the music of architecture

master of architecture  marilyn sheppard 2011
to those in search of the sublime
The music of architecture

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by marilyn sheppard
Music awakens in us emotions that are hard to explain. Architecture does it, too. A friend of mine used to call it "Architectural orgasms".

What is that “sublime” moment that happens when you are listening to a live orchestra and get moved by the experience? Are we capable of achieving that moment through the use of architectural elements alone? I believe the answer is yes.

There is more to the moment than just the music itself, and that a “sublime” moment can be experienced in many contexts. There are elements that are common to this experience, primarily the presence of the Four Classical Elements.

With this in mind, I came to the idea that by including Air, Fire, Earth and Water into my project, then I would be a step closer to having the users go through a sublime experience.
definitions .................................................. 1
site ............................................................. 6
diagrams ....................................................... 9
mused .......................................................... 12
playing music ............................................... 19
notation .......................................................... 27
first ideas ......................................................... 32
the sublime ..................................................... 34
designing with the music ................................. 37
designing with the sublime ............................... 47
the structure ..................................................... 68
materials .......................................................... 73
the landscape .................................................. 74
moleskine notes ............................................... 77
thanks .............................................................. 78
bibliography | image credits ................................. 80
curriculum vitae ............................................... 81

Table of Contents
“The fundamental phenomenon of sound is its development in time. Architecture is basically static; time is introduced through changes in daylight, periods of different intensity of noise and above all, through the movement of people. Sound-architecture is in its essence an event of temporal development. Space is developed gradually in time. But it is not a space, it is a constant sequence of spaces”.

- Bernard Leitner (SOUND:SPACE)
music comes from the Greek "mousike" (μουσική), in relation to an art inspired by muses.

music is the art of combining sounds and silences, in a way that creates harmony and usually transmits an emotion.
music = architecture?

I started thinking about the things that were interesting to me about architecture and about music. Jim Ritter suggested to think about the similarities and dissimilarities between them.

similarities

Music and architecture are the only arts that surround you.

Like in music, architecture makes you live, puts you through a journey.

Search for Harmony in both SYMMETRY AND ASYMMETRY.

Notation: music's scores [five line staff] and architecture’s plans.

dissimilarities

Architecture is the art of designing through space, music is the art of designing through time.

A piece of played music is an event in time, ephemeral almost.
A piece of Architecture could last centuries.
My thesis question was not defined yet. However, I needed to start thinking of where to start my research on music + architecture within an urban context.

A place for music and architecture to be perfectly perceived and sensed should be in a location close to the city tissue but not too close, and close to the nature but not in the middle of it. A place where our minds could be open to be sensitive and perceptive enough...

My question about the architecture of music could be better understood in a place close to the presence of water.
music + architecture + water
Susan Piedmont-Palladino suggested me a site that was hardly noticeable, since it is today part of Fort McNair, a military base. Located in South West DC, the site touches the Washington channel, a body of water within the manmade Haines Point and the Southwest part of Washington DC.

It was a perfect site for the project's search of the sensitive search of the music of architecture.
The site is proposed as a link to the historical cultural division of Southwest, DC that had 4th Street as main division axis. The site would give the city and the people a part of what today belongs to Fort McNair. This idea has been previously proposed and that is why I decided to use this land to explore how it could be used to create a musical park for the neighborhood and a cultural center for music performance that is unique in the area.

The site is about 600' x 600', so approximately 360,000 square feet.
east-west section

north-south section
The following are schemes I started drawing based on the information I had compiled until the moment. I later realized that that wasn’t enough and started all over again, looking at things in a more sensitive way that I had before, and created model 1, an experimental model based on a transliteration from music to the site.
After analysing similarities and dissimilarities between architecture and music, I decided I had to get inspired. By a muse, hopefully. I found in J.S. Bach’s music the inspiration I needed to start studying music with a reason. I needed to know what was it about that song that was so moving, how was it composed, graphically?
I decided I needed a subject to focus on to begin applying and testing my theories of the relationship between architecture and music. I had found architecture - I had precedents in architecture of the search on its relation to music - but I needed music that transmitted architecture in some way. I listened to Johann Sebastian Bach’s *Air on the G String* over and over again. I knew there was something secretly hidden in it that would help me find out what music had that compared to the same component in architecture...

First I listened to the music and made a model of the interpretation of the music on the site.
Letting myself go as I listened to Bach’s Air on the G string, this model was born. It was a first intent to express in a rather abstract composition the life of musical notes with their high and low pitches, early and reverberant sounds, sounds that live and suddenly die into the water of the model’s site, and in between transparent elements that join each note smoothly, turning them into a melody.
I read the partiture and tried to figure out how those scores would literally transform into architecture...

