The Aleatoric Milieu:

An Architectural Theory on Proxemics and Navigation Design

by

Elaine Yan Ling Lui

A thesis

presented to the University of Waterloo

in fulfillment of the

thesis requirement for the degree of

Master of Architecture

Waterloo, Ontario, Canada, 2015

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

The *Aleatoric Milieu* is an architectural theory that combines the space people require to feel at ease and natural wayfinding. By investigating how buildings and cities naturally possess or have been observed to develop ways to accommodate such considerations, we can learn how to create buildings that are hospitable to their communities. The Aleatoric Milieu provides a tool for spatial design that incorporates user-friendly spaces in cities and buildings. The theory strives to foster healthy transitions between inter-personal dynamics while intuitively connecting people to services a building provides, establishing an accessible environment.

In order to design for cities and buildings that consist of a hospitable design language, how the human body and its receptors interact with others is used to analyze dimensions of public, social and personal scale. To navigate these transitions in their application to the purpose of city and building infrastructure – be it retail, parks, monuments, or an information kiosk – requires a narration of space. *Navigation design* provides a spatial narration of space using an interconnected concept distilled into the *narthex, path,* and *node. Narthex* refers to an initial location of first impressions, informing users of a *node* and allowing for decisions to continue on a *path* to the *node.* The *path* refers to a recurring architectural treatment that edifies the *node* – the point of architectural interest, purpose or necessity.

Therefore, the Aleatoric Milieu consists of two main parts: *proxemics* and *navigation design* with a third organizing factor. Natural city development principles are used to link *proxemics* with *navigation design* to arrive at an architectural language that coincides with the development of cities. The greatest density exists in the public sphere, and the least dense travels the proxemic scale to increased privacy and vice versa through the principles of *navigation design*. Thus, the Aleatoric Milieu can be applied to strategies for design in specific proxemics at the end of chapter three.

These principles are visible in museums, as they are institutions that functions as miniature cities – they are the holding place of culture, ideas, or objects that exemplify a city. As such, in this paper, museums are used as case studies to examine the success or obstacles to hospitality through an analysis that uses the Aleatoric Milieu.

Finally, to illustrate a sequence of nodes, a museum design demonstrates a strategy of the Aleatoric Milieu that includes *navigation design* and *proxemics*. It is tested against a series of scenarios to accommodate the proxemics of "non-contact middle-class adults" with the addition of child-care supervision standards of Ontario, Canada.

The Aleatoric Milieu design theory ultimately strives to arrive at an architectural framework that creates inclusive space. Implementing these design considerations can produce concurrent buildings that welcomes and attracts its users, while naturally fostering a sense of community over time.

Acknowledgements

The content of this thesis has not come into fruition independent from the professors and mentors from the School of Architecture of the University of Waterloo. Without the dedication, expertise, encouragement and understanding of professors, librarians and office staff, this thesis would not have been possible.

The authors, architects and scholars I have referred to have notably helped me understand their perspective of the world. What I have created is simply an extension of their research and insight with the addition of my considerations.

Dedication

This thesis is dedicated to the loving memory of Queendy Lee, a friend and mentor who inspired many in her dance of life toward her Creator God. Full of joy and hope, she showed me how she danced her way home.

Table of Contents

List of Figures

List of Tables

Introduction: Aleatoric Milieu

I

Prologue

During a work term, I was assigned a project, which, in my opinion, created a great physical divide between the rich and poor by designing a city on a hill. Convinced that there must be a way to develop a design that is inclusive, hospitable, and preserves human dignity; I searched for a way to bridge various cultural and socioeconomic gaps in a mutually beneficial manner.

The Aleatoric Milieu is an architectural theory that brings an awareness to designing for inclusive and hospitable architecture. Through spatially accommodating the flow of people with visceral wayfinding that naturally directs to the amenities that a city and its buildings has to offer, the experiential nature of space improves in comfort and accessibility. The Aleatoric Milieu's objective is to provide a "space for chance" that is hospitable and provides positive opportunities for human interaction.

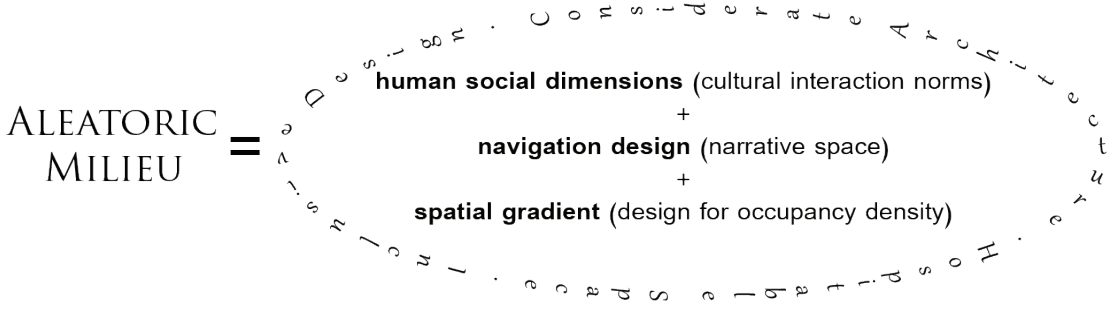

Figure 1-1 Aleatoric Milieu Word Diagram.

I. Introduction: Aleatoric Milieu and Hospitality

To foster an abundant civic life in a city, built works ought to inform the inhabitants regarding their purpose. Sometimes this architectural message is imposed by a cookie-cutter form in the branding of chain stores. At other times, architecture is a passive and subtle response to an environment, allowing its users to create and modify the building's purpose. In certain instances, it is the dilapidation and neglect in buildings of a previous era that leads to static and uninspired and irrelevant spaces. All the attention to such changes falls in and around the spirit of the age, the Zeitgeist.

Architecture responds to the Zeitgeist people of multiple disciplines, who gather to create shelter, monuments, homes, bridges, etc. – things that are significant to human survival, to flourish or to remember. Environments built for practical purposes improve the ability to evoke human sensory experiences while enticing them to move through the built environment in comfort. Within a secure and safe environment of a city, the next step is to design for human hospitality. Namely, a method in design that provides motivation for people to use commodities produced by a city economy with shared ease and beyond basic creature comforts.

The human faculties that include our senses and our vague perceptions are the basis of how people perceive space. Emotions and discernment linked with memory including materiality and spatial cues that link comfort with personal history and culture. These factors are relevant when a visitor encounters any environment. By utilizing visual elements; such as daylight or artificial effects, spatial indicators that allude to meaning as well as acoustic material, architects should be able to influence how a person may choose to move from one location to the other. A theory of spatial environments and its elements that correlate with navigation becomes a next step in creating mentally healthy and hospitable conditions.

Architecture can be organized and structured in a way that increases one's awareness of their surroundings. In order to do so, designing architecture that motivates people to specific locations in comfort and draws them into a story larger than themselves is pursued in the Aleatoric Milieu. This thesis stems from a desire to create something that reveals the beauty of one's immediate surroundings, or more bluntly, stops people from habitually staring at the floor when they walk.

In order to return to the roots of how space is perceived and consider how to apply these findings in an architectural space, the Aleatoric Milieu creates a new method of perception in designing. It utilizes a "language of acceptance" through hospitality. The invitation for the exploration and analysis of a building designed with an Aleatoric Milieu will become a catalyst for connecting people to innumerable possibilities. It will connect individuals with the same preferred destination or node within the scale they feel most comfortable at that moment in time.

The Aleatoric Milieu or the literal translation of 'chance space,' offers an opportunity for human encounters in a comfortable spatial arrangement. It can be made using the wealth of materials, technological advancement and construction methods to create "atmospheres" available to the designer of the post-modern era. Further information can be found in "Peter Zumthor's Atmospheres" on page 129.

Therefore, the inception of the architectural theory entitled an 'Aleatoric Milieu,' begins with the analysis of human dimensions, moves to how the awareness of these dimensions is heightened or enhanced in the process of navigating space through observations of city development. In other words, it is based on principles of design that combine human social interactive dimensions and wayfinding applied within the context of an architectural pattern language.

A. An Aleatoric Milieu

The term *Aleatoric Milieu* has been chosen to describe a design strategy that provides informed visual and sensory cues for users to navigate the built environment. This phrase describes designed space orchestrated to allow for the freedom of navigation without confusion. An informed place with sensory cues and spatially organized for a place that is spontaneous or full of chance. A place with suggested boundaries, open to independent choices to be made. An architect transforms a building and makes it like a piece of music when a pedestrian feels as if he or she has become a soloist in a tapestry of delightful experiences.

Aleatoric is borrowed from the term 'aleatoric music,' or indeterminate music, 'Alea' being the Latin word for a die, as in rolling the dice. It is a type of open form composition where details and pitches might be specified but the form left to chance.[1] An example in music is when a composer suggests a "trill or a rift" between notes and melodies that are left to the discretion of the performer. In applying this to architecture, the point is that people cannot be forced into any particular area to occupy space. Rather, they move unpredictably within the options available in a built environment.

In regards to the 'task of building,' *milieu* is where architecture is "regulating the relationship between man and his environment," creating a physical and social milieu that which encompasses the "meaningful frame for activities of man."[2] It is based on an understanding of the visceral relationship between humans and their environment.

The combination of the term, therefore refers to how people are affected by a design that includes social considerations of comfort and culture. The idea of Aleatoric Milieu can begin to re-address socio-cultural factors as an added dimension to the deliberation of architecture.

An Aleatoric Milieu is an architectural theory that argues that architecture shapes the necessities of holistic life - integrating sensory and socio-cultural details that help shape the impressions and atmospheres of architecture. Aleatoric Milieu is architecture that is considerate to those who inhabit it, as illustrated in "Figure 1-1 Aleatoric Milieu Word Diagram." on page 3.

Design shapes the fabric of life. In order for architectural design to positively inform human existence, consideration should be given to human sensory capabilities and social dynamics in order to create holistic and contextual environments. The usage of space includes the combination of awareness in human physical dimensions with its social connotations. The spatial dimensions of a particular space are suggestive of personal, social or public interactions and the subsequent behaviour that accompany those spatial arrangements. It also includes navigating this space as well as also giving consideration to a gradation of intimacy and density for occupancy in a designed area. Therefore, the recollection of a constructed realm is often understood as wayfinding, or from the navigation design of space, the places one has been where activities take place within the dimensions of the built environment.

The perceptions of a built environment from its material impressions, social dimensions within a cultural context, as well as the human aspects of the experience navigating the static building, culminates in the theory of the Aleatoric Milieu. Its application is twofold; to build architecture and design spaces that produce a language of acceptance and hospitality, and to also able to be used to analyse the built environment – the possible improvements to add interest at certain locations of a building, add delight and to increase or decrease traffic flow – thereby improving the motions of life occurring within it. The result of the following deliberation provides a litmus test, entitled "Aleatoric Milieu" for the evaluation of a building according to human experience and interaction.

In exploring how space may be navigated by its users in a visceral way, careful consideration was given to the following questions:

1. **How does a person decide to walk from point A to point B? Is it perhaps by chance, or are there specific considerations that can help determine a preferred path of travel, in scale, in relationship to the built fabric of life, or a purposeful decision to fulfill a basic necessity of life?**

2. **Secondly, within the every day, are there locations in the built fabric that people will gravitate towards, that remain in memories? What is the sort of place in which people invest a social consciousness, where all of the above can occur?**

An Aleatoric Milieu consists of a *navigation design* that delineates the motivating factors for a person deciding to walk from point A to point B through a *narthex* with the designed chance to choose. Then a purposeful *path* of travel to a *node* of interest creates a memorable place built into the material fabric of everyday life. Secondly, an Aleatoric Milieu is built through the consideration of a social scale that will provide comfort for interaction within the designed space which is hospitable and accessible. Within a built fabric for memories – a collective memory of a city – is strengthened through the process of navigational design.

Subsequently, the question is answered in a foundational idea entitled 'Navigational Design', within the context of a city while navigating a public building. This premise, combined with human dimensions, is woven together to create an informed concept from Christopher Alexander's Pattern Language filters and combines the theories into the conjecture of an Aleatoric Milieu.

1. The Application of an Aleatoric Milieu

The notion of this thesis is to gather a contemporary conceptualization of space and use it to create architecture that accepts and welcomes its users. The Aleatoric Milieu re-examines how humans utilize space so such information can edify users in a way that caters to the investigation of how humans perceive spatial elements in personal, social and public settings. Since people don't stay at a single location indefinitely, an understanding of paths and walkways is explored, as well as those combined elements in an architectural language. A "pattern language" that is an informed collection of how humans have developed the use of space over time adds a gradation of intimacy and density to the analysis. The Aleatoric Milieu becomes a multi-faceted perception of tangible forms of spatial examination and analysis.

The Aleatoric Milieu is a tool that is derived from a combination of studies. It includes human social interactive dimensions and wayfinding that is informed by historical architectural growth patterns. This theory can be utilized in architectural design and can also provide perceptible commentary to how an effective institution can create buildings that are hospitable, and, therefore, relevant to their communities.

B. Thesis Summary

This thesis investigates the following questions separated into three parts:

1. How does the theory of an 'Aleatoric Milieu,' address hospitality in architecture spatially, its navigation and coherence to the activities of daily life?

2. How does the theory of an Aleatoric Milieu improve existing museums?

3. How might a physical representation of a building designed with the concepts of an Aleatoric Milieu function?

1. Aleatoric Milieu

The theory of an Aleatoric Milieu consists of an exploration of physical human experience through interactive social dimensions. Then the consideration of how this space is navigated is explored. The combined strategies of both considerations are tested against established human patterns of life, which contains a language that consider dimensions and narrative identities within the built framework of architecture.

The research process of an Aleatoric Milieu concentrates on three influential writers and is inspired by their perspectives and writings. They are Edward T. Hall's study of proxemics in "The Hidden Dimensions," the navigation of space through Margaret Visser's encounter with Sant'Agnese Fuori le Mura in Rome in her book "The Geometry of Love," and Christopher Alexander's narration of space through gradations of density, focal points and intimacy in "A Pattern Language." The conclusion of these writings is the understanding of an Aleatoric Milieu.

The Aleatoric Milieu is the integration of human social dimensions and a *navigation design* theory that consist of a *narthex*, *path* and *node*. Nodal points entice visitors along a path and inform others of the purpose of the space to garner interest while the initial narthex allows space for such decisions to be made. The combination of narthex, path and node of the building describes the narration of the building, the *navigation design*.

2. Museum Case Studies

The second section of this thesis is the analysis of an Aleatoric Milieu found in museums. Through an analysis of their narrative and spatial arrangements with an Aleatoric Milieu, their navigation communicates substantial perspicuity considering the factors of an Aleatoric Milieu.

Within the expectation and perspective that buildings can be regarded with optimistic anticipation, museums can be used to symbolize ideas or stand as a monument to time for educational purposes, entertainment and play host to social venues. They are not simply for historic preservation. By identifying aspects of the Aleatoric Milieu and how museums have used or not utilized those locations, areas of success or improvements are discussed.

A series of diagrams of the chosen museums is derived from this collective perspective for an Aleatoric Milieu and is utilized to investigate their aleatoric aspects. The museums analyzed are as follows: Newseum in Washington D.C., Wolfgang-Bonhage Museum Korbach in Germany, Kunsthaus Bregenz in Austria, and the CaxiaForum in Madrid, Spain.

3. Aleatoric Music Museum Design

The implication of creating an Aleatoric Milieu is a clarification of designing spatial elements and how one can navigate it with motivation and comfort. With the theory of an Aleatoric Milieu, a designer can accommodate many 'atmospheres' and design styles that include an understanding of human social dimensions, navigation design, and gradations of intimacy and density. The perceptions included are believed to have been developed through architectural history. These gathered observations are presented by experts in their fields in the form of a 'pattern language.'

The thesis uses the design of a museum to test the application of the navigational design method that has been derived. The design is intended to demonstrate an application of the Aleatoric Milieu. The design focuses the flow of spaces in particular and has intentionally excluded many of the details of construction and materiality.

The museum design in this thesis is specifically oriented to the dynamic of sound and design as a Music Museum. It is measured with human social dimensions and is built for how human activities can be reinforced spatially, a central concept of motivating movement with comfort. In designing a spatial example of an Aleatoric Milieu, the museum design works towards designing architecture that gives consideration to sound, as well as the other classical senses of human perception in order to create a place where chance and space meet – an Aleatoric Milieu.

C. Conclusion

First impressions have a lasting impact and are similar to how impressions of a place are made. It is like the anticipation of meeting someone new, then finding topics of interest that lead to depth of character, which makes someone attractive. Similarly, the Aleatoric Milieu with *navigation design* consists of the narthex for first impressions, where nodes are visible, and paths lead from node to node. However, architecture being more enduring than fleeting moments of memory and human encounters needs to enthrall with multiple visible nodes that leaves the user with a varied palette of impressions – analogous to adding depth to the character of a person – and enriches urban city life.

Adding proxemics to include scale in architecture will amiably guide users as adjacently scaled transitions signify a change in program or exhibit. To architecturally conduct and compose public space that welcomes is the primary goal of the Aleatoric Milieu.

Creating an Aleatoric Milieu is motivated by the desire to be sensitive to personal, social and public dimensions within a geographical context. The desire is to understand how people navigate space and why certain arrangements of a program, seating, lighting and stairwells encourage usage, while others create "dead space."

