disengaged" performance space would feature fixed, raked seating and a small stage for acoustic music, spoken word, theatrical, and film performances. This quiet theater would be have complete acoustic separation from the rest of the building but would share social/lobby space and circulation routes with the main ballroom. All three of these performance spaces would plug into and be accessible from a single support or "back of house" core.

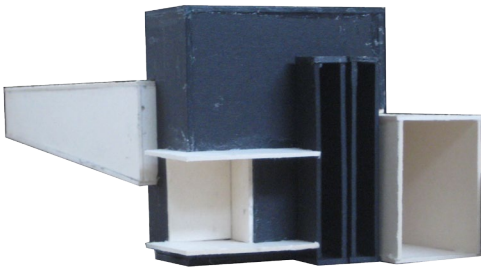

Figure 50. Early Conceptual Model. Photo by author.

Although the "quiet" theater is intended to be acoustically separate from the rest of the building, as the design progressed, it was decided that it would interact with the main ballroom as a floating, veiled object. This floating, veiled object would also serve as a dramatic formal gesture that would be visible from the exterior. Patrons of the floating, quiet theater would be aware of any goings-on in the main ballroom as they circulated their way up to a connecting bridge to bring them to the theater entrance. Patrons of the ballroom would be aware of the floating volume above them and would interact with patrons of the quiet theater in the shared social and circulation spaces.

Two ancillary, site-driven goals were to animate the otherwise unanimated Lincoln Campus Center Plinth and to transform the existing subterranean connection between the Campus Center and Student Union into a multi-tiered, light-filled space. The former was achieved by locating the principle social space adjacent to and at the same level as the Campus Center plinth, with the idea being that, in the warmer months, the plinth would serve as an extension of the social space via an openable facade. The latter was achieved by widening the existing subterranean passageway and removing the existing earth and concrete slab overhead. A new stair in this location provides an additional way to transition from grade to the Campus Center Concourse level.

The location of the service core was dictated, to a great degree, by the desire to locate it above the existing Campus Center loading dock. In this way, a single service elevator could accommodate all three performance areas and the new building could take advantage of existing infrastructure.

The vertical circulation core is inward-focused, with the stair and elevator landings all looking over the main ballroom and social spaces. Patrons circulating up to the quiet theater or to the lobby space on the uppermost level are brought into contact, both visually and acoustically, with the happenings in the ballroom and its associated ancillary social spaces. This allows for "promenading" and promotes interaction between the patrons of the various functions to encourage the ever-