I gave each of the notes in the partiture of Air on the G string a different numerical value and divided the site in an arbitrary amount of squares (1050). I drew a yellow line through 4th street (the one that crosses the site) and started my song notes/wood sticks there. The melody crosses the site North to South, and each note is represented by one of this sticks which height is given by its unique numerical value. The rest of the sticks in the site show how the sound notes die gradually especially toward the water.

model II
Air on the g string
J.S. Bach
I superposed my model on the site’s bird eye’s perspective. I asked myself whether that gave any answers or clues on how to approach the site. The image helped me understand how a project in this site should approach the contact to the water. The answer was rather irregularly.
How should a music project look like? Was my last model/experiment giving me any answers regarding form?
What if the notes died irregularly towards the water? The contact people should experience with water would be gradual.
What if I took my model I and combine it with model II? This image reflects the answer...

But then... What materials does music use?
What about a building for music, what senses of which materials should the audience experience?
At this point I had more or less understood what were the elements music had in common with architecture. But I still didn’t have a building nor a program.

I thought about that climax moment in music. That perfect moment when tens of musicians gather and play with so many different instruments a number of notes in a certain order that together, and perfectly performed, create a piece of music. I wanted to recreate that perfect environment, both acoustically and experiencially.

But how was music expressed in architecture?

My will was to design a concert hall, a place where the audience experiences chills when listening to music but also a place where they could be emotionally moved by the quality in the space they walk around, maybe in similar ways that music did.

I realized I was fully interested in the similarities between music and architecture, while not so thrilled about the realm of the differences. Similarities would help me more for they would lead my design in a way the users could have similar sensations than those they had when feeling music.

The selection of the program and its needs led me to both a qualitative and a quantitative analysis of the activities in a concert hall. I studied moment by moment, what were the activities people would perform in it. How would people get to the site and how would they move around in it, how much time would be spent in each activity? What would the quality of each one of these moments be? What were sensations involved in them? Were there special events? Music was for sure “the” event. The main music hall would be a unique space. But so would the reception or main foyer space, the musicians dressing rooms and rehearsing spaces, the music notation library.

This study would show me somehow the relevance of the spaces and hopefully some other hidden answers to some other hidden questions.
The time spent by the audience in general is 3.5 hours each time they go for a performance.

A graphical profile of the notes in Air on the G string drawn after the experimental model (model II).

The journey the audience experiences when attending a concert hall performance.

The journey the musicians experience when playing a concert.
Arrival relates to the feelings of new encounters, uncertainty/surprise, orientation. The place to arrive should be welcoming, should embrace visitants within a space that will start preparing them for what’s coming next.
The word foyer, from the Latin "fo-carium", derives from fire. It is the heart of a concert hall building.
Foyer is a place for artists and audience to meet up in the moments previous to a performance and warm up in the intermissions.
Rehearsal means to repeat over and over again one activity to then perform in an event. The term translates into feelings of repetition, regularity, rhythm, progression.
**music hall**

The music hall is the space that holds the most important event in the concert hall. There is a big emotional load included in this moment, were the users could experience from anguish and fear, to happiness and excitement, everything triggered by the special component in here: music.

The music hall is directly related to the main foyer space, any other foyers in the building used for intermission encounters, and many services that help support the main hall.

Here is where most of the magic takes place.
What is that “sublime” moment that happens when you are listening to a live orchestra and get moved by the experience actually made of? Are we capable of achieving that moment through the use of architectural elements alone?

I believe the answer is yes. There is more to the moment than just the music itself, and that a “sublime” moment can be experienced in many contexts. There are elements that are common to this experience, primarily the presence of the Four Classical Elements.

With this in mind, I came to the idea that by including Air, Fire, Earth and Water into my project, then I would be a step closer to having the users go through a sublime experience.
Architecture couldn’t be built if it wasn’t for its notation means [construction documents]. This form of notation creates a special language that architects and builders share in order to make architecture possible.

In music, a similar condition happens. Music needs both composer and performer to understand this specific language [music notation] in order for music to exist.
In music, many of the symbols used as part of the musical language are directly related to parts of the human body.

For example, the upper section of the five line staff is intended to be played by the right hand, while the lower one indicates it is played by the left hand.

Another example are some notes that go accompanied by a symbol on top of them indicating the note should be played together with the foot pedal pushed only with the heel or pushed only with the big toe.

There is, too, a symbol of “breathe” meaning a singer should take a break to breathe at that point.