The thesis discussing the Aleatoric Milieu theory is an investigation on wayfinding with conclusions re-titled "navigation design" and is superimposed on socially interactive dimensions, namely proxemics. The theory is further clarified with the practical factor of designing for a gradation of density in buildings that has been observed in "pattern languages" from the built environment. Through the acknowledgment that factors that influence perception exists beyond a visual esthetic of architecture, an informed wayfinding system that subliminally guides and facilitates the usage of the built environment creates new opportunities. Design that pays attention to the social and cultural dimensions of spatial awareness adds value not only to the built environment but also strengthens human dignity.

The Aleatoric Milieu creates an architecture design solution that can be used intentionally to create space that welcomes and accepts its users in a subtle and easily accessible manner. Therefore, when techniques contrary to the theories of an Aleatoric Milieu are applied, space can be designed with the intention of social discomfort, denying creature comforts, or enhancing individual senses by omitting other human perceptions. Architecture that invades the senses begs to be noticed, but when created unintentionally, becomes an uncomfortable location or series of spaces for conversing, staying or congregating.

An Aleatoric Milieu is an infused perception of space that has a twofold purpose: to provide a spatial palette for architects that inform the individualistic and social experience of space, while being an analytical and creative tool that can be utilised for the improvement of the existing fabric of a city or building.

Endnotes

1. More specifically, aleatoric counterpoint was perfected by a Polish composer named Witold Lutoslawski in which the pitches of the music were notated, but the rhythms were improvised. Influenced by John Cage, Lutoslawski's Venetian Games has string sections featuring aleatoric chord clusters that alternate with wind/percussion sections which were notated traditionally.

2. Christian Norberg-Schulz, *Intensions in Architecture* (Cambridge, Mass: M.I.T. Press, 1968), 109.

II

A Theory for the Aleatoric Milieu

II. The Aleatoric Milieu Theory

The Aleatoric Milieu is an architectural theory created for the purpose of designing architecture that is hospitable. Comprised of human social interactive dimensions or proxemic scale and wayfinding defined as navigation design, the gradation of density organizes the proxemic scale with the elements of navigation design. The findings culminate in a theory represented in diagrams that when applied to designing a building program, is useful for analyzing spatial arrangements for human social comfort while attracting intrigue that passively encourages pedestrian flow.

A. Interactive Human Dimensions

Cities can showcase the idea of placemaking which forms part of the physical and social milieu. In Martin Heidegger's 1951 essay "Building Dwelling Thinking," the German philosopher considers building as a type of dwelling. Gathered from the associations of the German word for "space" is *Raum,* and related to the English word "room," building becomes a physical expression of the idea of a "place."[1] This couples with the German word for architecture – *Baukunst* – literally the "art of building." In this Teutonic art of building, there is the consideration of a "public sphere" in design.[2]The creation of rooms and architecture is spatial and an art in placemaking that considers the public domain. Therefore, regarding how the human dimensions relate to the function of life is essential to design.

Human dimensions were the beginning of Graphic Standards for architectural design. The understanding of average human dimensional requirements in an area allowed for practical and essential elements of architecture to be created - handrails that are within reach, door handles that can be turned without jamming fingers against a door frame, overhead spacing that allows for people to walk up and down stairs without having to duck. Designs for fundamental human dimensions are now an unquestionable standard in the 21st century.

Having the basic dimensions standardized in chairs, tables, counter heights, cabinets and millwork within reach, the next obvious step was to cater to convenience, aesthetic and efficiency. Examples of standard practice include how kitchens are designed around a triangular workspace for an individual cooking at home, how the range is at an average height and that all appliances are placed within reach. Such practices have been reinforced by the development of an architectural code.[3]

However, there are further dimensions that need to be considered in the progression of design for humans. These are the social dimensions – or the dimensions that arise when humans interact – that are intrinsically linked within built space. It may not be apparent that there are social underpinnings in an entry, but design that is unaware of social or cultural aspects may result in awkwardness, strained relationships or even contravene cultural or social norms. For example, in places such as France, the center of the room is believed to be the most important and is reserved for people who are especially honored. In other cultures, it is thought that the centre of the room should be occupied with furniture if a place is to be considered complete. Many ideas of the usage of space are culturally embedded, such as ideas that chairs should not be moved, doors soundproofed or paper thin, that floor heights should be above eye level and beyond one's awareness when looking forward. Refer to the Appendix, "1. Cultural Proxemics" on page 127 .

Therefore, spatial requirements, material finishes, as well as construction methods respond to the cultural influences of the users. If, for example, a space is considered public, it is necessary to design in consideration of how users must respect other's space and maintain appropriate norms of social distance in a public place.

The creation of an Aleatoric Milieu affirms social dimensions that are intrinsic to built space, as well as particular dynamics resulting in socially appropriate behaviour. When the dynamics of the dimensions of social interaction are integrated with a phenomenological perspective and *navigation design*, buildings can be designed so as to support social and cultural contexts more effectively.

1. Edward T. Hall: The Hidden Dimensions of Proxemics

In 1966, the anthropologist Edward Twillich Hall published *The Hidden Dimensions,* coining the term "proxemics" to illustrate how both 'man and his environment participate in molding each other.'[4] He describes a 'Silent Language' where communication occurs simultaneously on different levels of consciousness. Proxemics depicts the implicit and explicit experiences of an environment, describing in physical dimensions how people inhabit their respective sensory worlds.

As humans, we possess a sensuous nature, and as delineated by Pallasmaa: senses of sight, sound, taste, touch, scent, muscle and bones.[5]The emotions, relationships and experiences that are derived from the reaction to our senses are arguably more complex. Of those categories, Hall has defined distance receptors and immediate receptors: distance being the eyes, ears, and nose, while the immediate receptors are the skin, membranes and muscles. Although the experiences of these senses are shared, there is a difference in how senses are selectively screened in the context of cultures, personalities, climates and purposes. Similar to how the study of ethnography attempts to be a holistic approach to understanding people in their contextual environment, the study of proxemics attempts to map the hidden dimensions of how humans inhabit their sensory worlds.[6]

Although 'experience' is shared by many different people, proxemic research:

> *[...] describes how people from different cultures not only speak different languages but, what is possibly more important, inhabit different sensory worlds. Selective screening of sensory data admits some things while filtering out others, so that experience as it is perceived though one set of culturally patterned sensory screens is quite different from experience perceived through another. The architectural and urban environments that people create are expressions of this filtering screening process.*[7]

Hall sought to define the sense of space in relational boundaries to challenge concurrent assumptions of relational boundaries existing beyond physical contact and that not every effect stems from a single cause.[8] Refer to appendix "1. Cultural Proxemics" on page 127.

a. Edward T. Hall's Proxemics Visualised into Diagrams

Instead of focusing on different personality types, Hall chooses to document learned 'situational personalities' by compiling observations and interviews with "non-contact"[9] middle class healthy adults who are mainly from the Northeastern seaboard of the United States. A high percentage of the men and women were business professionals and classified as intellectuals. In basing his study on 'non-contact' adults, consideration is given to the people who require the most space to feel comfortable but out of the necessity to communicate, will keep a studied distance in public engagements, social interactions, personal and intimate situations. Hall defined these learned situational distances to include types of activities and relationships associated with each distance categorically under the following: Kinesthesia, Thermal receptors, Olfaction, Vision, Oral and Aural. In "Table 2-1 Hall's human social dimensions derived from Proxemics." on page 17, outlines Hall's observations of the Intimate, Personal, Social-Consultative and Public, as ways humans conduct themselves when applying those distance receptors.

Hall's conclusion is four informal social distance classifications: Intimate (0-0.5m), Personal (0.5-1.2m), Social – Consultative (1.2-1.6m close, 1.6-3m not close) and Public.[10] The average human standing heights for males and females including shoes are 1775 and 1665 millimeters respectively. Assuming an equal population percentage of half females and males, the average adult height would be approximately 1720 millimeters.[11]

Table 2-1 Hall's human social dimensions derived from Proxemics.

Informal Distance Classification	Metric in Meters	Imperial in Feet	Abbreviated Description
Intimate	0 – 0.45m	0 - 1 ½ ft	Distance which intense feelings are expressed: tenderness, comfort, love and strong anger.
Personal	0.45 - 1.3 m	1 ½ - 4 ½ ft	Conversational distance between close friends and family.
Social - Consultative	1.3 – 1.6m (close) 1.6 - 3.7 m (far)	4 ½ - 12 ft	Mandatory recognition distance begins. Conversational distance between friends and acquaintances.
Public	3.7 - 7.6m (close) >7.6m (far)	12 - 25 ft	Formal one way communication, e.g. lectures or uninvolved bystander.
Social Context	20-25 m	>60-80 ft	Social context begins; feelings and moods perceived as well as facial recognition, hairstyle, age etc.

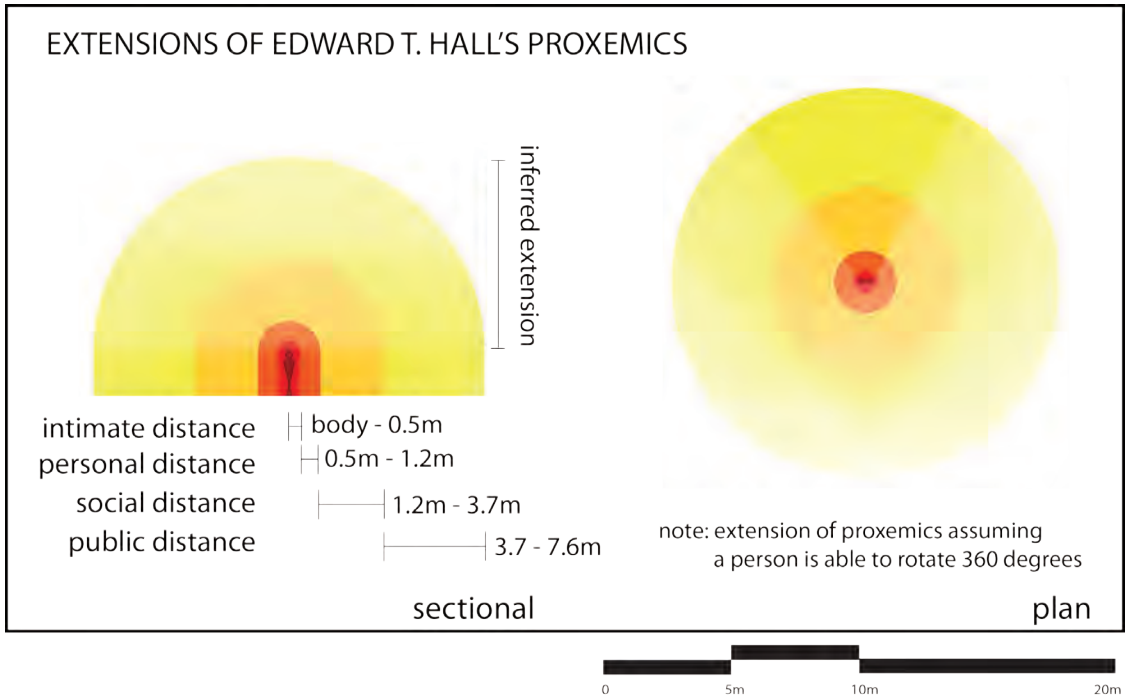

Figure 2-1 Visulization of Hall's Proxemics and Informal Classification

To better visualize the scale of Hall's findings and to project it into an architectural scale, the following diagrams are derived from human social dimensions for the purpose of understanding space in three dimensions in the Western Context, as demonstrated in "Figure 2-1 Visulization of Hall's Proxemics and Informal Classification" on page 18.

This diagram that only effectively shows Personal, Social, and Public spheres of proxemics have been visualized as an extension of the mobility of humans in a stationary setting, as visualized by me, the author. These diagrams are not to be used as a generalization of all cultures and people groups, as people envision space differently. For the purposes of creating and studying hospitable space for the the Aleatoric Milieu, this diagram will be used as a standard for which humans percieve space.

In addition, there are considerations to be given to the height of children, teens and adults, since individuals also develop social dimensions differently. Some might be more keenly aware of a certain distance category more acutely than others. For example, some may be more aware and expressive in intimate expressions, like a child who is shy socially, and chooses only to whisper to his mother, while an extroverted teenager is acutely aware of how social circles are formed by selectively placing his or her body in a semi-circle format – even while walking.

Hall explains that: "The greatest criticism one can make of the many attempts to interpret man's past is that they project onto the visual world of the past the structure of the visual world of the present."[12] He argues that man, through the history of time possess a growing awareness: "First to himself, second of his environment, then of himself scaled to his environment, and finally of the transaction between himself and his environment."[13] Therefore, it is in a designer's interest to design to accommodate the proxemics of his or her users.

It is plausible to infer that the distance classifications are learned sequentially from the body to greater spheres of involvement. The presumption is that the intimate is learned first as a baby. As an adult person, one learns the person, social, and finally public as well as ways to conduct oneself in every type of setting, differing from each person and various cultures. As such, every person on particular occasions, have preferences for certain social spheres. Some prefer intimate spaces like little niches to sit – small windows or balcony spaces – while others prefer social atmospheres, such as an open concept diner with the general seating for five or lounge seating around a coffee table. For others, wide streets and open vistas of public space is where they like to spend time, such as parks or in a large vaulted cafeteria or church.

Yet, preferences do not equate to the same social dimensional norms. For example, in each culture, social expectations or inferences follow each social dimension. In intimate space lovers or friends like to be linked arm in arm, while in the social dimension, friends laugh and converse. Publically, norms may be in place that discourage people to shout or yell unless addressing the entire crowd of people while sharing the same public space.

Not only are there proxemic preferences, but there are differing expectations of social norms even within a single culture. Therefore, in a social setting to accommodate for the greatest number of people, Hall's study for middle class preferences are extrapolated into architectural space that possesses the potential for personal, social and public occurrences.

b. Visualised Proxemic Dimensions

Since it is natural to infer that a person standing can turn around in 360 degrees, or turn their head to the left or to the right, a stationary person can propagate Hall's social dimension as a sphere around themselves.

"Figure 2-2 Visulization of Hall's Distance Classifications" on page 20 is a chart that describes Hall's study of intimate, personal, social and public dimensions and its implications on the physical environment. It demonstrates to scale what the informal distance classification looks like on an average adult in a stationary position. The social implications of scale have been extrapolated by the author.

Now frequently referred to solely as *personal bubbles*, people become aware of this phenomenon when these invisible lines have been crossed and the first sense of crowding and annoyance is experienced. With the study of these hidden dimensions, over-crowding can be diagnosed. Hall has noticed that – "when stress increases, sensitivity to crowding rises – people get more on the edge – so that more and more space is required as less and less is available."[14]Hall's intension is to create an awareness of space to allow for cross-cultural understanding, becoming the first steps that might allow others to read the silent communications of space as easily as the printed and spoken ones.[15]

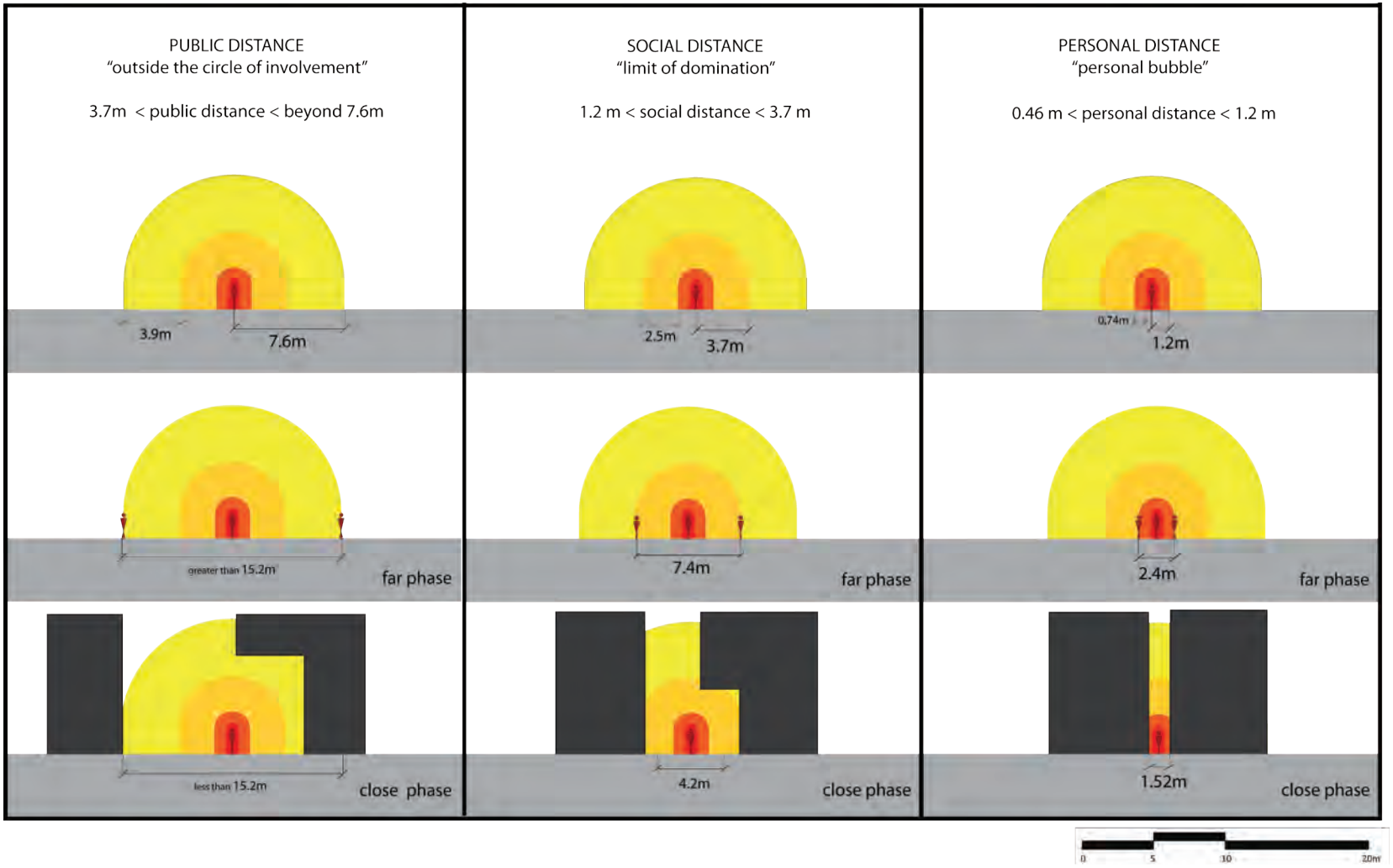

Figure 2-2 Visulization of Hall's Distance Classifications

c. Walking Social Dimensions

In addition, consideration is placed into the act of walking. There is also a perceptible cone of vision, as people are free to turn their heads to both the left and right. As a person moves and walks, the perception of space shifts. While a person is stationary, Hall's analysis may be the most accurate, since the cues to the zones of intimacy are originally based off the use of sound. As a person moves however, the perception of awareness shifts into the direction one chooses to move in. Jan Gehl illustrates a forward head tilt and tendency when humans are in motion in Figure 2-3 on page 21.