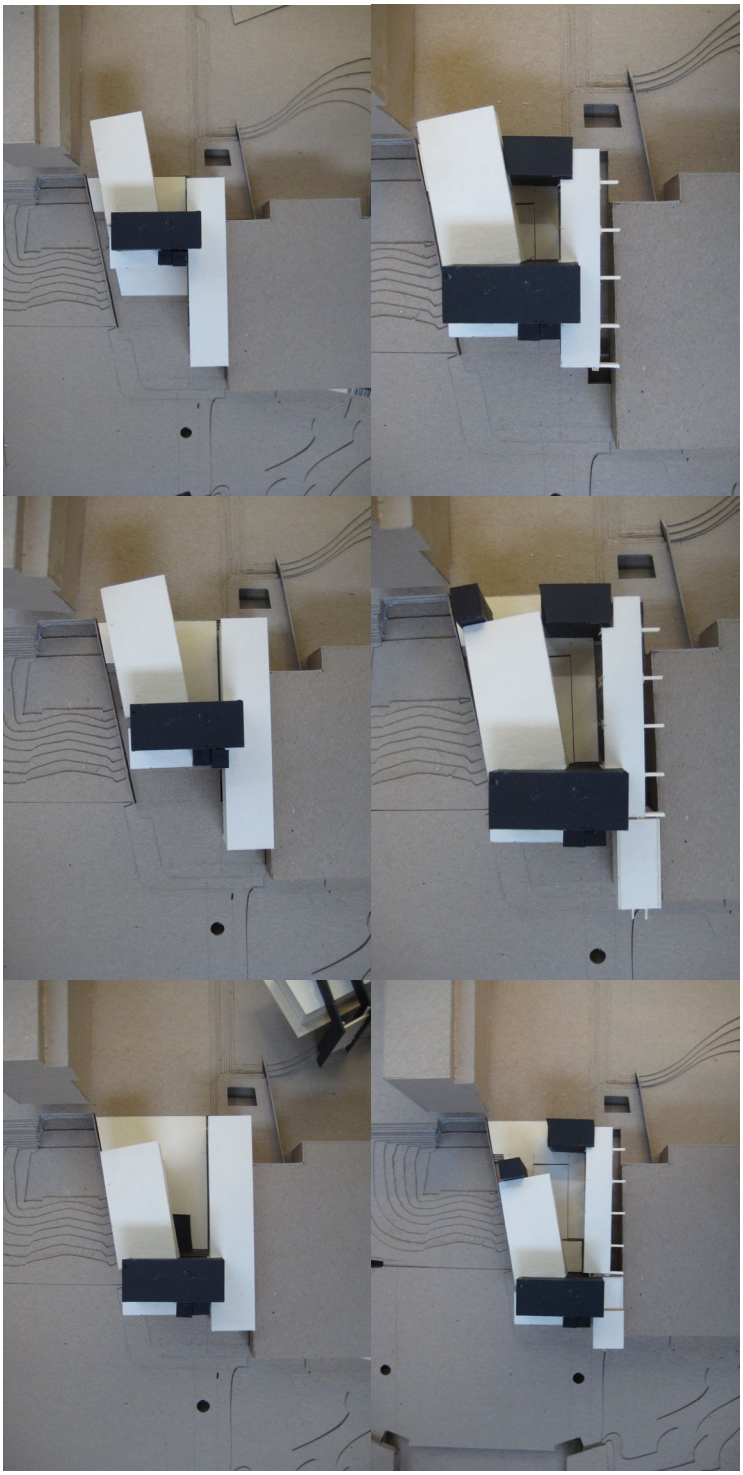

Figure 51. Conceptual Massing Model Studies. Photos by author.

important random encounters. In turn, the ballroom mezzanine and upper lobby have views to the main circulation path of the low-roofed Student Union connector, which in turn has views (and stairs) down to the enlarged and now light-filled passage at the Campus Center concourse level. The overall result is a cascade of spaces, wrapped in a skin of layered, translucent panels of various sizes. The intended effect is to produce a dappled, dream-like quality to the light on the interior and a quartz crystal-like faceted appearance on the exterior with the metal panel-clad quiet theater cantilevering over the newly animated Campus Center plinth.

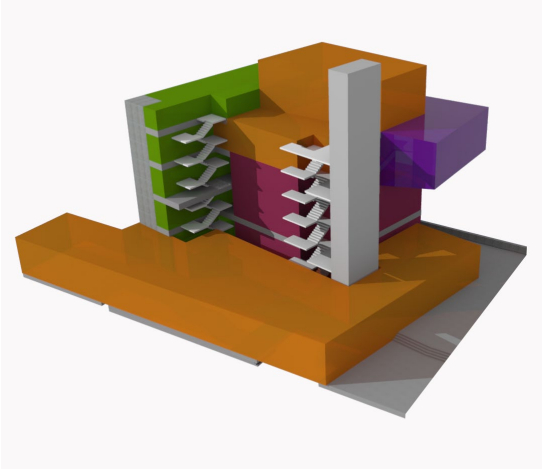

Figure 52. Programmatic Massing Model, View From SE. (Purple = performance, orange = social, green = service). Image by author.

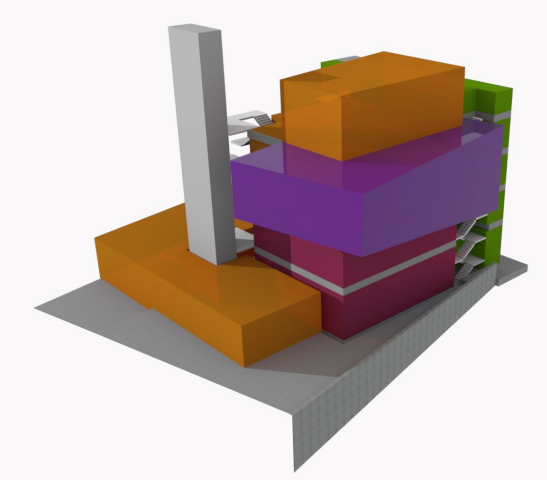

Figure 53. Programmatic Massing Model, View From NE. Image by author.

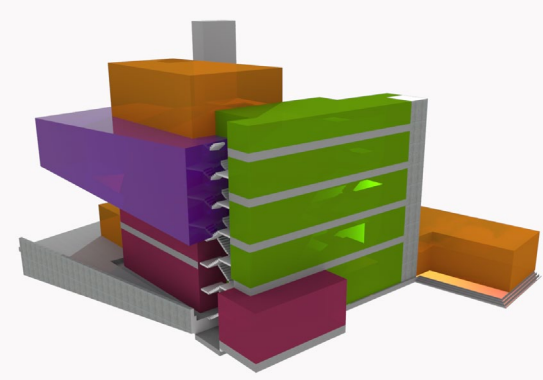

Figure 54. Programmatic Massing Model, View From NW. Image by author.

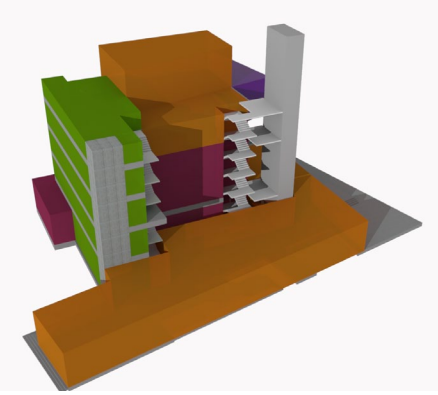

Figure 55. Programmatic Massing Model, View From SW. Image by author.

CHAPTER V

PROPOSED BUILDING

A. Interior and Exterior Experience

Figure 56. View From the Campus Center Plinth. Image by author.

Figure 57. View From the Parking Garage. Image by author.

Figure 58. Transverse Section Through Ballroom. Image by author.