The relationship with the human body indicates how much the language of the music notation is needed to fully understand how to perform what was originally intended for the piece of music to be by the composer.
music notation

Two experiments using architecture notation (section drawings) to express a piece of music (Air on the G string - J.S. Bach).
music notation

Music expressed in an architecture drawing.
grace notes

Grace notes are considered a sort of “ornaments” in music. They are written by the composer of the piece of music but left open to decide whether to play them to the performer. That way, if played by a different performer, the piece of music might be different as well.

Grace notes caught my attention for their hidden condition. They are graphically printed as small sized notes with a line across the main note axis line.
Music notation and architecture notation are special languages in the realm of these arts. Notation systems are the reason music and architecture are able to exist as performed and built. The transmission of the piece from the composer to the performer and that one of the architectural piece from the design architect to the builder architect is an essential point in common in both arts. My first ideas are based on that concept.
I decided to take the five line staff from music and lay it out on the site as if the lines were architectural elements. I imagined the lines as if they were in an architecture plan, and therefore they became walls in the architecture project. They were not parallel to each other, though. As they were part of the physical world, within the city of DC, I arranged them so that some of the lines responded to the South West urban tissue, in the orthogonal cardus-decumanos configuration. Other lines responded to the water shore, aligning perpendicularly to it. I envisioned 4th street corridor as a transparent but strong element appearing in the site as a reminder of the history of the neighborhood. It would then become the entrance way and axis of the circulation to approach the concert hall building.
I came to the idea that maybe if I could include Air, Fire, Earth and Water as elements into my project then I might have been a step closer to having the users experiment the sense of “the sublime”.

Then I realized I needed to get into a deep research on what “the sublime” really meant.

In aesthetics, the sublime has to do with that physical, intellectual, artistic or spiritual object which greatness or vast magnitude cannot be imitated, measured nor calculated.

Arthur Schopenhauer says: “Our pleasure in the tragedy belongs not to the feeling of the beautiful, but to that of the sublime; it is, in fact, the highest degree of this feeling”\(^2\). In his intent to clarify the term Sublime, Schopenhauer created a very practical list giving examples of each one of a series of levels that go from Beauty to Sublime:

- Feeling of Beauty – Light is reflected off a flower. (Pleasure from a mere perception of an object that cannot hurt observer).
- Weakest Feeling of Sublime – Light reflected off stones. (Pleasure from beholding objects that pose no threat, yet themselves are devoid of life).
- Weaker Feeling of Sublime – Endless desert with no movement. (Pleasure from seeing objects that could not sustain the life of the observer).
- Sublime – Turbulent Nature. (Pleasure from perceiving objects that threaten to hurt or destroy observer).
- Full Feeling of Sublime – Overpowering turbulent Nature. (Pleasure from beholding very violent, destructive objects).
- Fullest Feeling of Sublime – Immensity of Universe’s extent or duration. (Pleasure from knowledge of observer’s nothingness and oneness with Nature). This stage gets as close as possible to the unmeasurable, to the infinite and, why not, immortality and perfection.

“What is music? Music has to do with an enormous discipline. To play an instrument, to read music, to perform music, requires a discipline. This is one of the connecting links between music and architecture, because both are extremely rigorous engagements. You cannot play music approximately, unless you’re just playing around; if you really want to play a melody, you have to hit every note correctly, and every tempo and every harmony has to be there in order to be audible. And I think that is true of architecture: you cannot really do architecture approximately, you have to do it exactly. And what ties them together in my own experience is the element of time and the element of mathematics. Both of them really are very exact disciplines, they are very precise, they are both drawn in a certain way, and the drawings, whether they are scores in music or architectural drawings, connect the music” \(^1\).

- Daniel Libeskind, Architect

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the sublime
Music, as a performing art, transports us to distant moments and spaces than those we are in the present time. A hundred musicians playing Bruckner’s *Scherzo on Symphony No. 7* could make us feel emotionally moved; it could make us feel joy, anger, anguish, delight, peace, fear, freedom. Music has the ability to change our mood, to make us go through a series of feelings. This, I believe, has to do with how it involves you in it. Artur Schopenhauer also says: “The effect of music on the mind, so penetrating, so immediate, so unfailing, and also the after-effect that sometimes follows it, consisting in a specially sublime frame of mind, are explained by the passive nature of hearing just described”3. This penetrating component of music, so immediate, of which Schopenhauer speaks, is how the Sublime is experienced through it. Music even elevates the soul of those who are most open to perceive it.