This expansion and contraction of social dimensions may occur as seen in Figure 2-4 on page 22. It is an illustration of how social dimensions may change when in motion to some people.

Depending on the individual, in addition to the social perception shifting to the front, while the sides or peripheral dimensions shrink, there may also be an awareness of varying social awareness behind oneself. An indicator of such an awareness is the annoyance of being aware of someone walking behind oneself too closely; either for the fear of others stepping on his or her ankles when one slows down, for example. Social dimensions may also be distorted to the forward motion, or when in a confined space, like a subway or moving vehicle. In order to shrink one's proxemics, one may avoid eye contact and remain extremely stiff and ignore people beyond one's immediate surroundings.

It is, therefore, not an exact science or a set of expectations of human dimensions that are proposed, nor is it a specific reaction to architectural and physical experience. Rather, Hall's study becomes a reference point in engaging a set of acknowledged yet invisible human dimensions.

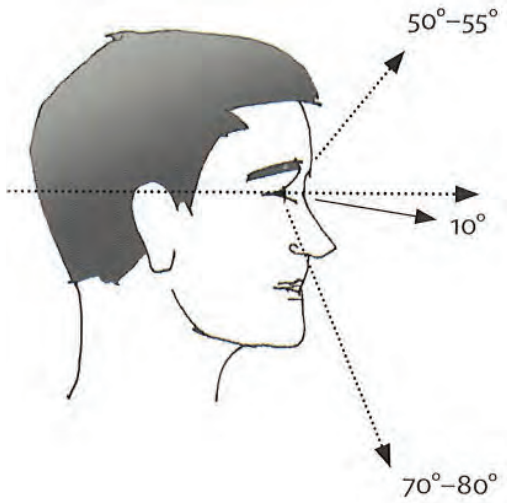

Figure 2-3 General degree of visual perception that often occurs due to walking.

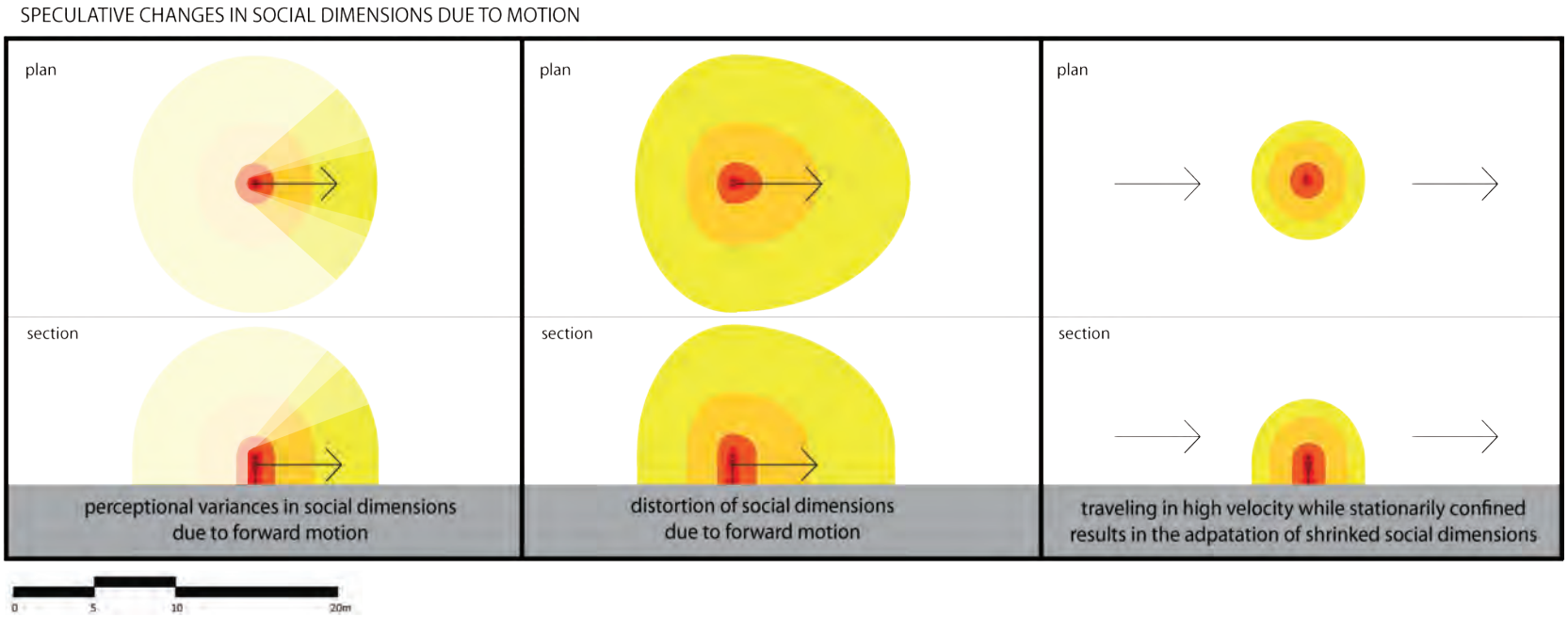

Figure 2-4 Visulization of Possible Movment of Distance Classification in Motion.

d. Vertical Social Dimensions

Since social dimensions are learned by individuals as a progression, it is also relevant to refer to how people socialize in vertical dimensions. Jan Gehl is an urban planner who had redesigned the streets of Copenhagen based on principles of proxemics, and the human preference for slopes and edge conditions. He advocates for providing optional seating, bollards with leaning options, seating with protected backs with a view and lively streets. Gehl also considers the vertical limitations of effective social interaction and observation.

Figure 2-5 on page 24 are Jan Gehl's illustrated analysis of spatial vertical sensibilities.

They are also similar to Hall's proxemics since Gehl had made reference to Hall's writing and had additionally investigated the vertical implication of the human social dimension. Incidentally, Gehl's important threshold is 6.5m, which is the extent of social dimensions while 13.4m is also the extent of public dimensions. It appears Gehl supports Hall's dimensions in generating his own analysis.

Therefore, to visualize a spatial enclosure in the terms of personal, social or public scale through its proxemic dimensions is illustrated in Figure 2-9 on page 30.

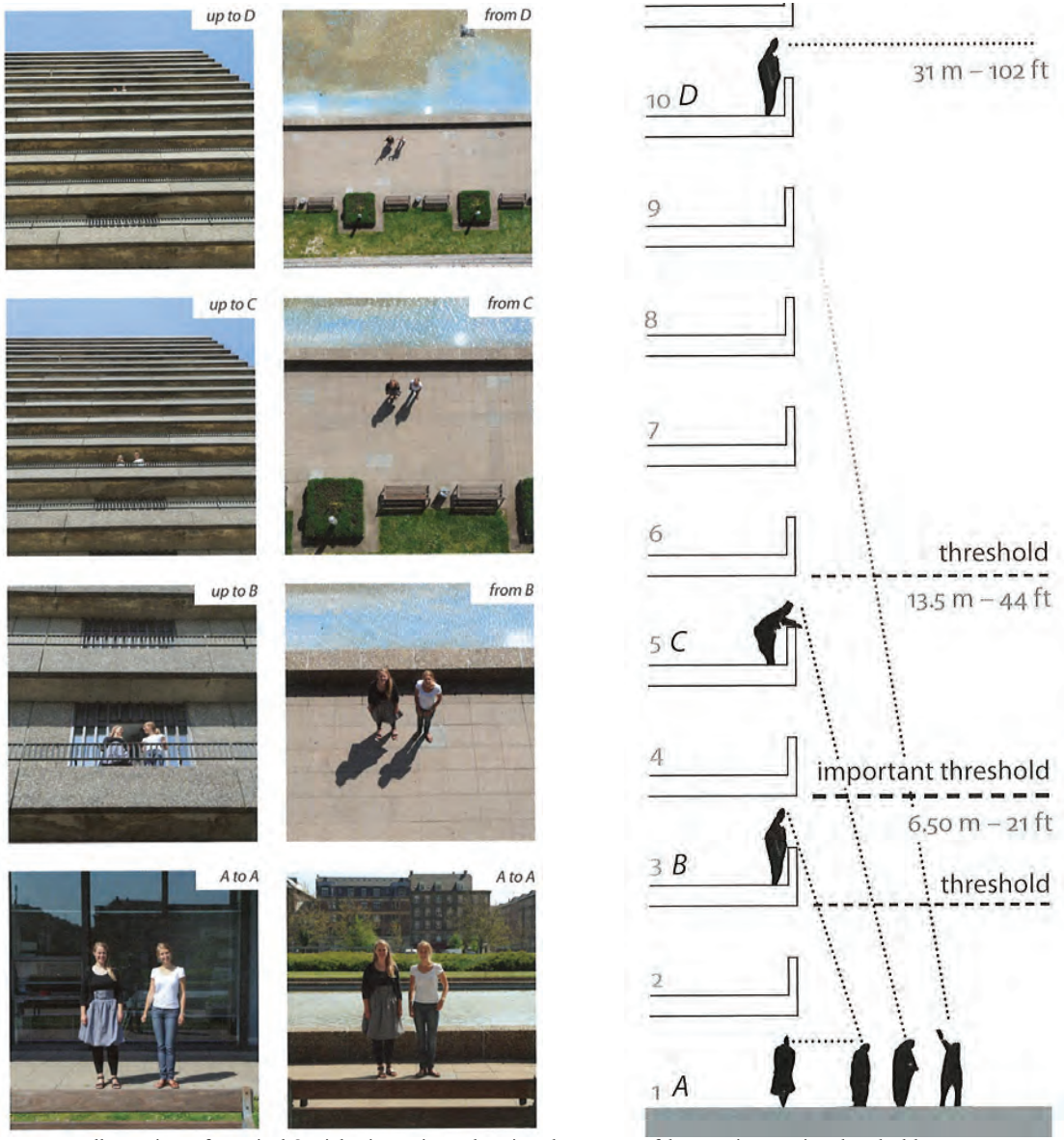

Figure 2-5 Illustration of Vertical Social Dimensions showing the extent of human interactive thresholds.

e. Children and Proxemics

Children grow and develop proxemics through learning to communicate, they also learn intimate, personal, social and public dimensions. However, to better design for children as they grow, there should be a generalization of personal space as the extension of their arms, and social space as just beyond their arms reach. Thus, this spatial chart is an analisis of children at the age of 7 years of age at an average height of 1220mm according to anthropometric data.[16]

To simplify the analysis for children, Figure 2-6 on page 25 illustrates a snapshot of the proxemics of an average child at age seven. The child's personal distance is gagued at arms length while social distance is speculatedated to be just beyond arms length to 1200mm.

In order for children to experience motion in a room, they also need to be supervised. According to the standards set by the Ministry of Education in Ontario, children play area is standardized for a maximum of 30 students in general. Each child has been calculated to require 2.4m^2 therefore the area for play is 84m^2.[17] As analysed in Figure 2-7 on page 26, it is suggested that classroom numbers or sizes do need to reflect an adult's as well as a child's proxemics. In a stationary learning setting, children do need to be within an adult's sphere of social dimensions, since the expressions and responses of children sitting at the outskirts cannot be correctly accessed by the teacher. In addition, children also need to have adequate space from their peers as this may help mitigate disruptive behaviour that occur between children who feel crowded.

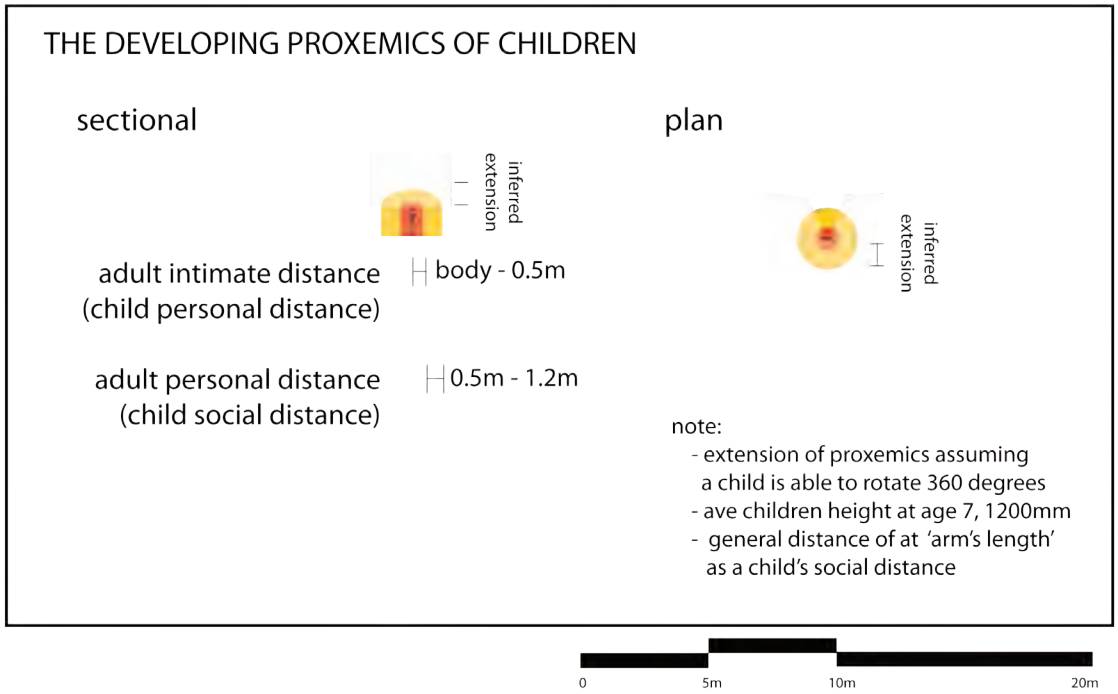

Figure 2-6 The Developing Proxemics of Children

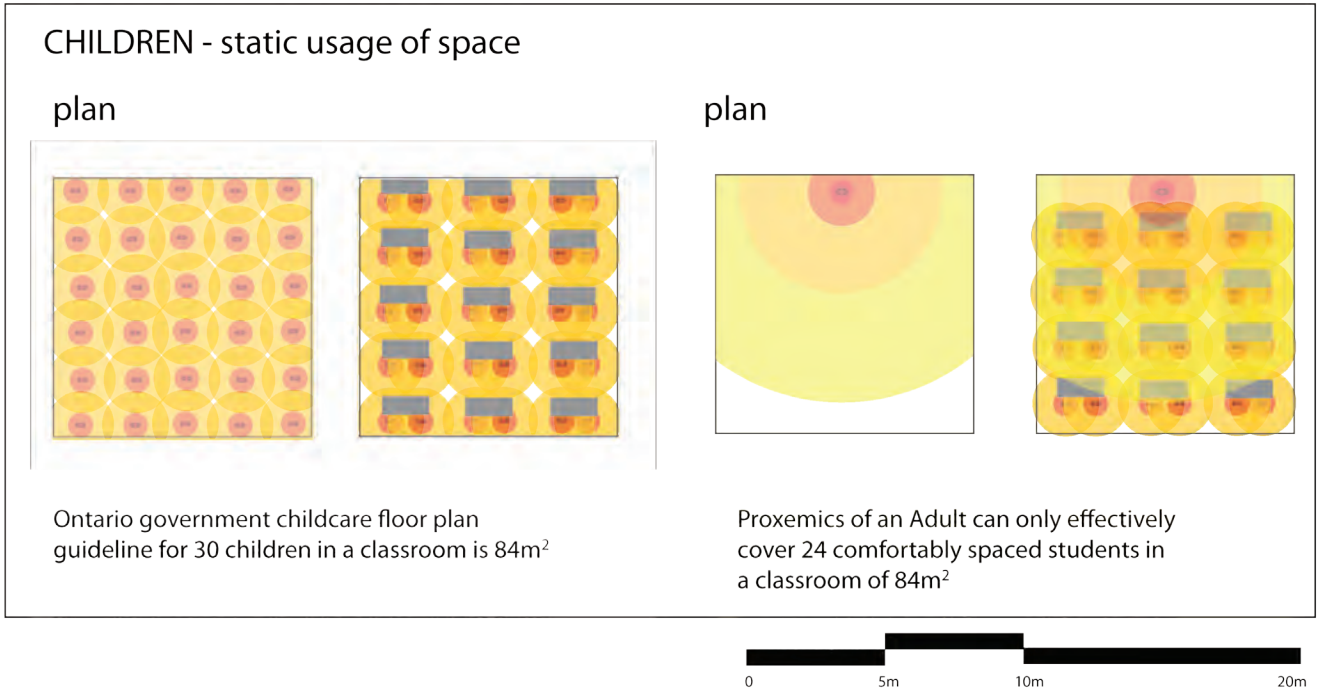

Figure 2-7 Children in a classroom setting supervised by a single adult.