Figure 59. Transverse Section Through Connector. Image by author.

Figure 60. Perspectival View of Interior. Image by author.

B. Plans

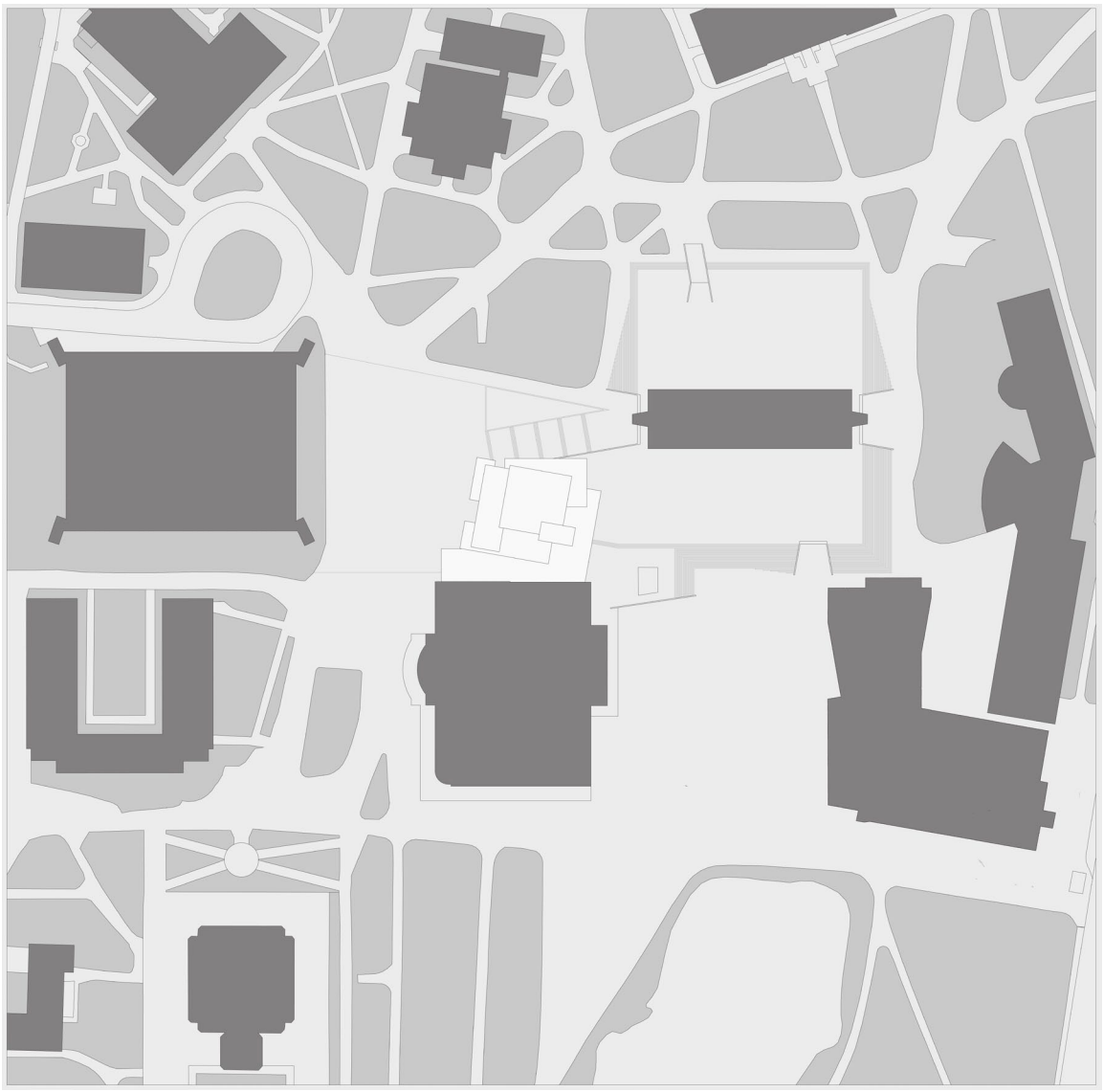

Figure 61. Site Plan. Image by author.