Music and architecture are similar in the way that they are the only arts that surround you all. Just like music, architecture has this ability that music has to surround you all and to take you through different sensations, a piece of architecture makes you experience a series of emotions; it puts you in a journey. “Architecture is frozen music. Really there is something in this; the tone of mind produced by architecture approaches the effect of music.” - said J.W. von Goethe. Architecture could be frozen music since architecture generates a journey in time, just as music does. Although architecture also generates a journey in the space that it creates. Architecture contrasts with music’s volatile component as well, for the former has to be materialized (built) in order to be experienced, and remains through time. Music, on the other hand is as ephemeral as a musical note lasts.

“All is poetry: the emotion of the senses, the joy of the mind as it measures and appreciates, the recognition of an axial principle which touches the depth of our being. Art is thus pure creation of the spirit which shows us, at certain heights, the summit of the creation to which man is capable of attaining. And man is capable of great happiness when he feels that he is creating”4 (Le Corbusier|Precisions) Clearly, Le Corbusier refers to the Sublime when speaking of “the summit of the creation...” What should Architecture do to reach the magnificence of taking its users to feel in the summit of creation? At this point we could go back to Libeskind’s comment at the introduction of this paper when he says to play a real melody you have to actually hit the right series of keys in the right moment. Architecture might be like that as well, then. To recall the Sublime, architecture needs to aim to that “perfect” component that Nature easily expresses, the one that brings every piece together to work in harmony, creating a perfect system, an entity that awes and amazes the spectator. “It is that nature never deviates in its forward march, and everything in nature is striving towards the goal of perfection”... “and all things in all respects have a perfect relationship, perfect analogy and harmony”.5 Says Etienne-Louis Boulée. For a piece of architecture to reach sublimity, it has to be able to touch the user’s soul. It has to make you think of the past, the present and the future, it has to get you angry and happy, sad and enthusiastic, and then in peace and freedom with yourself and the world. It has to reach this perfection and surpass it in a way that makes the spectator feel the will-to-live. In the introduction of his “Architecture, Essay on Art”, Etienne-Louis Boulée expresses: “I will merely state that if Architecture had acquired the perfection attained by the other arts, and if there were as beautiful examples, we would not today be reduced to trying to establish whether architecture has its source in nature or whether it is pure invention. (..."
The ability to perceive the Sublime through architecture could be achieved by incorporating the presence of the 4 classical elements into the design. Earth, Air, Water and Fire are elemental components of the Universe and the sole thought on each one refers to an infinite quantity of Nature. Perhaps by bringing the presence of these elements to the architecture the Sublime could be somehow expressed through architecture.

The perfection we find in these four elements is brought to architecture to reach the sublime. Boulée, again, writes: “...a sphere is, in all respects, the image of perfection...” and then he mentions that because the sphere derives from nature, it has characteristics that have an “immeasurable hold over our senses.” This, once again, refers to that feeling of sublime achieved in this case by a geometrical shape. Boulée expresses in his Architecture, Essay on Art, “let us take a look at some of the beauties of nature and we shall see that we are forced to express ourselves in accordance with the effect they have on our senses”. And John Ruskin, following the same thought, writes: “whatever is in architecture fair or beautiful, is imitated from natural forms; and what is not so derived, but depends for its dignity upon arrangement and government received from human mind, becomes the expression of the power of that mind, and receives a sublimity high in proportion to the power expressed”. I believe these might be the keys to reach the Sublime in Architecture.

6 Ibid.
7 Ibid.
8 Ibid.
The following is a collection of my models and drawings in the study of a design of a building experience that would be a step closer to the feeling of the “Sublime” through Architecture design.

designing with the music
With my following model the goal was to understand how to distribute the program on the site. How was the site going to be experienced from a visitor’s point of view. I decided 4th Street’s prolongation into the site was going to appear as the main corridor from where visitors and musicians came into the site and meet to the approach the entrance indoor foyer. Then after that, spaces would generate a sequence as these boundary lines I created were crossed trough. In this study the main foyer appears adjacent and parallel to the 4th street corridor axis. I would later change this to have visitors perceive the water from that space.
Study models helped me understand how spaces connected to each other, how materials related to the site and to the uses of the space. They helped me understand the scale of the site and the building.
entrance foyer
foyer
m u s i c  h a l l
With this model I started to design spaces, moments, events happening in the concert hall. Events happened all the time, every space is a witness.
concert hall
The following are my final drawings: plans, sections, views and perspectives and also pictures of my latest models. Together they express my search toward the Sublime in my architecture and therefore; the architecture of music.
**Up:** entrance to artists rehearsal building
**Below:** rehearsal hall from water
rehearsal hall and practice rooms
up: concert hall interior
below: main foyer and foyer bar
Concert hall walking arrival atrium
Concert hall interior foyer and large staircase hall
left: interior foyer and large staircase hall
right: up: interior foyer from main foyer - below: cloakroom and toilets
Concert hall interior foyer and large staircase hall
The concert had to be acoustically designed, and that includes shape of the music hall, envelope, and materials. The height and width of it put me to think in different design solutions for the structure of the concert hall and the meaning of the space. I decided ultimately the structure was a combination between metal and concrete, working both together better for the goal I was trying to reach through design and also worked perfectly structurally.
structural details
Concert hall structure
scale 1"=1'