While children are outside a classroom and at an excursion, the ranges of motion in adult social dimensions can also be accessed. In a worst case scenario, there are a minimum of two adults to supervise thirty students according to the standard written in Schedule 3, for children aged 68 months to 12 years old.[18]

Figure 2-8 on page 28 assesses how many students are able to comfortably move in terms of personal, social and public scales. It also shows how ineffectively two adults would supervise thirty students on a public, social or personal scale. While it is possible for two adults to supervise thirty children in public and social settings, in personal dimensions, it becomes difficult.

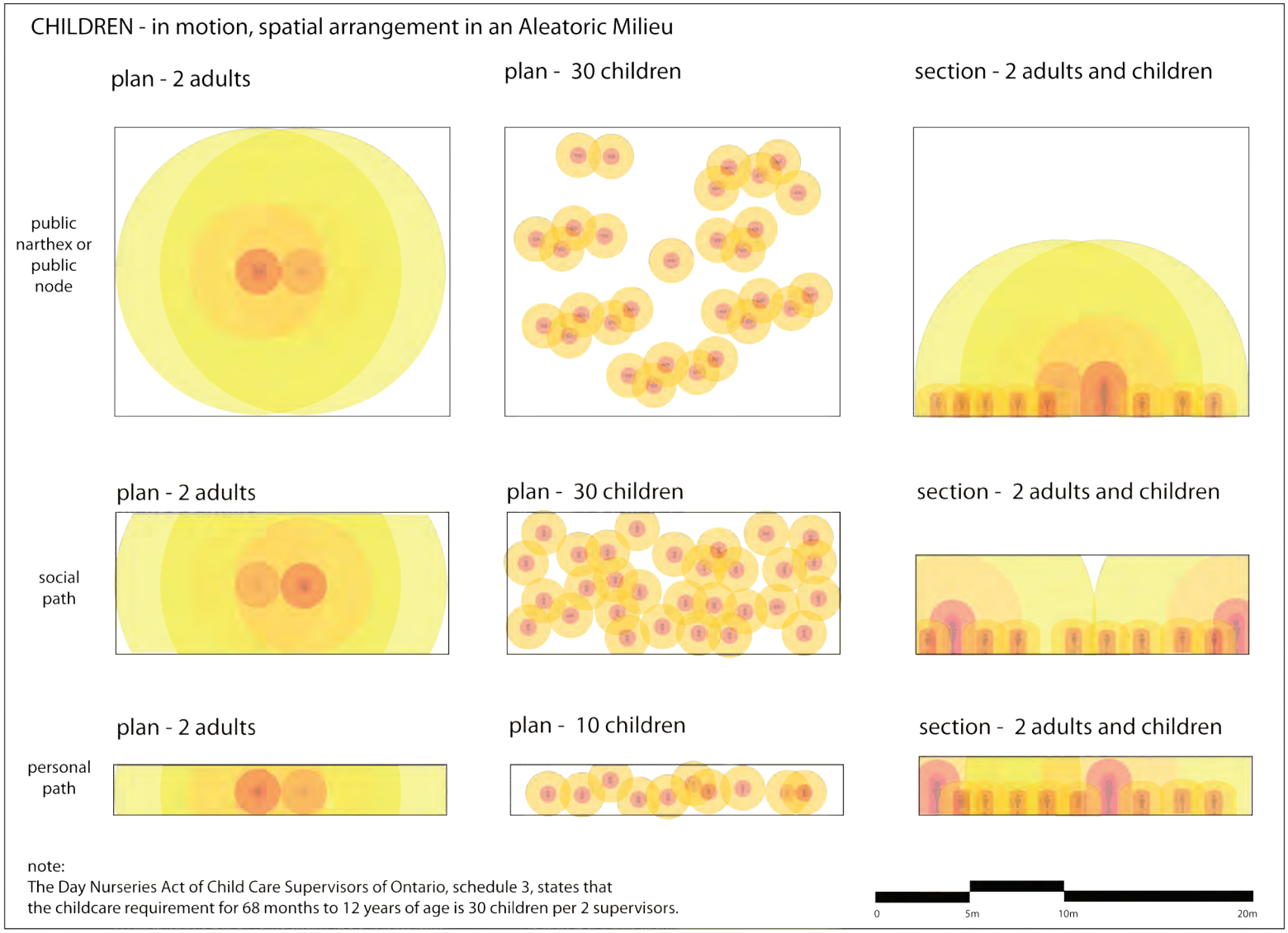

Figure 2-8 Children placed in adult social dimensions.

2. Architectural Social Interactive Dimensions

Although postmodern society has developed technology to mitigate intimate dimensions through technology personal devices, the personal, social and public aspects of life should not be forgotten in design. The architectural dimensions on the axonometric in Figure 2-9 on page 30 not only describes the scale of created space, but also indicates that the social interactive implication for that space can be personal, social or public. The space does not necessarily have to be enclosed; it can be simply delineated by the architecture that surrounds it. Therefore, since architectural dimensions that are scaled in between those personal, social and public spheres can be described in such spatial aspects. Larger spaces can then be parceled out into increasingly smaller social spheres through the creation of aspects that will be discussed with navigation design.

Hall's proxemics and hidden dimensions when used in its proper contexts – encompass incredibly practical physical design conventions. However, besides the physical realm of space in architecture, there exist memories linked to experiencing the built environment, the allusions to a past, or the desire to be a part of a grand narrative. How these social spheres are linked to a narrative is also discussed in the next section as navigation design.

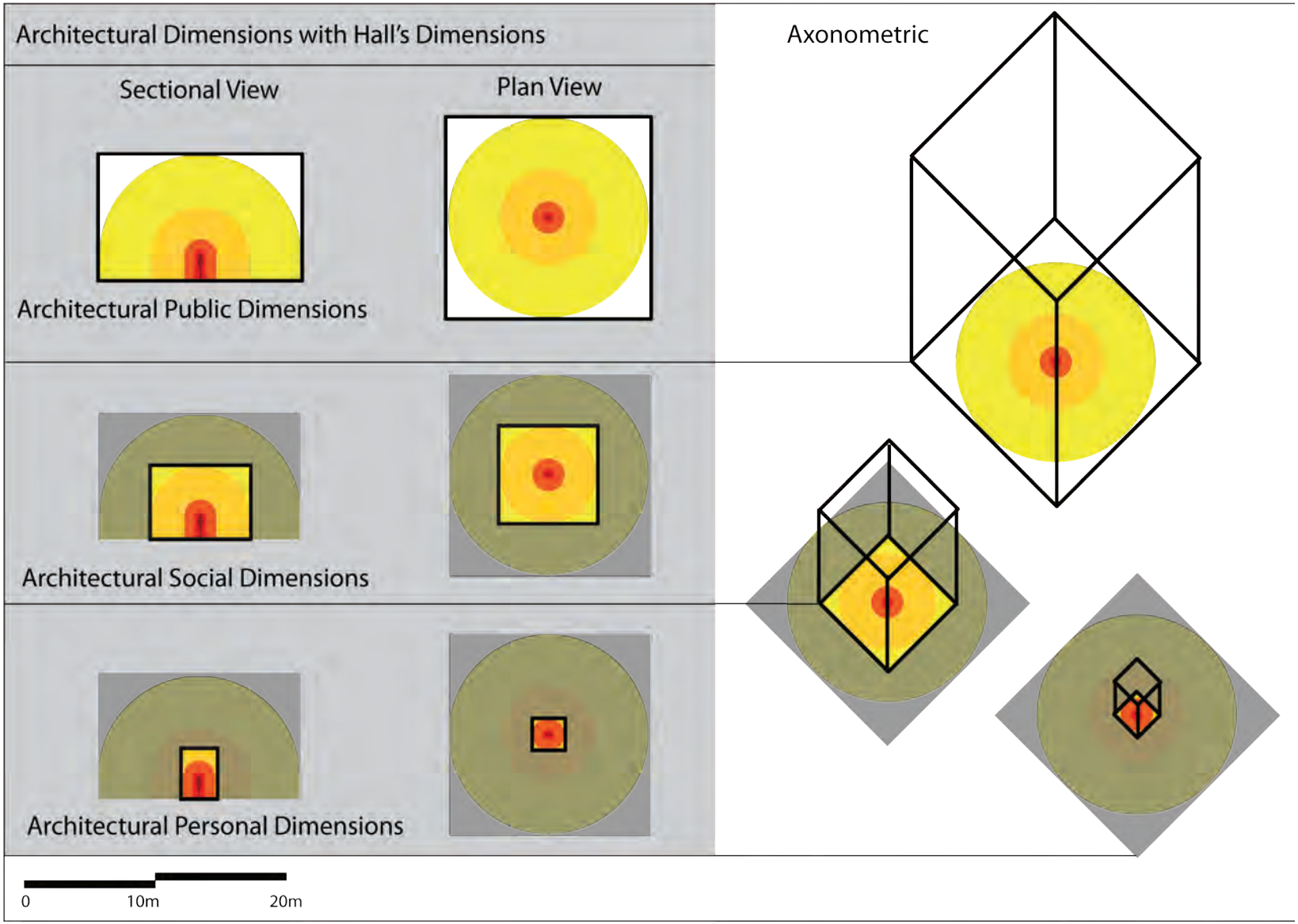

Figure 2-9 Architectural 3D Space in scale, encapsulating Hall's Informal Distance Classifications.

B. Navigation Design: Ecclesiastical Byzantine Art, Architecture and Margaret Visser's 'Geometry of Love.'

Aleatoric Milieu first considers how humans perceive spatial scale. The next step is to investigate how these scales may be navigated and remembered. By drawing upon the structuring reality of human recollection, memories are created from lasting impressions of architecture.

The often-invoked metaphor of the museum as a cathedral for the arts has been recognized as a result of city development: '... museums are, like cathedrals, fundamentally urban phenomena.'[19]

Much like how museums are an outflow of collected plethora from the progress of civilization, Byzantine ecclesiastical architecture, the one of the earliest types of architecture devoted to monotheistic worship, has also persisted through the psyche of human existence and currently still stands within urban environments.

Churches were first created to communicate ideals, imbued with stories told to visitors through the composition of space. Margaret Visser admires church architecture in relics, symbolism, purposes and functions. Her awe and respect for her observations is akin to those who seek historical truth in museums. Extrapolated from Visser's narrative of Sant'Agnese fuori le Mura in her book, 'Geometry of Love,' a theory for Navigation Design is analysed from this example of ecclesiastical Architecture.

1. Social Scale and Proxemics in Navigating the Scale of Byzantine Art and Architecture

Procopius of Caesarea, who came from Palestine and wrote in the 6th century and is known as the last major historian of the ancient world. He captures the mysticism and the beauty of the Byzantine Empire. Procopius asserts that church viewers likely saw the interior as a whole, as in this description by of the church Saint Sophia:

> *The vision constantly shifts suddenly, for the beholder is utterly unable to select which particular detail he should admire more than all the others. But even so, though they turn their attention to every side and look with contracted brows upon every detail, observers are still unable to understand the skillful craftsmanship, but they always depart from there overwhelmed by the bewildering sight.*[20]

Although large in spatial scale and built in public dimensional proportions, frescos and mosaics are decorated and drawn in an accessible scale. They create an impression of intimacy and invitation where important figures are graphically located at an apse and visible in social proportions from the very entrance of the church. The scales utilized represent the knowledge of intimacy the artists and craftsman desired to convey in conjunction with the scale of the building.

Ecclesiastical architecture in the Byzantine Empire preserved theology through a public display of religious stories. Christian beliefs were narrated through embedded elements within a built environment. This was a model of narration and spatial navigation designed for spiritual seekers in search of purpose and direction.

It is important that Byzantine architecture was created with the knowledge of social proxemics as apparent in the size of its mosaics - often large to impress a sense of intimacy for the viewer. [photo of Jesus at apse] These design elements are evident in the architecture of churches in the Byzantine Empire as a whole. One can deduce from the larger context how elements were to be experienced within the context of a single building.

Similar to how signage is created today, religious icons were considered as the visual 'signage' that helped communicate a message to its users. The architectural signage of modernity has devolved into words on a plaque or signage on the corner of a wall. Byzantine 'signage' was instead designed into the buildings and thus embedded into the urban fabric as a focal point of veneration or as a part of a narrative imbued within the ecclesiastical architecture itself.

Byzantine Architecture, in its combination of unique crafts intertwined contextually in a building narrative, creates a design for navigation that enhances the individual elements while also providing a sense of place and focal point for its users.

a. Ecclesiastical Byzantine Art and Architecture: Urban Armature and Navigation Architecture

Art gives clues to the perception of a particular culture's worldview. Byzantine Art was centered on a Christian society based in Constantinople. Dedicated in 330, this vibrant city was the capital of a Christian empire until 1453 when its religious landscape and art became Islamic.[21] Although dulled from its former glory, its abundance and wealth still glitter in churches and monasteries today.

Byzantine Art was known for its 'religious icons' or *eikon* in Greek, which included images in churches. Vast resources were devotedly lavished on their creation and care over this span of 1000 years.[22]Byzantine icons became 'timeless,' since they had "received prayers and veneration that passed through them to the 'other' world that they symbolized, and they were expected to reflect the powers of God. Each icon had to maintain its power for century after century."[23]

Byzantine Art was characterized by the urban artifacts housed in church buildings to represent a living God: holy relics, mosaics, the sounds that echo off the domed ceiling in an atmosphere filtered with daylight. When attributed to the glory of God, the architecture becomes an act of worship, which further links the artifacts and the building housing them, to their cultural narrative, context and usage.

Through similar dynamics that is now used by museums to preserve and present their artifacts, Byzantine Ecclesiastical Architecture is likewise steeped in context and history. Through how the space is used and navigated, a narrative of worship in the 'New Rome,' Constantinople, the ancient city of Byzantium was dedicated to Christ. Church buildings of the era contained a clear narrative of the story of redemption through Christ, which is seen in the scale of building and how navigation method also narrates its purpose. By housing a clear source, a way to approach it and an initial invitation to that very destination, its navigation design meets the needs of its users before they have entered the building.

Therefore, as part of the fabric of a city, Byzantine Art and architecture still project their culture, and by extension, eccesiatical architecture that has endured since that era has become part of the urban armature.

Using spatial elements, artifacts and architecture elements that entices the senses, its design simplicity and narrative procession articulates a clear type of navigation design. The Aleatoric Milieu draws loosely upon how the ecclesesical narrative and architecture together can become a navigation solution.

Figure 2-10 Aerial view of the Bilbao Guggenheim. The museum is visible from San Jose Plaza and is located visibly along River Ria del Nervion O de Bilbao, in Spain.

Figure 2-11 The view across Millenium Bridge that visually connects to St. Paul's Cathedral from the Tate Modern.

Figure 2-12 The view from the Millenium Bridge of Tate Modern during a Street Art exhibit. in London, England.

b. Museum as an Aesthetic Church

In the same way churches venerate the divine in their designs; museums venerate their aesthetics. For example, some museums were given a neutral envelope like the 'white museum' first realized by Franco Albini in the Palezzo Bianco in Genoa in the 1950-51. Such designs isolated art and thus elevated it to a "zone of unquestioningness […], which is the secular correspondent of worship."[24]

However, Michaela Giebelhausen, in a compilation of collected essays on museums entitled "The Architecture of the Museum: Symbolic Structures, Urban Contexts," chronicles various prevalent perspectives of the museum as architecture. Giebelhausen comments that postmodernism witnessed the existence of in both complexity and contradiction, and after decades devoted to the white box, simply functional and without symbolic significance:

> *...the museum building is again being conceived as an evocative entity that is in dialogue both with its content and urban context.*[25]

Giebelhausen asserts that the planning process of a museum has been 'recast in terms that invoke the Christian legend.'[26] Giebelhausen cites Bilbao's new cathedral of modern and contemporary art, the Guggenheim is a location where 'art pilgrims [were] queuing all the way around the building and along the waterfront.' The aerial view in Figure 2-10 on page 33, shows that the scale of the museum is comparable to a city block.

In addition, the Tate Modern Museum along the bank of Thames in London, connected through the Millennium Bridge to St Paul's Cathedral, creates a symbolic balance between the church, museum and city through the rewriting of the urban geography. This is seen in Figure 2-11 on page 34 and Figure 2-12 on page 34. Tate Modern has been described as 'looking a little like a cathedral of power,' though the contextual allusion from museum with the traditional views between the church and the city.[27]

Not only have both the Bilbao Guggenheim and Tate Modern played a vital role in the regeneration of local infrastructure, they both create symbolic reference to the boundaries between the museum and the city, while becoming the secular equivalent to worship with the veneration of objects and the museum building itself.