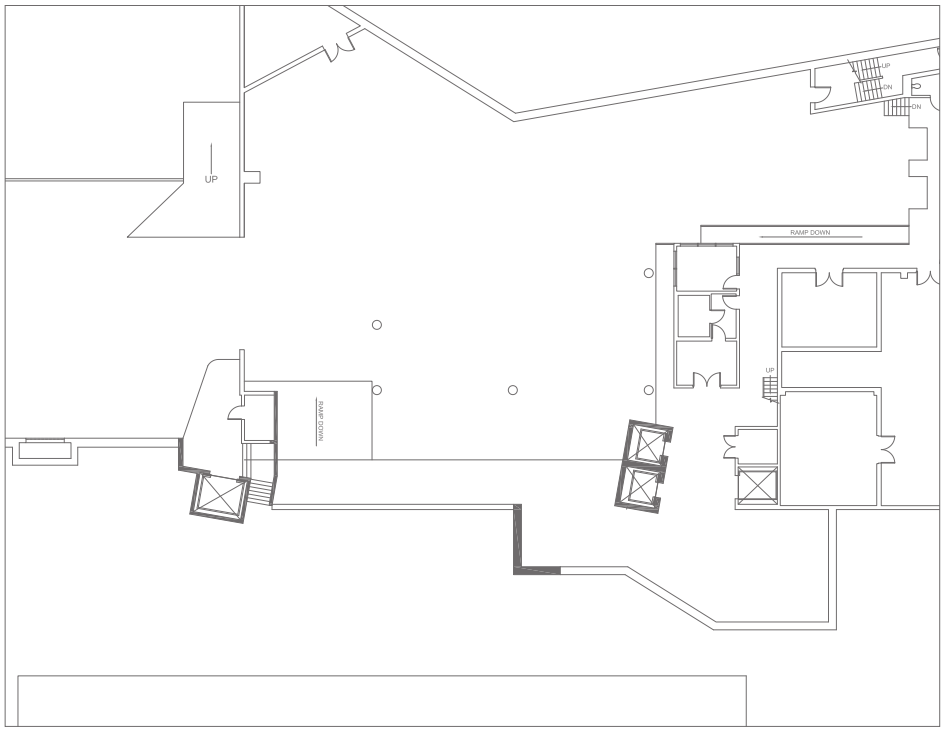

Figure 62. Loading Dock Level Plan. Image by author.

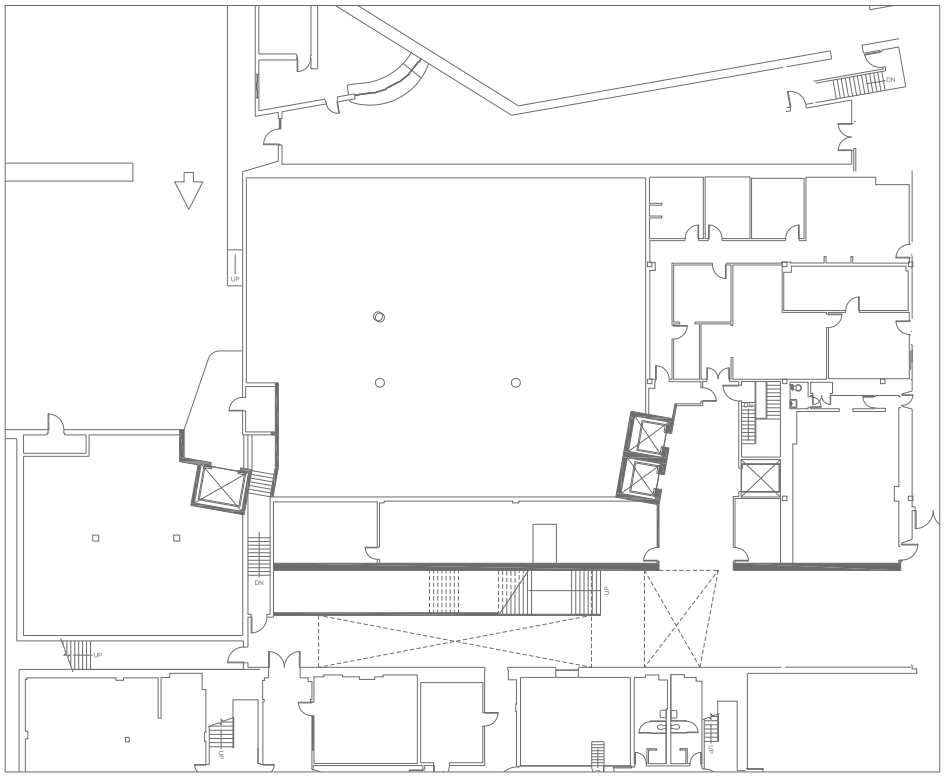

Figure 63. Campus Center Concourse Level Plan. Image by author.