Detail thru walls
scale 1"=10'

Detail thru sloped wall
scale 1"=10'
Concert hall structure
scale 1” = 10’
“Charles Garnier, designer of the Opera Garnier in Paris, said in his book, The Grand Opera in Paris, that he had pursued diligently the elusive factors of good acoustics, but he confessed that he finally trusted to luck, ‘...like the acrobat who closes his eyes and clings to the ropes of an ascending balloon. Eh bien!’ he concludes, ‘Je suis arrive!’ He went on, The credit is not mine. I merely wear the marks of honor. It is not my fault that acoustics and I can never come to an understanding. I gave myself great pains to master this bizarre scene, but after fifteen years of labor, I found myself hardly in advance of where I stood the first day....’". 10

The principal materials picked for the concert hall are:

- Weathering Steel for the “music box”, since it brings that earthy element that reminds us of the progress of time and history in the site.
- Wood for the interior spaces that are most related to people’s needs, such as services. Wood has also been used as an important element for the concert hall interior as a sound absorbant material. This material has to do with life, it is a live material.
- Concrete: The original “notation lines” of the project, later born as walls, and bearing walls became concrete, as the roots or foundations of the origin of the project. Concrete has the eternal condition like stone does and reminds the user how important these principles are.
- Light is used in the project as another material. Spaces have been carefully designed so that natural light takes a important roll in the perception of spaces.
Landscape appears as a story that tells about two of the four classical elements: Earth and Water. The other two (Air and Fire) are represented in the concert hall’s interior.
The four classical elements are brought to the project through the use of architectural elements and their materials.

- Water is brought as three shallow pools that people can use during warm days to get refreshed. This water lies in pools that filter the water from the Washington channel and returns clean. These pools have bridges that work as links from the tree-vaulted public space next to the site to provide a number of different accesses to the new project.

- Earth appears as soil terraces whose geometry patterns follow those from the music hall seating pattern. Patterns relate to both; city grid and shoreline by the channel. Terraces of land allow as well to organize the outdoor spaces for their better use for recreational purposes. There is also the possibility of using them as for open air public seating for outdoor performances.
• Air appears in the intimate foyer when there is no other window than the one in the roof. That skylight makes an obvious but simple connection with the sky, letting light come in the room so magically as the element itself.
• Fire happens in the foyer, the element comes to the project as a story, as it used to be back in the history of this typology of buildings. Foyer (comes from latin fccarius=fire) is a space where artists and audience meet in the intermission for an exchange of opinions on what had happened during the first part of the spectacle.
Thanks to my committe; Susan, Paul, Jaan and Jim.
Thanks Susan for always pushing me harder, for always identifying what was really important to me, and for me.
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Thanks Jaan for knowing but letting me find it out, experience it by myself.
Thanks Jim for being humorous, sarcastic, and passionate about my project. But mostly for being always there.
Thank you so much Henry for being the best boss one could ask for, for having the patience that allowed me to learn constantly while in the office.
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Education

2009-2011
Master of Architecture • Virginia Tech, Washington-Alexandria Architecture Center (WAAC)
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2003-2007
Architecture and Urbanism Professional Degree • Universidad de Mendoza, Argentina
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Computer Skills
Revit • AutoCAD 2D/3D • SketchUp • Adobe CS (Photoshop, InDesign, Illustrator) • 3D Studio Max/Viz • Microsoft Office • Rhino

Awards

2011
WAAC • Virginia Tech • Crystal Award Honorable Recognition for Thesis Defense
2011
Washington Monument Ground Ideas Competition • wamo.org • semifinalist
2011
WAAC Awards 2011 • Virginia Tech • Front Line GTA Award

2005
Scholarship • University of Mendoza, Argentina • Study Abroad Scholarship awarded for Best Grades

2003
Exhibition • University of Mendoza, Argentina • Second year Studio project selected to be exhibited at RIBA’s Jury

Languages
Spanish (native) • English (fluent) • German (beginner)