The implication of the museum as a building associated with a metropolis has become an accepted entity akin to what a local church represented as a part of a city. Therefore, in studying the ancient ways churches have been organized can add value to how museums can be designed and narrated in enduring and impactful ways when translating an artist's message to the public.

2. Narthex, Path and Node: Margaret Visser in Sant'Agnese Fuori le Mura in Rome

A more recent recapitulation of the impression of restored Byzantine architecture is the church - although situated in Rome - is Sant'Agnese Fuori le Mura as described and navigated by Margaret Visser. Visser has authored a multidisciplinary book entitled, "The Geometry of Love," where the church is a spatial metaphor of a spiritual journey, a narrative for the story of salvation.

The church exists as an urban artifact and houses more of the same, and includes Sant'Agnese on a gold mosiac ground in the costume of a Byzantine empress. It is situated close to a private mausoleum for Constantina, now known as Santa Constanza, which was originally a part of what is now the remains of a 4th century basilica.

Visser describes and narrates her viseral journey of the church of Sant'Agnese Fuori le Mura. It is built in the 7th century above the catacomb floor where the site of Saint Agnes' grave is believed to reside. Her journey narrates – with the architectural scaled awareness of social dimensions – a visceral experience of her visit and the cognitive implications of her experience.

Margaret Visser recalls her first visit as "small and far and sharply vivid." Visser explains she

> *recalled grandeur in littleness, gorgeousness of colour (purple, pink, grey and gold in Sant'Agnese's; terracotta, green, and white in Santa Costanza's), and always there lurked hints of the smell of fresh flowers.*[28]

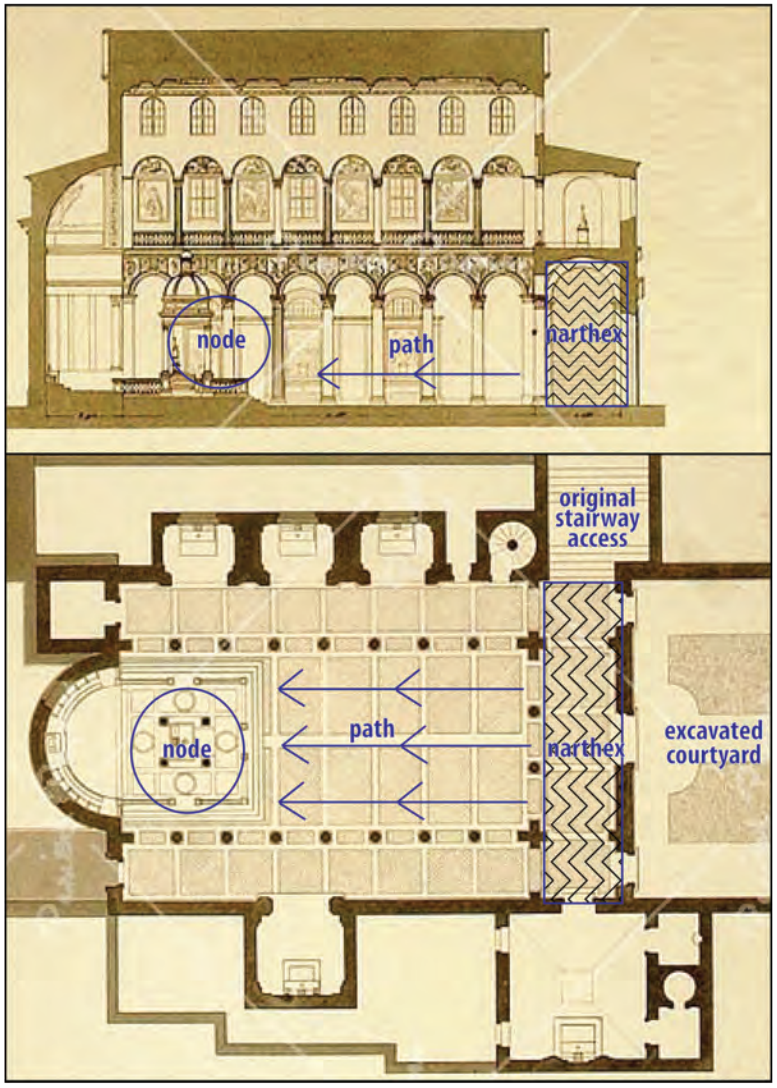

Figure 2-13 Diagram of Narthex, Path and Node on the Floor plan and section of Sant'Agnese Fuori le Mura.

Figure 2-14 The courtyard of Sant'Agnese.

Figure 2-15 The apse of Sant'Agnese Fuori le Mura showing Sant'Agnese in the centre in Byzantine Art style.

They evoke strong memories as well as representing for her a link to the past, recalled at any given moment creating for her a hope for the future, becoming for her, a living memory.

Ecclesiastical church architecture can represent with clarity the Christian narrative and seeks to describe one's ultimate purpose for existence. Recorded as a journey from the perspective of a pedestrian, Visser describes her arrival to the church from the *Aqua Marcia* fountain by the road, walking past a medieval monastery on via Nomentana, to traverse the courtyard of Sant'Agnese. Visser then reaches the top of a broad staircase and finally descends forty-five steps into the *narthex* of Sant'Agnese. Visser illustrates the entrance as an experience:

> *[of being]… drawn into the movement, almost unawares. It is like taking the first bite of a delicious meal: the experience is so concentrated and satisfying that the action needed to procure it occurs almost unconsciously, without will or effort. The last step of initiation has been taken, from dim vestibule into the main body of the building. One has scarcely had time to realize that the passage is actually the vestibule of the church.*[29]

The vestibule Visser describes is the church *narthex*, a transition before the *path* or isle towards an altar, the *node* for worship which symbolically houses the very purpose for the built space.

A narrative is staged in the architecture of Sant'Agnese Fuori le Mura. It is a journey that is demonstrated through the distillation of the architectural elements of the narthex, path and node of the church's geometry. Margaret Visser explains:

> *The people in a church are on a journey, the 'journey of life,' towards their destiny, which is God. Time—the life of the group, the lifetime of each individual person—is expressed as space. Moving up the nave and aisles is moving towards our end: our aim ('end' as purpose) and also our body's death. Movement and immobility, the temporal and the eternal, time and space: all these oppositions are expressed in a church's geometry.*[30]

In Jewish culture, the people retained the ethos of the Word, their Holy Scriptures, through memory and narrative. Church architecture is similarly purposed with representing the presence of God, a divine being of infinite knowledge and wisdom, choosing to dwell with and reveal Himself to man.[31]

Through Margaret Visser's observations, ecclesiastical architecture can be extrapolated as a narrative consisting of a clear narthex, path, and node, producing a tangible, cross-cultural and universal narrative. It is depicted in the floor plans in Figure 2-13 on page 35.

This narrative when further defined can be combined with the implicit social dimensions of architectural space to create an informed theory of the Aleatoric Milieu.

a. Navigation Design: Narthex, Path and Node

Sant'Agnese Fuori le Mura, like other ecclesatical worship spaces, is a physical architectural expression of the spiritual experience of Christians. The architectural Church language clearly communicates that a community together can encounter the divine in this enclosed space to present a "worldview" or "narrative identity."[32] Similar to how museums desire to edify their pilgrims, the Christian model informs a navigation design in the planned path through physical space. Navigation design then, can be said to be comprised of the *narthex*, *path* and *node*.

The *narthex* acts as the buffer into entering a new world: to step into a Byzantine church is to enter into the mythical story of Adam and Eve in the Garden of Eden. In the biblical Paradise, they acted upon the temptation to become 'like gods,' thus the curse of sin entered the world there. To enter the church is to step out of this 'paradise' to encounter God's interruption into human history; the visible path towards the altar from an aisle lined with pews to be populated.

The *path*, lined with pews alludes to the transient existence of people and of life, while juxtaposed with the consistent daylight that washes from clerestory above. With a straight and direct path toward the altar, the ephemeral context of an encounter of mortal people with an eternal God is reflected on the permanent testament to the ideals represented in mosaics, figures and statues created to reflect the glory of God.

The raised altar, the *node* of the church, physically constructs the coming of Jesus Christ. The urban armatures of benches, regular pillars, and mosaics reinforce and strengthen the physical representation of the idea of 'God dwelling among men through Christ's sacrifice,' especially since it is visible at the altar from the entrance of the narthex.[33] The node of the church, the altar, is an internally domed structure that represents the way for mortals to obtain immortality through the sacrifice of Jesus, the son of God.[34] It is an architectural representation of a final and prophesied encounter with the divine.[35]

Margaret Visser explains how the role of multisensory experience in architecture is demonstrated in church architecture. She reflects on how ecclesiastical architecture utilizes simplistic architectural forms to explain the idea of God with clarity through the intersection of space and experience. Since church architecture became a focus for community interaction in the 5th century, the essential architectural organizational positions of the narthex, procession path and altar physically describe the narrative of a personal encouter with the divine in a church. It becomes a type of spatial organization and narration - a *navigation design.* It pares away architectural complexity to a basic perception of a phenomenological experience that is not often considered in concurrent building design.

Figure 2-16 The interior of Sant'Agnese Fuori le Mura showing the path that leads to the altar.

Navigation Design *can be defined through the combination of the narthex, path and node, and can be visually depicted in the Sant'Agnese Fuori la Mura through* Figure 2-17 on page 38.

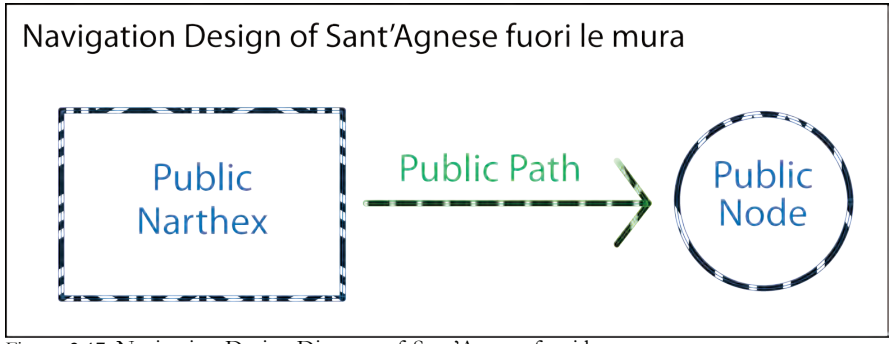

Figure 2-17 Navigation Design Diagram of Sant'Agnese fuori le mura.

The *narthex* becomes a location for meetings and partings, and also a space for introductions that foreshadow the building's narrative. By doing so, it is considerate and hospitable to the visitor or user while adding value to the pending architectural experience. It can be used for promoting galleries and events, advertising products, events, or ideas the building represents while providing the first impressions of an enclosed space.

The *node* becomes a featured element for the building, visible from the narthex or the very beginning of a path. It should be designed to entice a visitor by utilizing the senses, and is related to the idea or object it seeks to represent.

The *path* then, becomes the link that informs the visitor or user and transitions to the node through a series of architectural elements that are repetitive and recurrent.

Since the theory of navigation design combines both proxemics and a distilled version of Margaret Visser's recollection of Sant'Agnese fuori le mura, the narthex path and node extrapolation of the design narrative combines both architectural narrative, recollections of Visser and a macro-level analysis, a generalization of a holistic experience. While Visser includes details that can be described as micro-level observations, inferences and allusions, as well as macro-level thematic elements that are essential to the built architectural environment and its conveyed narrative – Navigation Design extrapolates its spatial essence of arrangement that combines architecture with a strong narrative.

b. Kevin Lynch's Wayfinding and Navigation Design

Navigation design, or the narthex, path, node model is similar to a type of architectural navigation elements coined by Kevin Lynch, an American urban planner who studied city navigation extensively. Lynch wrote an influential book, the 'Image of the City,' in 1960, describing a city navigation concept that describes how humans recall and orient themselves in three dimensions.

In order to highlight the 'legibility' of American cities, Lynch has posited five parts of cities each with coherent patterns but still inter-dependant with regard to the other parts. Lynch describes the navigation of cities as derived from the compilation of paths, edges, districts, nodes and landmarks. Paths are the streets or sidewalks that are the channels of travel, while edges are perceived as the boundaries – walls, buildings and shorelines. Districts are sections of a city with identifiable characteristics. Nodes are focal points, intersections or loci and finally, landmarks are identifiable objects which serve as external reference points. Lynch concluded through his studies that it is through the visual qualities of the environment that people perceive and organize spatial information.[36]

It should also be noted that the cities Lynch often walked and analyzed are American cities in the fifties, while Visser analysed and described her experience of a church in modern day Rome. Fundamentally, American cities have used a grid system to organize streets in sequential numerical order, while Rome is organized by nodal wayfinding. It is therefore beneficial to consider the similar elements of observation from both Lynch and Visser to arrive at a language to describe navigation design in the Aleatoric Milieu.

Similar to Lynch, using the observations of Visser, the concept of Aleatoric Milieu has been defined as consisting of a narthex, path and node. It also includes the concepts of paths, nodes and landmarks, since they explain the physical embodiment of the purpose of the built environment. A path in navigation design is similar to the paths in Lynch's wayfinding, as is nodes and landmarks, and can be defined as a public node by navigation design terms. What differs from wayfinding from navigation design is that wayfinding consists of categories while navigation design is more a network of spatial arrangements that also considers proxemics.

Kevin Lynch has rightly observed the importance of city streets. He comments that for most people, paths are the predominant city elements. Lynch describes that cities are experienced through moving through its streets and paths: "the qualities which make sensible to the observer, through the visual and the kinesthetic senses, his own actual or potential motion."[37] By further investigation, we see that a node anchors a path's destination and can lead to a narthex that point to further nodes that are accessible through more paths. Navigation design consists of interconnected concepts of leading one through a city or building while Lynch has defined how one recalls how to navigate a city.

What these two concepts agree upon is that the process of navigation is to be experienced. Lynch has aptly noted that in navigating a city:

> *nothing is experienced by itself, but always in relation to its surroundings, the sequences of events leading up to it, the memory of past experience.*[38]

However, the political and territorial aspects of *wayfinding,* edges and districts, are not defined in the same ways in design theory of an Aleatoric Milieu. There will simply be no paths to an undesirable node, unless it is a node of conflict. Therefore, *edges* can either be created through an absence of nodes, or be a node where conflict exists, is often deliberately left vacant. While *districts* are often a superimposed program or demographic to built architecture, it can also be a collection of similar physical elements; building types, commercial activity, cultural group, density, etc. These types of demographic categorization can provide an analysis for a city for specific purposes, for example, informing city dwellers of the best locations for specific niche markets. However, if the distinct categories are apparent enough, they are a type of publically scaled nodes, and are more aptly described as *districts.*

Since the Aleatoric Milieu is an architecture theory that engages with physical space, a definition like *districts* that define a type of collective program has not been considered. *Edges*, since the definition is more physical, can be related to navigation design as a boundary which encloses space, in a scale that is either Public, Social or Personal and either a node, path, or narthex. Thus, physical space in navigation design is defined in its context and in how it relates to its surroundings.

c. Navigation Design of Tactics and Strategies in Architecture

In "The Practice of Everyday Life," written by the French author Michel de Certeau, describes tactics and strategies of urban design. A *tactic* "expects to have to work on things on order to make them its own, or to make them 'habitable,'" while *strategies* are the buildings and institutions created to accommodate the needs of a growing population. While an individual cannot physically reorganize a city, he or she can adapt it to his or her needs by choosing how to move through it.

In some ways, tactics allow for the habitability of cities, but should its navigation be difficult or overextended, it renders some parts of a city or building inaccessible. The adoption of an Aleatoric Milieu strives to include the tactics individuals employ within the strategy of buildings. Instead of forcing people to apply tactics in navigating the strategies provided for daily living, city planning through the principles of an Aleatoric Milieu provides a solution to an integration of tactics and strategies to develop city life that is truly habitable.

3. Navigation Design in Aleatoric Milieu

Navigation design is defined as a part of the Aleatoric Milieu as consisting of a physical space that consists of a narthex, path and node to aid in wayfinding and creating memory while moving through space. Navigation design is an extrapolation from Margaret Visser's narration and recollection of church space. The narthex represents a transitional element that is strengthened by a clear path towards a visible, desirable node. Utilizing light, sound and materials, the node viscerally entices the senses in a phenomenological manner yet remains visible from the narthex. Connected by a path, from the narthex to the node, the aisle consists of a regulated set of visual stimulation discloses additional information regarding the node.

Navigation Design is an integrating concept derived from a historic and concurrent working esthetics borrowed from ecclesiastical narratives that can inform museums and public buildings with a method of design that is associated with memory and purpose-built architecture. The museum as an institution of the city, has integrated itself into the post-modern world in representing the public face of a city supplanting what churches have been identified as in the past, and co-existing with them as urban artifacts.

When integrated with Lynch's wayfinding theory, Navigation Design is defined as a physical space consisting of a narthex, path and node, while 'edges' help define proxemic scales and 'districts' a collection of categories – culture, building types, political boundaries, etc. By including a corresponding proxemic scale that fits the type of activities, the navigating experience of narthex, paths and nodes become a welcoming and hospitable enclosure. Thus, city environments can contain significance and richness, become anchors for people's lives and contribute to the daily delights of life.

C. Christopher Alexander's Gradation of Density and Intimacy

As museums are an extension of a city, the analysis of how a city evolves exemplifies how humans create culture, comfort and hospitality within their geographical location. As architecture develops, built environments survive in its usefulness and accessibility to new users who inhabit those spaces, perpetuating the grown of an urban environment. As a place that many people use persists, there is eventual attention paid to how a space is narrated and made usable. Culturally sensitive social dimensions start to delineate paths within the narrative of everyday life, and spatially attentive people instinctively begin to create nodes – strengthening the importance, usability and memory of places.