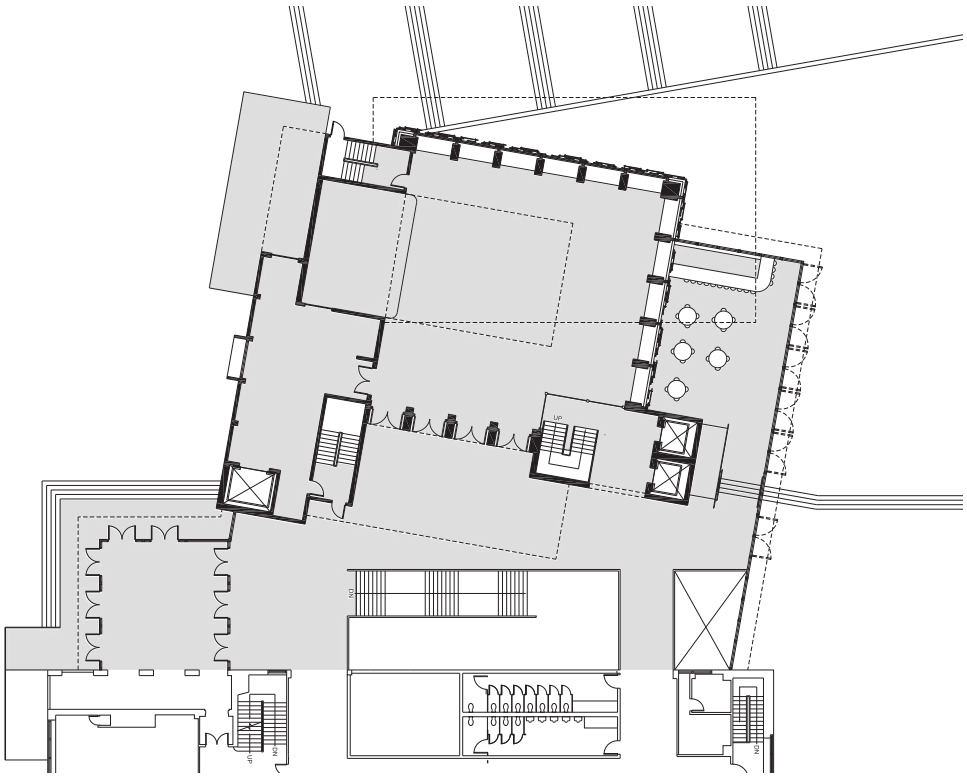

Figure 64. Grade/Ballroom Level Plan. Image by author.

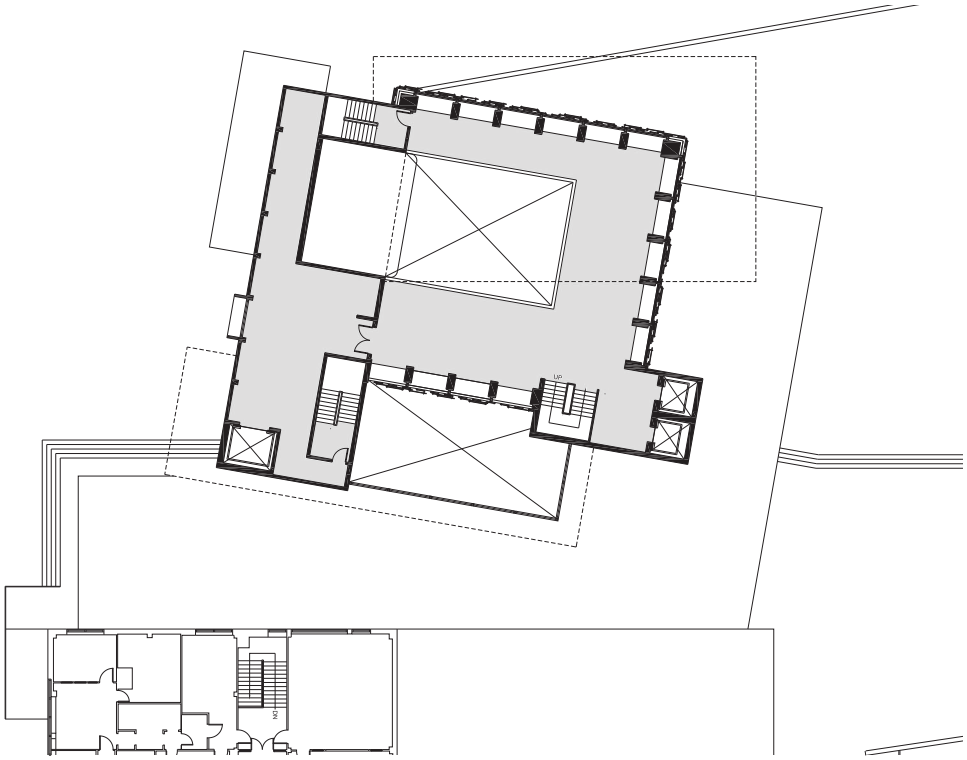

Figure 65. Mezzanine Level Plan. Image by author.