Consequently, the Aleatoric Milieu is a malleable tool, consisting of navigation design, the proxemics that is comfortable to each aspect of the narthex, path or node. Since the Aleatoric Milieu is a deliberately designed space that is sensitive to others, comprising of hospitable, attractive and useful spaces, how proxemics is organized into a navigation design is investigated in this section.

1. Alexander's Vision of a City

The history of the development of a city is described as consisting of creating usable space and patterns are described as architecture. In the preface to the second Italian edition of *The Architecture of the City*, Also Rossi argued the following:

> *To consider the city as architecture means to recognize the importance of architecture as a discipline that has a self-determined autonomy ..., constitutes the major urban artifact within the city, and ... links the past to the present. Architecture so seen is not diminished in terms of its own significance because of its urban architectural context or because a different scale introduces new meanings; on the contrary the meaning of the architecture of the city resides in a focus on the individual project and the way it is structured as an urban artifact.*[39]

Although used to refute a simplified functionalist approach to urban design, in the same way Rossi's explanation of an urban artifact as linked to a city can not only be applied to how museums are a part of the urban fabric, but also to the way in which a city is created through the generation of these urban artifacts. Architectural analysis of this urban artifact is therefore an understanding of how that 'individual project' fits into and supports its urban context.

In a similar way, Christopher Alexander has envisioned an entire city that flourishes as consisting of 'patterns' and together forms a 'language' for design. He considers how a city is organized in a macro level to the micro details of construction methods. They consist of observations of how people use space in everyday life and how various buildings strung together creates liveliness, as well as, other prescriptive methods to create buildings that would speak cross-culturally in a spatial language that may be universally understood.

Alexander's collection consists of his observation of common habits of everyday human behaviour, which are carefully categorized in his series of books 'A Pattern Language.' First published in 1977, Alexander describes the ways in which the built environment works together, or rely upon other buildings, services or access points that functions together much like a network.

The condition of a possible pattern language is that towns and buildings – created by the people in a society sharing a common pattern language – will be enabled to 'come alive.'[40] In creating 'A Pattern Language,' Alexander aims to

> *present an archetypal core of all possible pattern languages, which can make people feel alive and human.*[41]

Alexander's description of 'A Pattern Language' is a part of an elaborate description and illustration of the basic sensitivity to human social dimensions including aspects of how navigation design is applied to the everyday.

An architectural language starts to form with the combination of specific elements which Alexander carefully names and numbers. Alexander's total of 253 patterns provides a basis for the creation of socially sensitive physical spaces designed with sensitivity to human scale, common human behaviour in public places and practical ways to design for the navigation of a city. Alexander suggests that compressing his patterns into architectural expressions is: "the only way of using a pattern language to make buildings which are poems."[42]

The poetic narrative Alexander strives to achieve in his Pattern Language holds additional perspectives on the narthex-path-node model. He is aware of the human social dimensions not in measurable qualities, but within the context of physical barriers or surroundings. He includes an observation of degrees of intimacy, which can be interpreted as gradients from personal relationships to public density that is beneficial as an organizing principle to an Aleatoric Milieu.

2. The Aleatoric Milieu in Christopher Alexander's Pattern Language

A series of conditions for the Aleatoric Milieu is rendered through Alexander's compilation of observations, categorized through the elements of *navigation design* of *narthex*, *path* and *node* conditions. Although it is not an exhaustive attempt, these sets of conditions represent a general undertaking of dissecting Alexander's perspective in architecture in order for an integrated understanding of a narrative design and proxemics within the Aleatoric Milieu.

Table 2-2 on page 44 consists of selected patterns that are numbered by Alexander for clarity and his assertions to their credibility as a 'universal language' are rated by the number of asterisks placed upon the pattern. Two asterisks mark observations that he is most confident in as possessing the most accurate diagnosis and solution to a certain pattern, one asterisk indicates that more factors have to be considered before the best solutions are found. Patterns without asterisks have been omitted from this list in order to include Alexander's most confident comments applicable to an Aleatoric Milieu.

The chart has been organized in numerical ascension since Alexander had begun his analysis on a city scale in single digits up through 253 elements of design. It has been categorized pertaining to how Alexander's patterns relate to an Aleatoric Milieu as previously discussed, under the titles: Alexander's Organizational Observations, Narthex Descriptions, Elements of a Path and Nodes.

Table 2-2 Author's Analysis of Alexander's Pattern Language in terms of Navigational Design

Pattern Number	Description	Author's Analysis and Conclusions of Alexander's Pattern Description
Observations Supporting an Aleatoric Milieu		
108*	**Connected Buildings**	An ideal urban fabric consists of physically connected buildings. Therefore paths are naturally created that would result in natural nodes.
190**	**Ceiling Height Variety**	Rooms are a social dimension where proxemics is considered.
191**	**The Shape of Indoor Space**	Indoor Space is reflective of human dimensions.
205*	**Structure follows Social Spaces**	Social spaces and needs are the crucial to the design of structure.
Narthex		
53**	**Main Gateways**	They represent an architectural feature of a passage marker, separating a series of purposeful spaces and create a clear delineation of areas.
88**	**Street Café**	An external transitional space between enclosures that is linked through activity.
106**	**Positive Outdoor Space**	Is a shape of space <150 Degrees.
114*	**Hierarchy of Open Space**	Naturally orient open spaces towards a larger space while offering seating with protected backs.
117**	**Sheltering Roof**	Describes a social aspect in bringing down the scale of an entrance to ease the transition of unenclosed to enclosed space to provide a sense of welcome to visitors and users.
124**	**Activity Pockets**	The presence of social gathering spaces reinforces public space around the edges.
130**	**Entrance Room**	This room provides the first and last impressions of the building.
160**	**Building Edge**	Represent zones of transition.
Elements of a Path		
31**	**Promenade**	The connection of social nodes through a public path with regular architectural features creates a promenade.
48**	**Housing In Between**	Variety in paths*
98**	**Circulation Realms**	Transitional scale of paths taken informs its user a transition of realms.
119**	**Arcades**	Arcades mediate from the inside to outside.
127**	**Intimacy Gradient**	Represent navigation paths of increasing privacy.
Node		
8 **	**Mosaic of Subcultures**	A medley of collected cultures and values enrich lives. A 'district' Lynch's terms.
29*	**Density Rings**	Describes the need for the formation of local centers of increased density, or nodes of activity.
30**	**Activity Nodes**	Clusters of density for pedestrian activity.
95**	**Building Complex**	A building as a concrete manifestation of a social group or social institution.
110**	**Main Entrance**	It is clearly an entrance and visible on the façade.
142**	**Sequence of Sitting Spaces**	Social spaces that are focal points in a room that increases in privacy as one proceeds into a space.
252**	**Pools of Light**	Light shapes spaces and brighter areas act as a focal point.

Alexander's analysis can be observed as a whole with a set of design principles. Using language as a metaphor to his patterns, the allegorical grammar of connected patterns is linked through scale and nodal associations. Alexander discusses architecture from an internal, detailed structure to the house that extends to the garden, to paths that lead to social spaces forming larger encompassing networks and structure. By basing his observations on built space and considering forms external and internal to architecture as space framed by design, his analysis of how people see and use space draws upon multiple disciplines of observation. In Alexander's analysis, psychological factors, social factors, architectural aspects, construction and the passage of time have been considered.

Firstly, Alexander describes "connected buildings" in pattern number 108. Alexander explains that isolated, free-standing buildings are common:

> *The psycho-social disintegration of society is embodied in the fact of their (free standing buildings) existence. […] And real towns which have this form, like dreams, embody just this meaning: they perpetuate the arrogant assumption that people stand alone and exist independently of one another.*[43]

His Pattern Language is based upon his ideals that towns are developed cities that consist of a fabric of connected buildings. This is because Alexander considers that "isolated buildings are symptoms of a disconnected, sick society."[44]

As a result, external paths are formed between dwellings and space as a whole and become enclosed external walkways to Alexander. This proves to be extremely helpful in the understanding of space as perceived as formed, and not empty – similar to how a grove of trees can form paths in forests while providing shelter from the sun. Therefore, the conditions for analyzing the narthex, path and node coincide with Alexander's general understanding of space.

Secondly, Alexander mentions the idea of navigation design with 'paths and goals' in pattern number 120. It describes how 'the process of walking requires a series of gently curving paths in intermittent goals to less than a few hundred feet or thirty metres apart.' In homes, pattern number 132 prescribes short passages, due to the fact that 'long sterile corridors set the scene for everything bad about modern architecture.' Alexander possesses an understanding of paths and goals similar to the path and node concept derived from navigation design discussed earlier.

Finally, Alexander also considers human social dimensions with pattern number 190, entitled 'Ceiling Height Variety' only mentioning that without this; it would be boring. However, in pattern number 191, referring to 'The Shape of Indoor Space,' he creates round and organically formed buildings citing the Vitruvian man extrapolated as space to create 'imaginary social bubble.'[45] An even more compelling argument for considering social dimensions is Alexander's pattern number 205, entitled "Structure Follows Social Spaces," which simply states that structure is built around social spaces.

Therefore, the basis Alexander uses to analyze his buildings are structures that are founded on an acknowledgement of forming external space as paths towards nodes of activity or destination, and buildings are formed based upon its social designations. Figure 2-7 on page 26 illustrates the Aleatoric Milieu in combining both navigation design and proxemics as they are both demonstrated in a holistic understanding of architecture, similar to the ideas that has been highlighted from Alexander's observations.

A series of studies that investigates the navigation design - the concepts of the narthex, path, and node - identifies and discusses within Alexander's pattern theory valuable details and reincorporates some elements of his language into the Aleatoric Milieu. Since Alexander is sensitive to design for human comfort with an awareness of proxemics Alexander's research will ultimately lead to a more informed interpretation for a functional analysis and application of the Aleatoric Milieu.

3. Identifying Characteristics of Navigation Design

a. Narthex: an Entrance Room

In addition, Alexander continues to describe an internal pattern, numbered 130, to describe "entrance rooms" as a social setting, akin to a description of a narthex:

> *Arriving in a building, or leaving it, you need a room to pass through, both inside the building and outside it. This is the entrance room. [...] Therefore: As the main entrance to a building, make a light-filled room which marks the entrance and straddles the boundary between indoors and outdoors, covering some space outdoors and some space indoors. The outside part may be like an old-fashioned porch; the inside like the hall or sitting room.*

This pattern discusses the type of activity or part of a story one would like to tell when designing. The narthex is the location of welcome and farewells, first and last impressions of architectural design. Internally, the narthex is created to accommodate the needs of those who inhabit those buildings while providing shelter to welcome those who approach the building.

Creating transitional zones to an entrance is an effort to increase its approachability by offering multiple options of activity and mediates the proxemics of external conditions to the internal proxemic scale.

b. Path: Socially Dimensioned and Anchored with Nodes

Pattern number 31 describes a promenade, a large city-scaled path that is linked by two strong nodes:

> *Each subculture needs a center for its public life: a place where you can go to see people, and to be seen. ... Therefore: Encourage the gradual formation of a promenade at the heart of every community, linking the main activity nodes, and placed centrally, so that each point in the community is within 10 minutes' walk of it. Put main points of attraction at the two ends, to keep a constant movement up and down.*[46]

Alexander seems to be describing an avenue akin to the Avenue des Champs-Élysées in Paris, populated by activities of smaller scale along the larger path. He envisions a space that is a public gathering space that is a grand path of public scale, anchored with nodes of equally significant physical scale and psychological importance to demonstrate visually and publically a place for civic life.

Pattern number 119 entitled 'Arcades' describes the transition element from the edge of a building to the extremities. Alexander observes that there are human scales to arcades that create a pleasant space for dwelling. He explains that

> *arcades don't work if the edges of the ceiling are too high. Keep the edges of the arcade ceiling low.*[47]

The purpose of his arcades that connect buildings together is to create a building edge that incorporates a human scale to buildings to increase its approachability.

Therefore, a path would include the incorporation of the social dimensions of the narthex and the node, housed within a regular pattern of architectural treatment.

c. Node: Designed to Intrigue and Accommodate

Alexander explains nodal conditions of space that attracts and draws attention to itself, by means of necessity, like entering a building, or a node of repose - that allows for the spatial capacity necessary to accommodate the congregation of people. Nodes can also direct a visitor to certain locations highlighted by lighting.

Firstly, a node can be an entrance to a building from the network of city streets. In pattern number 110, entitled 'Main Entrance,' Alexander explains that:

> *Placing the main entrance (or main entrances) is perhaps the single most important step you take during the evolution of the building plan. ... Therefore: Place the main entrance of the building at a point where it can be seen immediately form the main avenues of approach and give it a bold, visible shape which stands out in front of the building.*[48]

Alexander describes a node that is the entrance of a building, identifiable and visible, in a scale that addresses the street dimensions in order to attract a visitor. In addition, an entry should be of appropriate social scale to clearly indicate the entrance to those who approach the building. Although ambiguous entries can be intentionally designed, it can either be exploited as an exclusive location, or totally ignored by the public, which is the opposite aim for an Aleatoric Milieu in creating hospitable and welcoming public buildings.

Secondly, a node can be created for the purpose of the gathering of people and still act as spatial anchors to public paths. In pattern number 30, Alexander describes 'Activity Nodes' in the scale of a city:

> *Community facilities scattered individually through the city do nothing for the life of the city. ... Therefore: Create nodes of activity throughout the community, spread about 300 yards apart. First identify those existing spots in the community where action seems to concentrate itself. Then modify the layout of the paths in the community to bring as much of them through these spots as possible. This makes each spot function as a "node" in the path network. Then, at the center of each node, make a small public square, and surround it with a combination of community facilities and shops which are mutually supportive.*[49]

Alexander describes a public node for social gatherings, mutually supported by the community it serves. Therefore, goods and services without a gathering space that is along a few paths to bring density will, due to a lack of access, lose customers and revenue.

Finally, Alexander suggests in pattern number 252 entitled "Pools of Light," shapes spaces socially and directs attention to particular nodes:

> *Uniform illumination – the sweetheart of the lighting engineers – serves no useful purpose whatsoever. In fact, it destroys the social nature of space, and makes people feel disoriented and unbounded. ... Therefore: Place the lights low, and apart, to form individual pools of light which encompass chairs and tables like bubbles to reinforce the social character of the space which they form. Remember that you can't have pools of light without the darker places in between.*[50]

Alexander, by pointing out the ability of light to architecturally shape space alludes to how a node can be created to 'reinforce the social character of the space they form.' Therefore, while public dimensions require public lighting, intimate dimensions can utilise focused lighting that illuminates those smaller dimensions. This principle can be extrapolated to the illumination of the objective of museums, in its displays, in a focal sculpture of multiple paths or in the design of a grand entrance.

While lighting affects the staging of museum pieces and visitor interest, the social dimension given to particular objects can be effective in prescribing the nodal options within a museum. Conversely, problems arise when there is an absence of ambient lighting and visitors cannot see where they are walking.

Therefore, nodes help reinforce external public dimensions and are addressed by main entrances in a public sense, while internally, are architecturally defined according to a particular social dimension. Firstly, a main entrance of a building is a promotion for what exists inside; a location of accessibility. Secondly, a node can be social in nature, where its main purpose is to provide space for the gathering of people as anchors along a path which is a location for activity. Finally, a node can be used to emphasize and reinforce a social space or illuminate specific objects.

4. Navigation Design Defined

Thus, a more informed analysis of Navigation design from its most basic elements can be defined by the following:

Narthex: *an entrance space that creates first impressions, straddles internal with external proxemic of two realms.*

Path: *enforced by strong nodes, consisting of a regular pattern of activity and architectural features.*

Node: *an intriguing physical location of activity or object, which is accessible and serves as an objective or purpose.*

In order to create a diagrammatic representation of the proxemics aspects of navigation design, Figure 2-18 on page 49 shows the narthex, path and node in personal, social and public dimensions for illustrative purposes.

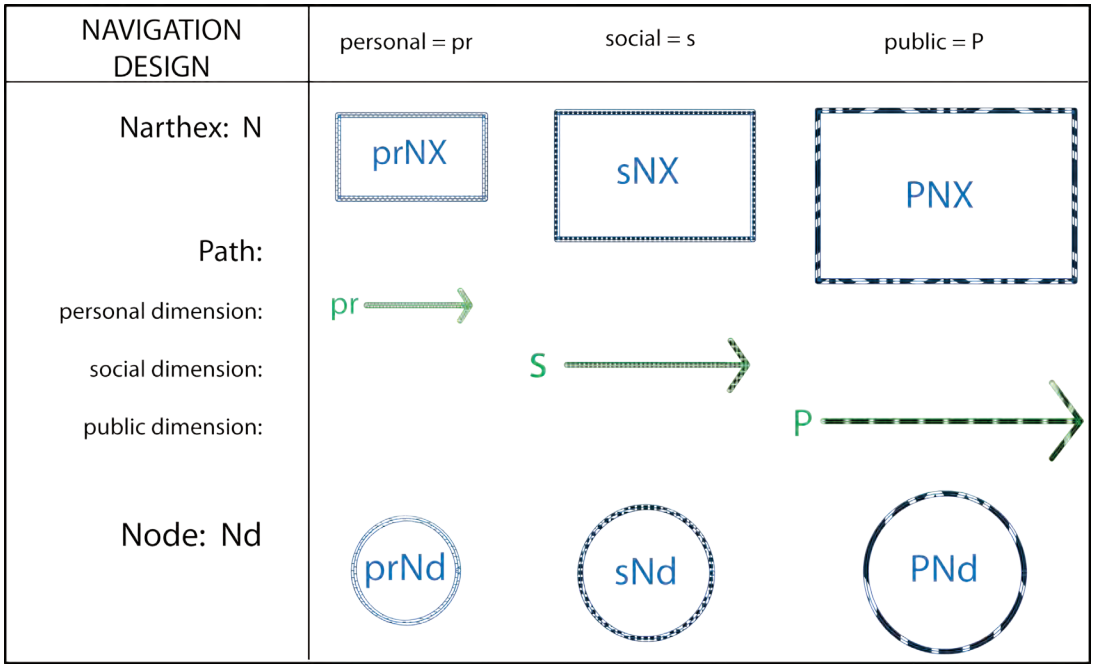

Figure 2-18 Navigational Design comprises of a Narthex, Path and Node in situational proxemics.

5. Proxemic Gradation in Navigation Design

Alexander has considered social interconnections imbued within a building's purpose and design. The following narthex, path and node description and diagrams describe how an added layer of social gradation of intimacy and density between the three aspects of Navigation Design is beneficial. This will increase understanding in the design of public buildings as a place for the gathering of people of various walks of life to navigate in proxemic comfort.

a. Narthex: Hierarchy of Social Spaces

In Pattern number 114, entitled "Hierarchy of open space", Alexander points out that a narthex must have a safe location that can observe a larger space, creating degrees of scale and privacy. Alexander writes that:

> *Outdoors, people always try to find a spot where they can have their backs protected, looking out toward some larger opening, beyond the space immediately in front of them. ... Therefore: Whatever space you are shaping – whether it is a garden, terrace, street, park, public outdoor room, or courtyard, make sure of two things. First make at least one smaller space, which looks into it and forms a natural back for it. Second, place it, and its openings, so that it looks into at least one larger space. When you have done this, every outdoor space will have a natural 'back'; and every person who takes up the natural position, with his back to this 'back,' will be looking out toward some larger distant view.*[51]

This relates to Edward T. Hall's social dimensions in two ways. Firstly, that there is consideration given to when someone's back is protected; the surface they lean upon essentially informs and acts upon one's effective social dimension, as depicted in the first diagram of Figure 2-19 on page 52.

Secondly, Alexander's pattern describe that there is a 'distant larger view' that explains a hierarchy or gradation of observable social interactive spaces, from most public to intimate, as depicted by Alexander's own diagram that is also shown in Figure 2-19 on page 52.

This narthex, an entrance room or space, becomes the initial point of decision making as to how a building can be navigated by its user. By transitioning an external public realm with an awning or lowered parapet, provides a diminished public scale that informs the user that they are entering a space of greater intimacy, thus lower density then a capacity of an open street.

Therefore, there is a sequence of proxemic spaces to be considered when designing an entrance room, which is the narthex of the Aleatoric Milieu. It should transition the proxemic factors previously encountered with space that is the entrance to a new space. For example, an entrance into a shop where there is an initial room for displays from a larger covered mall, or a storm door scaled appropriately before a grand lobby. The scale will welcome visitors with the intended hospitality inherent to the Aleatoric Milieu.

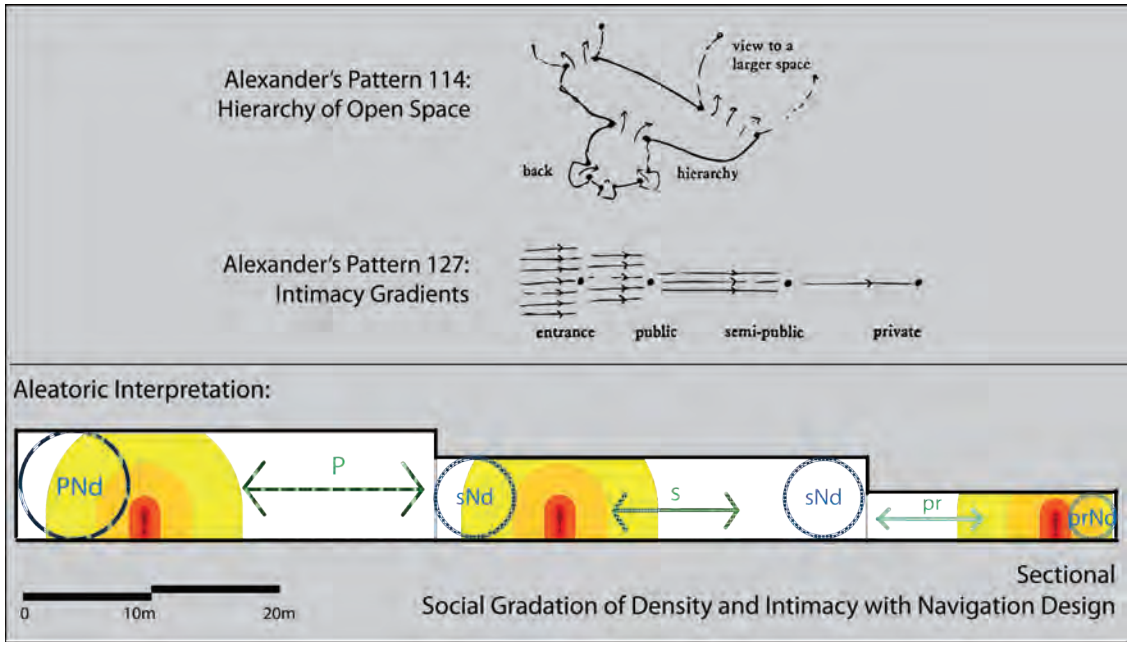

Figure 2-19 Alexander's Gradation and Hierarchy of Space introduced as an Aleatoric Milieu.

b. Path: Proxemic Transition between Narthex and Nodes

Alexander suggests a change of scale in order to differentiate between paths to add clarity to architectural design. Pattern number 98 describes Circulation Realms:

> *In many modern building complexes the problem of disorientation is acute. People have no idea where they are, and they experience considerable mental stress as a result.*[52]

Alexander's solution is a simple one:

> *Lay out very large buildings and collections of small buildings so that one reaches a given point inside by passing though a sequence of realms, each marked by a gateway and becoming smaller and smaller, as one passes from each one, through a gateway, to the next. Choose the realms so that each one can be easily named, so that you can tell a person where to go, simply by telling him which realms to go though.*[53]

A proxemic or gradual transition in scale can help individuals orient themselves in paths. Also, by paths that are 'easily named' I would suggest that clear architectural differentiation through material treatment would be better than a street sign or name.

Furthermore, Alexander most specifically speaks of his understanding of the social aspect of transitioning space as a series of 'Intimacy Gradients' in pattern number 127:

> *Unless the spaces in a building re arranged in a sequence which corresponds to their degrees of privateness, the visits made by strangers, friends, guests, clients, family, will always be a little awkward. … Therefore: Lay out the spaces of a building so that they create a sequences which begins with the entrance and the most public parts of the building, then leads into the slightly more private areas, and finally to the most private domains.*[54]

His idea of the gradation of human dimensions in terms of privacy entitled "Intimacy Gradient" describes the human instinct of consideration upon entering space belonging to others to possess some sort of privacy gradient. In addition, the gradation of space helps orient a visitor in a foreign location in gradation dimensions similar to how a home may be scaled with a gradation of intimacy. Figure 2-12 already illustrates the proxemic scale of the Aleatoric Milieu, while Figure 2-13 illustrates Alexander's diagram which describes the scale of proxemic paths leading to greater privacy through the use of sequential proxemic scales.

In museums, this can refer to the most public exhibits with large displays to more intimate and private scale that corresponds to smaller displays of greater detail.

In this way, Alexander proposes to utilize the size of paths. A pattern that regularly tapers to smaller sizes through gateways reinforces the idea of creating a new narthex to distinguish different programs of a building. This underscores the idea of an 'intimacy gradient' of decreasing density and increasing privacy within built architecture.

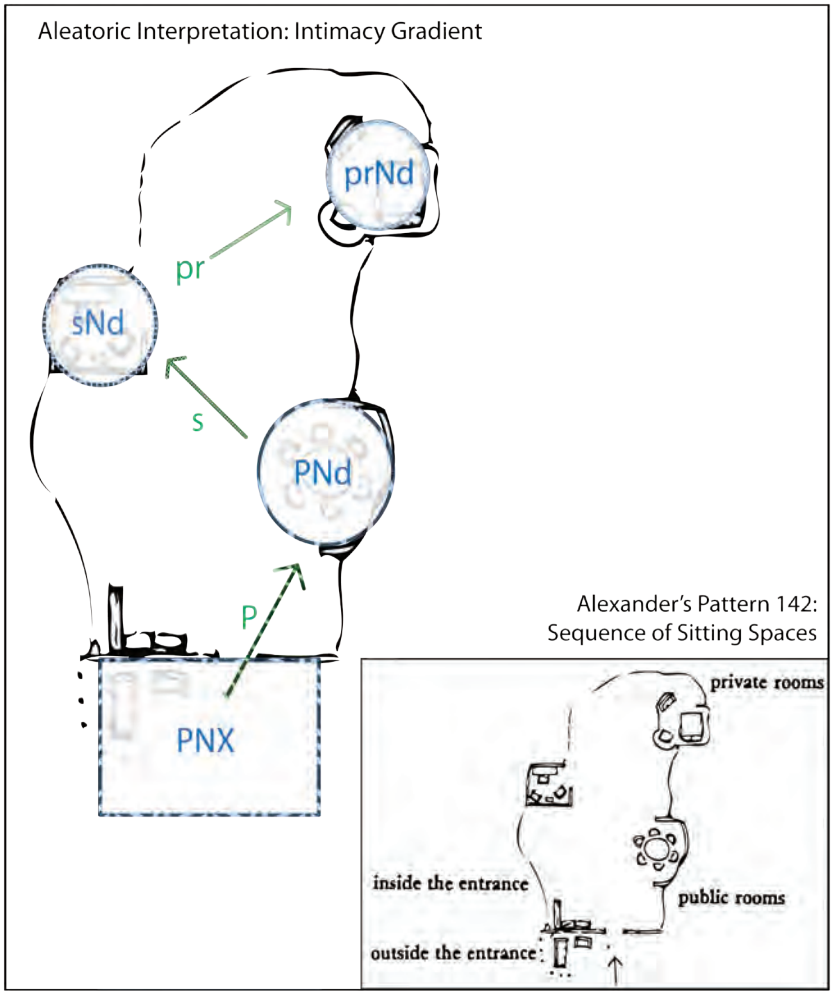

Figure 2-20 Alexander's sequence of gradation of intimacy includes proxemics that are ideal for its owners.

c. Node: linked to other Nodes through Navigation Design

Finally, nodes describe the destination of a path, and should be visible from a narthex. Seen as destinations or focal points, the following two patterns illustrate the social function of the node. Nodes that are increasingly private coincide with a decrease of human occupancy.

Alexander's pattern number 142 entitled, "Sequence of sitting spaces" states:

> *Every corner of a building is a potential sitting space. But each sitting space has different needs for comfort and enclosure according to its position in the intimacy gradient. […] Therefore: Put in a sequence of graded sitting spaces throughout the building, varying according to their degree of enclosure. Enclose the most formal ones entirely, in rooms by themselves; put the least formal ones in corners of other rooms, without any kind of screen around them; and place the intermediate on with a partial enclosure round them to keep them connected to some larger space, but also partly separate.*[55]

He explains that there should be a designed series of options for destinations in order to accommodate others in a hospitable manner. The conditions being that the seating is scaled according to the space that has been designed for it, and that options to other locations are visible from that node to others. Once a node has been chosen, that particular node becomes the access point to other nodes that are visible. This is illustrated in Figure 2-20 on page 53.

Therefore, the sequence of graded sitting spaces are nodes and should be from public to intimate in order for the owner to feel secure and visitors to be comfortable in not intruding in private spaces. In addition, those nodes can link to multiple nodes of increasing intimacy or grandeur controlling and guiding how a building is designed to be navigated.

6. Aleatoric Milieu Defined

The following conclusions regarding the Aleatoric Milieu, which combines proxemics and navigation design for the purpose of hospitality, can be drawn from the analysis demonstrated in Alexander's observations:

An **Aleatoric Milieu** *is comprised of a narrative design entitled 'navigation design,' beginning with a narthex, led from a path to nodes that increase in density, from public to private realms using a gradient of proxemic scales.*

The **navigation design** *consists of:*

Narthex:

An entrance room that creates first impressions, where nodes are visible as an invitation for prospective users. It enforces a social gradation of architectural space that increases in intimacy for the people who own or operate a building.

Path:

Anchored by strong nodes, reinforces building density with proxemic scale and consists of a regular pattern of activity and recurring architectural features.

Node:

An intriguing location of activity; is accessible and serves an objective or purpose, visible from the narthex. Once a user has reached the node, other nodes are visible via paths of adjacent proxemic scale.

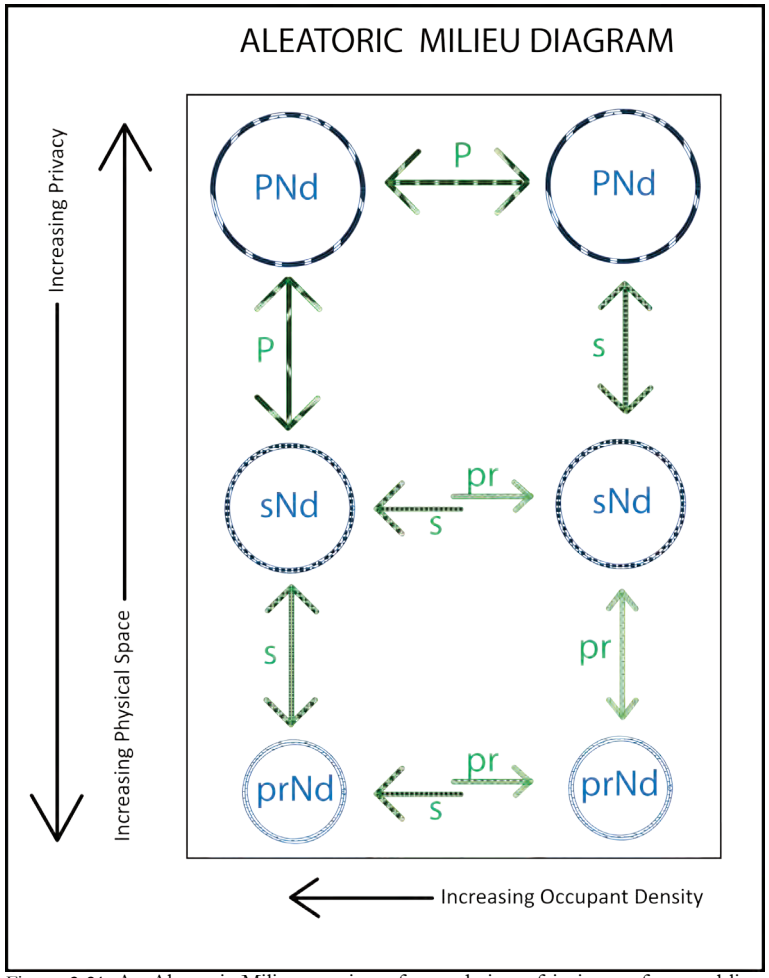

Figure 2-21 An Aleatoric Milieu consists of a gradation of intimacy, from public realms to private, that include navigational design with social interactive dimensions.

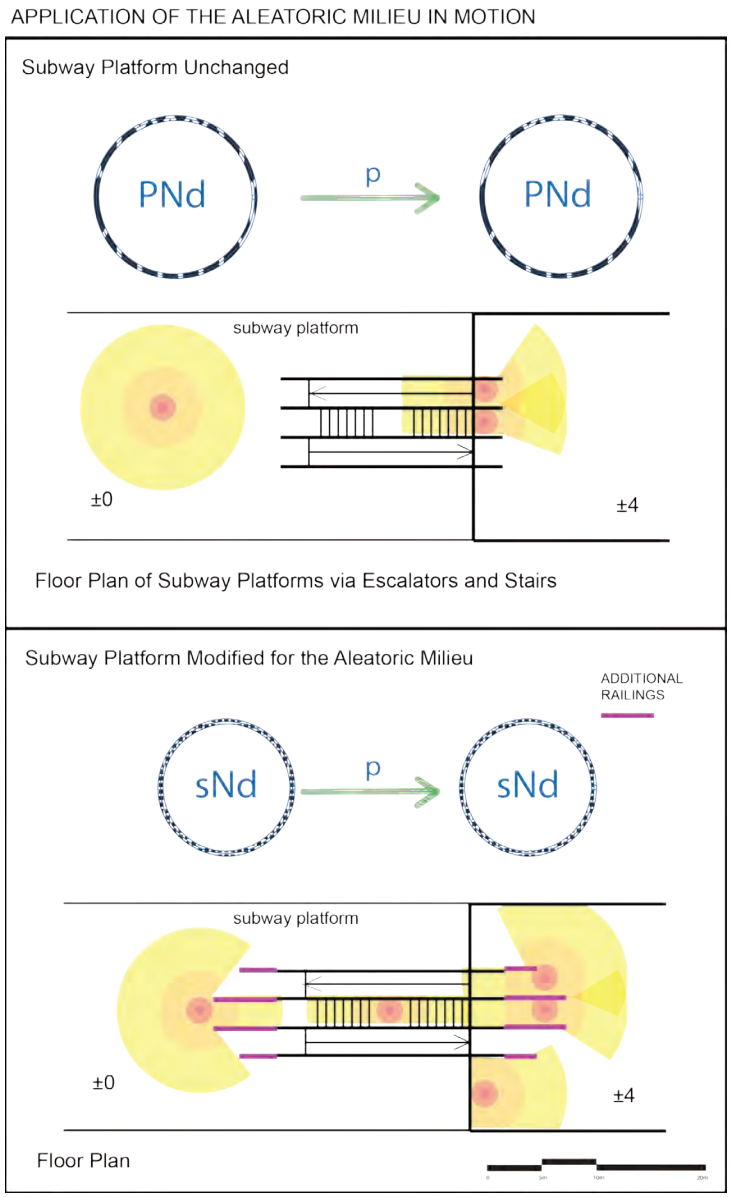

Figure 2-22 An application of the Aleatoric Milieu in Motion.

a. Motion in the Aleatoric Milieu

In order to create environments that are hospitable and in align with the Aleatoric Milieu, using the Aleatoric Milieu helps consider how motion creates a narrative of spatial scales.