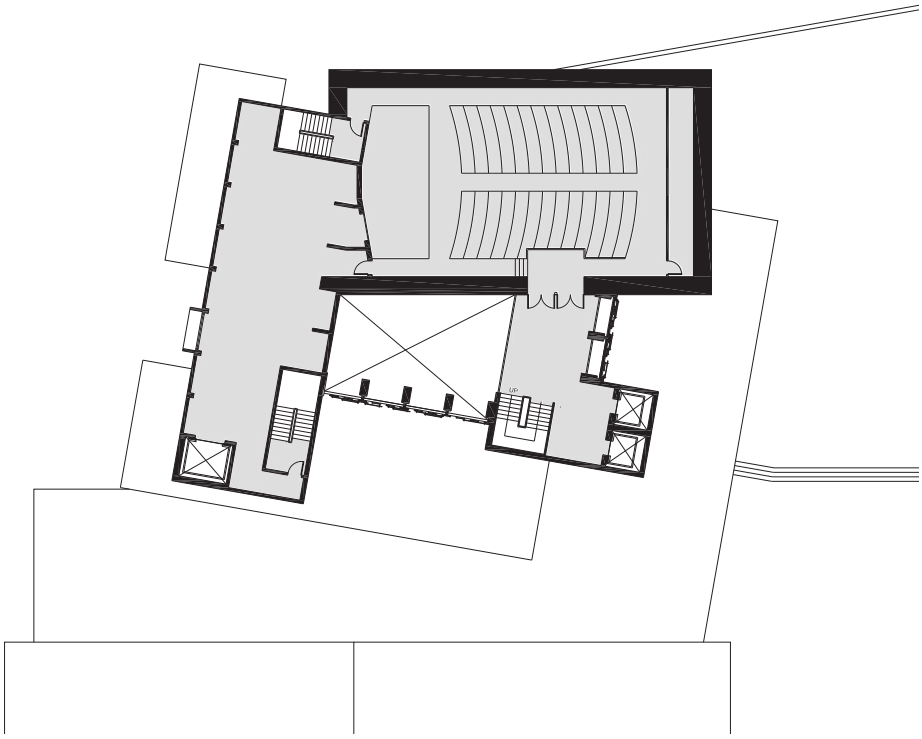

Figure 66. Quiet Theater Level Plan. Image by author.

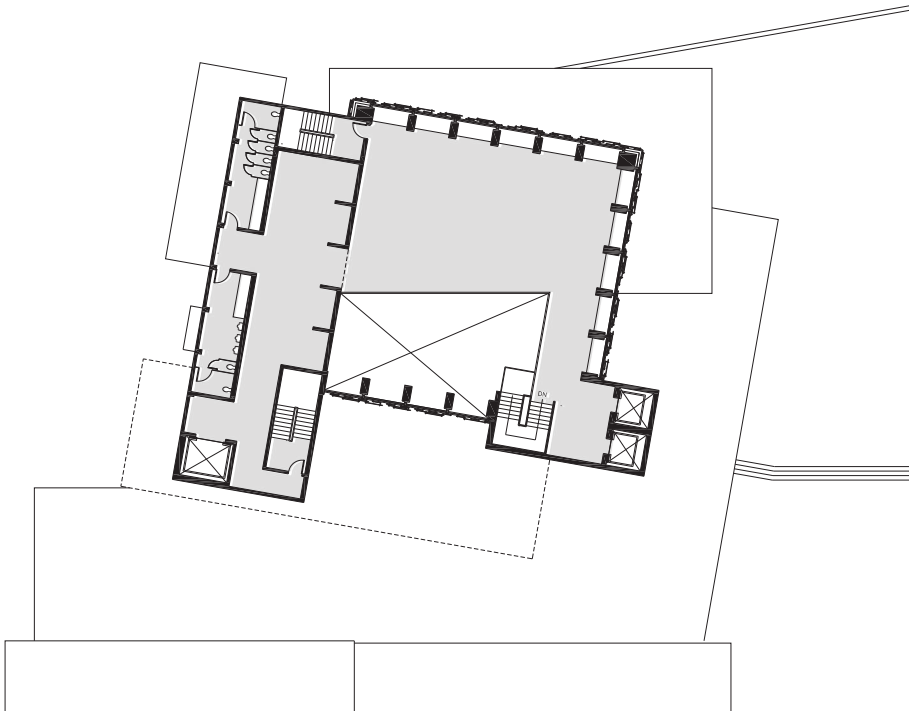

Figure 67. Upper Lobby Level Plan. Image by author.

C. Structure and Skin

Figure 68. Detail View of Frosted Glass Panel Exterior Skin. Image by author.

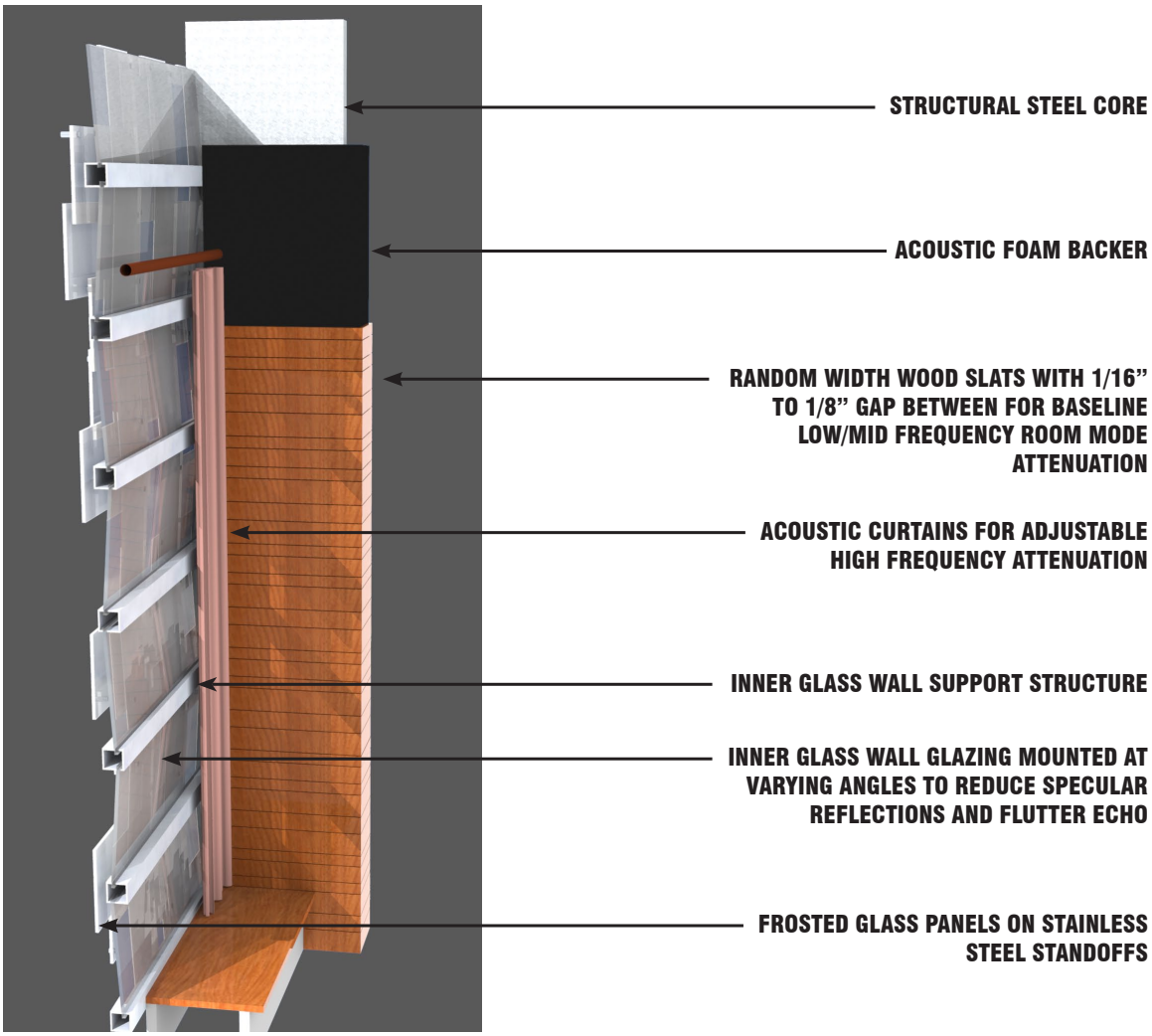

Figure 69. Cut Away View of Building Skin. Image by author.

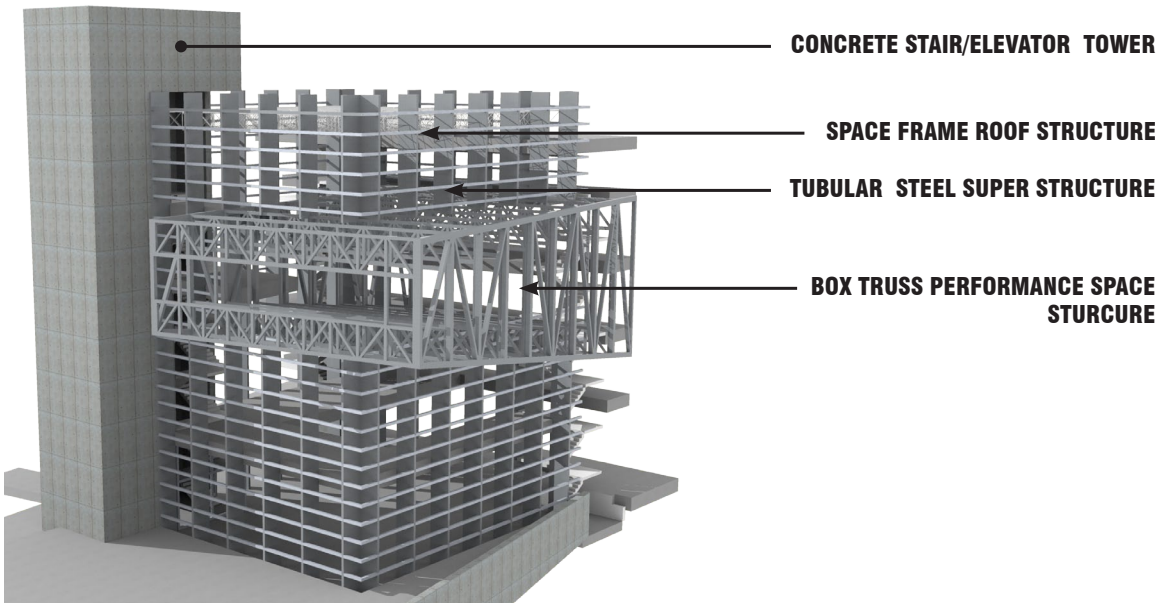

Figure 70. View of Building Structure Image by author.

BIBLIOGRAPHY

AI Archinnovations (2009) *Zaha Hadid Architects - JS Bach Chamber Music Hall.* Retrieved on April 19, 2011 from http://www.archinnovations.com/featured-projects/performance-arts/zaha-hadid-js-bach-chamber-music-hall/

American Micro Industries, Inc. (2005, July) Product Data Sheet: Echo Absorber. Re trieved February 27, 2011 from http://www.soundprooffoam.com/pdf/Echo-Absorber-Natural.pdf

Anderson, Chris (2006). *The Long Tail: Why the Future of Business Is Selling Less of More.* New York: Hyperion.

Banham, Reyner. (1984) The Architecture of the Well Tempered Environment. Chicago. University of Chicago Press

Basulto, David (2009) *Mobile Performance Venue/Various Architects*. Retrieved on April 19, 2011 from http://www.archdaily.com/4333/mobile-performance-venue-various-architects/

Beranek, Leo (1962) *Music, Acoustics & Architecture*. New York. John Wiley & Sons, Inc.

Beranek, Leo (1996) *Concert and Opera Halls; How they Sound*, Woodbury, New York, Acoustical Society of America

Brand, Stuart. (1994) How Buildings Learn; What Happens After They're Built. New York. Penguin Books.

Brynjolfsson, Erik; Yu (Jeffrey) Hu, and Michael D. Smith, "Consumer Surplus in the Digital Economy: Estimating the Value of Increased Product Variety at Online Booksellers", Management Science, 49 (11), November 2003. working paper version, April 2003

Bynjolfsson, Erik; Yu Hu, and Michael D. Smith, (2010), "The Longer Tail: The Changing Shape of Amazon's Sales Distribution Curve"

CDC Corporation. (2009, February) Product Data Sheet: Low Frequency Tuner. Retrieved February 27, 2011 from http://www.walltechnology.com/docs/products/wallpanels/ds_lowfrequencytuner.pdf

CDC Corporation. (2009, February) Product Data Sheet: Metro Wood Panels. Retrieved February 27, 2011 from http://www.walltechnology.com/docs/products/wallpanels/ds_metrowood.pdf

Cox, Trevor, & D'Antonio, Peter. (2004) *Acoustic Absorbers and Diffusers.* New York: Spon Press

D'Antonio, Peter. (2005, August). Technical Bulletin of the Evaluation of the Kinetics Tuned Absorber/Diffuser Panel. RPG Diffuser Systems, Inc. Upper Marlboro, MD

Dillon, D. (2010, February). *Vertical Theatrics.* Architectural Record, 60-65.

Everest, F. Alton and Pohlmann, Ken C. (2009) *The Master Handbook of Acoustics*. New York. Mcgraw-Hill

Newhouse, V. (2010, February). *Opera Reaches Out.* Architectural Record, 52-56, 58-59.

Gonchar, J. (2010, February). *When Size Matters.* Architectural Record, 57.

Gonchar, J. (2010, February). *Dramatically Reconfigurable.* Architectural Record, 66-67.

Geerdes, Harold. (1975, April). Adjustable Acoustics in Music Performance. Music Educators Journal. 61(8), 40-44.

Jones, Peter Blundell (1978) *Hans Scharoun, A Monograph.* London, Gordon Frase
Smith, Richard D., (2000) *Can't You Hear Me Callin'*, Boston: Little, Brown and Co. (69-71)

Knauf Insulation. Product Data Sheet: Knauf Acoustical Board Smooth. Retrieved February 27, 2011 from http://www.knaufusa.com/pdf.aspx?page=920&theme=print

Koolhaas, Rem. (1997) Delirious New York. New York. Monacelli Press.

Kristiansen, U.R. & Vigran, T.E. (1994) On the Design of Resonant Absorbers Using a Slotted Plate. Applied Acoustics. (43)1. 39-48.

Mankovsky, V.S. (1971) *Acoustics of Studios and Auditoria.* New York: Communication Arts Books

Page, Will and Garland, Eric. (2009) *The Long Tail of P2P*. Economic Insight, 14. Retrieved on April 22, 2012 from http://www.prsformusic.com/creators/news/research/Documents/The%20long%20tail%20of%20P2P%20v9.pdf

RPG Diffuser Systems, Inc. Product Data Sheet: BAD Panel. Retrieved February 27, 2010 from http://www.rpginc.com/products/badpanel/index.htm

Sabine, Wallace. (1922) *Collected Papers on Acoustics*. Cambridge: Harvard University Press.

St. John Wilson, Collin. (1995) The Other Tradition of Modern Architecture: The Uncompleted Project. London. Academy Additions.

Sallee, Andre & Chauveau, Phillippe. (1985) Music Hall et Cafe Concert. Paris. Bordas

Sewing, Werner (2004) *Architecture: Sculpture*. New York, Prestel

Stebbins, Richard Poate. (2000) The Making of Symphony Hall. Boston, Massachusetts. Boston Symphony Orchestra, Inc.

Thompson, Emily (2002) *The Soundscape of Modernity,* Cambridge, MA, MIT Press

Tuvie (2011) *JS Back Chamber Music Hall by Zaha Hadid*. Retrieved April 19, 2011 from http://www.tuvie.com/js-bach-chamber-music-hall-by-zaha-hadid-architects/

Various Architects (2009) *Mobile Performance Venue*. Retrieved on April 19, 2011 from http://variousarchitects.no/project/mobile_performance_venue/

Wikipedia (2011) *Schaffner Players*. Retrieved on April 19, 2011 from http://en.wikipedia.org/wiki/Schaffner_Players

Zulkifli, R., Nor, M.J.M., Ismail, A.R., Nuawi, M.A., Tahir, M.F.M.. (2009) Effect of Perforated Size and Air Gap Thicknrdd on Acoustic Properties of Coir Fibre Sound Absorption Panels. European Journal of Scientific Research, (28) 242-252