The intermediary scale of public to personal scale is the social scale. The connection between spatial scale is especially important in motion since there is a general pace due to the allowable motion. In Public scales, people are free to run and walk faster and overtake slow strollers. However, in personal spatial scale, the slowest pedestrian indicates the pace of the people behind. Therefore, a socially spaced scale between public and personal dimensions help create fluid ambulatory motion.

An application situation for motion in high-traffic areas is subways or underground metro stations. For example, Figure 2-22 on page 56 illustrates a floor plan of a personal path between public nodes from a bottom platform to a higher level. Typically, stairs in between would be of social scale instead of the personal one indicated, but this expample illustrates a worst case scenario. The Aleatoric Milieu suggests that social scales reconcile personal and public space.

A social node is created by extending railings. They are staggered as it shrinks the social scale for those walking toward the path gradually. The design naturally slows down the speed of ambulatory traffic flow, thus increasing the hospitality of this space.

7. Aleatoric Milieu: Navigation Design, Proxemics and Alexander's Pattern Language

The narthex, path and node – as defined by Navigation Design – possess distinct qualities that are on par with Alexander's understanding of the built environment. The narthex should be transitioned through a gradation of proxemics or spatial scale, in order for it to be perceived as welcoming, as it is the initial choice to a path toward a new node. The path links the narthex to the node, but is responsible for navigation through increasing degrees of privacy proportional to a decrease of enclosures or spatial delineations. The node is a clear goal for visitors and is an entrance to a building with architecturally distinct treatment.

The narthex then, acts as the transitional element from external to an internal sanctuary, as well as a vestibule for an intimacy gradient that leads to paths with strong nodes. That intimacy gradient can be said of an internal building, to districts or neighborhoods and applied throughout as design factors to human dimensions. Depending on the scale of building that is analyzed, there are external narthex in towns and cities, and border crossings between nations, while internal narthex exists within the internal intimacy gradients of buildings. The argument that Alexander attempts to describe as 'positive space' results in a general idea of space where the public, social, personal and intimate dimensions when designed in the sequence of their adjacent dimensions, are the most welcoming and natural.

The purpose of a gradation of social dimension is to create a seamless sense of experience in order to not create undesirable and undefined space. Unconnected space will ultimately become neglected space as it is removed from the context of a 'grand narrative' as described by the components of navigation design.

The Aleatoric Milieu is described as possessing *navigation design* extrapolated from Byzantine church architecture, consisting of the elements of the *narthex*, *path* and *node*. Through the combination of proxemics in navigation design, Alexander's Pattern Language helps merge those two concepts into an Aleatoric Milieu considers privacy and occupation density.

Therefore, an Aleatoric Milieu consists of two aspects; the *navigation design* and the gradient of public density to personal privacy, as demonstrated in Figure 2-16. Since the Aleatoric Milieu includes the aspects a *narthex*, *path* and *node* as well as the social scales that inform behaviour which helps determine the inclusiveness or exclusiveness of an organization or establishment through the built environment, enclosed space can no longer be treated merely as 'uniform space.'

The narthex can be described as an entrance room that creates first impressions, where nodes are visible. It enforces a social gradation of Architectural Space that increases in intimacy for the people who own or operate a building, while the entry acts as a node for its users drawing them into the narthex – the point of decision to enter further into the establishment. Upon entry, the path reinforces zones of intimacy created within the narthex of the building, while it is also anchored by nodes. The path consists of regular patterns of activity and contains regular architectural features. A node incorporates an intriguing location of activity, necessity or visceral stimulation. It remains accessible while being visible from the narthex, and serves an objective or purpose. Once a user has reached the node, other nodes are visible via paths of adjacent social dimensional scale.

Thus, *navigation design,* proxemics, privacy and occupation density inform the Aleatoric Milieu. While narthex is a transitional space from internal to external element of a main welcoming entry to a building, nodes that differ in social interactive dimensions are aided by paths that inform the user of the node using the same proxemic. This will result in a natural formation of a gradation of intimacy, since paths and nodes will result in a sequential proxemic dimension and will aid in healthy and memorable environments as observed by Hall, Visser, Gehl, and Alexander.

8. Composing the Aleatoric Milieu

Table 2-3 on page 58 examines possible categories of the Aleatoric Milieu derived from proxemics. It considers Navigation Design patterns as well as includes examples of the Aleatoric Milieu in everyday life.

Table 2-3 Aleatoric Milieu Example Conditions in Design

Public Scale to Public Scale:

Central Narthex where Multiple Nodes are Visible:

- Entrance to a complex where nodes are features of special interest
- Paths are kept on a regular scale of smaller stores
- E.g. Shopping centres with large department stores that act as nodal anchors

Grand Narthex, Path and Node:

- Cathedral-like proportions
- E.g. Byzantine church: narthex, path, node narrative

Public Scale to Social Scales

A Central Node to Multiple Nodes:

- Narthex provides a view into a central node.
- Paths can form nodes that radiate from a central node with adjacent nodes that are of smaller or equal social dimension from the central node.
- Scale of paths mediate between two nodes and should have a unique and regular architectural finishes. For example, regular lighting, texture or material.
- E.g. Pantheon in Rome

A Sequence of Nodes:

- Original Narthex location provides a visual sequence of a grand internal node.
- Internal public node acts as an anchor the subsequent paths and nodes to return to.
- Paths can mediate the scale of the sequence that narrates a story based on architectural patterns.
- E.g. Music Museum in the Design Section

Social Scales to Personal Scales:

Featuring Paths:

- Narthex of introduces building narrative featured in paths.
- Paths at social or personal scales discourage congestion occurring at social scales.
- Nodes of public or social scale reinforce social paths or personal nodes from personal paths.
- E.g. Shopping circuit, garden paths, galleries or halls.

Featuring Nodes:

- A social narthex at the entry provides context to other nodes of interest.
- Nodes of social or personal settings convey comfort, warmth and hospitality.
- E.g. Entry to a house, with couch or kitchen visible, sofa seating around a table, dining table that has been set, or in a store entry, a wall or designed display of merchandise visible on a pedestal with special lighting.

Some examples for elements of Aleatoric Milieu are the Four Seasons Performance Centre in Toronto, The Guggenheim in New York and The Pantheon in Rome.

The Four Seasons in Toronto uses an urban scaled Public node with its open theatre, addressing the Public street scale. However, internally during performances, access is blocked off for acoustic purposes and the lobby of public scale with an internal theatre of public scale can benefit with the creation of more social nodes so visitors have a space to create their own memories within the public scale of the space.

The Guggenheim in New York transitions from Public to Social scales from a public scale internal lobby and a social scaled spiraling path, but lacks a proper node in its destination of the spiraling path. Arguably, the journey may be memorable enough, and the destination artwork placed along the path, but a formal node would improve and add value to such a dramatic path.

While the Pantheon in Rome has a Public central node, it is unique in that the space is empty and is defined by the external elements that enter the circular opening. It has niches and altars that were once intimate in scale, but now fenced off to visitors. It is not scaled or in a sequential social dimension, so the most impressionable space will remain as a public coffered spherical enclosure.

Figure 2-23 The Four Seasons Performance Centre in Toronto.

Figure 2-24 The Solomon R. Guggenheim Museum by Frank Lloyd Wright is an iconic museum in New York City.

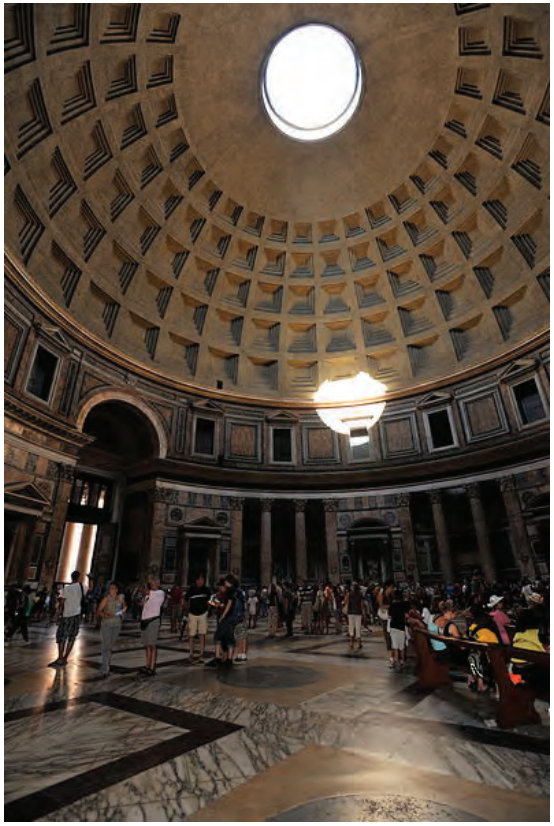

Figure 2-25 An internal perspective of the Pantheon in Rome.

D. Conclusion: Discovering and Infusing the Aleatoric Milieu

Edward Hall has explored how space can be measured by the scale of possible social interactions. A progressive experience of space is documented by Margaret Visser demonstrating the historical roots of Navigation Design. The integration of their illustrated perspectives is found in the theories of Christopher Alexander, clarifying the application of an Aleatoric Milieu that integrates human experience, historical references, and recognized observations.

Navigating the human social dimensions as studied by Hall and extrapolating a navigation diagram from Margaret Visser's experience of Sant'Agnese Fiori le Mura in Rome, coupled with the analysis from Christopher Alexander's principles of design in *The Pattern Language* resulted in a series of diagrams. Using the Aleatoric Milieu as a design tool, phenomenological social dimensions can be perceived in architecture and evaluated as an Aleatoric Milieu.

Therefore, the experience of space having been defined by Hall, a concurrent historical reading of space demonstrated through Visser, infused with the theory of Alexander's ambition to create a holistic architectural language that details the design of rooms to entire cities.

The third organizing factor of the Aleatoric Milieu can be explained as designing gradations of density to intimacy of proxemic scales using Navigation Design. In other words, the Aleatoric Milieu links external space to buildings of adjacent proxemic dimension using a narthex that link paths to various nodes that follows the same principles of adjacent proxemic scale to create gradients of density from the most public space to the least dense to indicate private space.

In an increasingly globalized world, the importance of understanding human social boundaries is exceptionally beneficial to design. In addition to understanding the contextual social distances with their respective spatial dimensions in the built environment, utilizing the same known spatial preferences can help inform architectural projects. A method for analyzing design allows for the creation of truly considerate and contextual buildings, which respect both cultural and situational aspects of architecture.

The concept of Aleatoric Milieu includes new elements to spatial design that can increase the speed of design, as well as user-friendly buildings, making buildings more welcome and more likely to be visited by the general public. Additionally, it also provides a new basis for the critique of design.

As museums are 'a city on a reduced scale,'[56] in the same way, museums can incorporate and utilize elements of an Aleatoric Milieu. The prospects of an Aleatoric Milieu are identified and analyzed in existing museums in the following chapter.

Endnotes

1. Harry Francis Mallgrave and David Goodman, *An Introduction to Architectural Theory: 1968 to the Present* (United Kingdom: Wiley-Bleckwell, 2011), 99-100.
2. Mallgrave and Goodman, *An Introduction to Architectural Theory*, 99-100.
3. Bruce Bassler, ed. *Ramsey/Sleeper Architectural Graphic Standards: Student Edition* (Toronto: John Wiley & Sons Ltd, 2000), ...
4. Edward T. Hall, *The Hidden Dimension* (New York: Doubleday and Company, Inc., 1966), 4.
5. Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses, (*West Sussex: John Wiley & Sons Ltd, 2005), 25.
6. Hall, *The Hidden Dimension*, 2.
7. Hall, *The Hidden Dimension*, 2.
8. Hall, *The Hidden Dimension*, 108.
9. By 'non-contact', E.T. Hall seems to refer to the social preference of these individuals; that they collectively prefer social interactions to have no physical contact with others, especially strangers.
10. Hall, *The Hidden Dimension*, 108.
11. Bruce Bassler, ed. *Ramsey/Sleeper Architectural Graphic Standards: Student Edition* (Toronto: John Wiley & Sons Ltd, 2000), 6-7.
12. Hall, *The Hidden Dimension*, 75.
13. Hall, *The Hidden Dimension*, 83.
14. Hall, *The Hidden Dimension*, 122.
15. Hall, *The Hidden Dimension*, 4.
16. Bassler, *Ramsey/Sleeper Architectural Graphic Standards*, 3.
17. "Information for Child Care Professionals." Ontario Ministry of Education, Queen's printer for Ontario, last modified September 4, 2014, accessed June 25, 2014, http://www.edu.gov.on.ca/eng/parents/planning_and_design.pdf.
18. Ontario Ministry of Education,"Information for Child Care Professionals."
19. J.Pedro Lorente. *Cathedrals of Urban Modernity: The First Museums of Contemporary Art 1800-1930* (Aldershot: Ashgate, 1998), 1.
20. Robin Cormack, *Byzantine Art* (New York: Oxford University Press, 2000), 12.
21. Cormack, *Byzantine Art*, 45.
22. Cormack, *Byzantine Art*, 2.
23. Cormack, *Byzantine Art*, 2-3.
24. Paul von Naredi-Rainer, "The Semantics of the New Museum Architecture," in *Museum Buildings: A Design Manuel (*Basel: Birkhäuser, 2004), 29-38.
25. Michaele Giebelhausn, ed. *The Architecture of the Museum: Symbolic Structures, Urban Contexts,* (New York: Manchester Universtiy Press: 2003), 7.
26. Giebelhausn, *The Architecture of the Museum*, 7.
27. Karl Sabbagh, *Power into Art: The Making of Tate Modern* (Harmondsworth: Penguin Books, 2001), 45.
28. Margaret Visser, *The Geometry of Love: Space, Time, Mystery, and Meaning in an Ordinary Church.* (Toronto: HarperCollins Publishers Ltd, 2000), 3.
29. Visser, *The Geometry of Love*, 28.

30. Visser, *The Geometry of Love*, 32.

31. Isaiah 53 (NIV), John 3:16 (NIV).

32. Timothy Keller, *The Reason for God: Belief in an Age of Skepticisim*. (New York: Dutton, 2008), 16.

33. Visser, *The Geometry of Love,* 29.

34. Romans 5:20-21 (NIV).

35. Visser, *The Geometry of Love*, 64.

36. Kevin Lynch, *The image of the City* (Cambridge Mass. : MIT Press, 1960), 1.

37. Lynch, *The image of the City*, 107.

38. Lynch, *The image of the City*, 1.

39. Aldo Rossi, *The Architecture of the City* (Cambridge, Mass.: The MIT Press, 1982), 165.

40. Christopher Alexander, et al., *A Pattern Language: Towns, Buildings, Construction.* (New York: Oxford University Press, 1977), ix-x.

41. Alexander, et al., *A Pattern Language*, xvii.

42. Alexander, et al., *A Pattern Language*, xliv.

43. Alexander, et al., *A Pattern Language*, 532.

44. Alexander, et al., *A Pattern Language*, 531-534.

45. Alexander, et al., *A Pattern Language*, 887.

46. Alexander, et al., *A Pattern Language*, 169-173.

47. Alexander, et al., *A Pattern Language*, 582.

48. Alexander, et al., *A Pattern Language*, 540 – 544.

49. Alexander, et al., *A Pattern Language*,163 – 167.

50. Alexander, et al., *A Pattern Language*, 1161 – 1163.

51. Alexander, et al., *A Pattern Language*, 557 – 560.

52. Alexander, et al., *A Pattern Language*, 480 – 484.

53. Alexander, et al., *A Pattern Language,* 480 – 484.

54. Alexander, et al., *A Pattern Language*, 610 – 613.

55. Alexander, et al., *A Pattern Language*, 673 – 675.

56. Gerhard Mack, *Art Museums into the Twenty-First Century* (Basel: Birkhäuser, 1999), 44.

Case Studies

III

III. Aleatoric Milieu in Museums

The Aleatoric Milieu is a method of design that provides a strategy to entice users to navigate an intended program while also considering the proxemics required to navigate this space. This spatial construct is one that can be used to analyze design as well as being applicable to diverse architectural palates. It is a design theory that utilizes a common language of social and cultural spatial arrangement and wayfinding to promote a design language of acceptance and hospitality.

Museums exist in a city out of necessity, and the effectiveness of these buildings as presenting itself as welcoming and navigated with ease can be gauged with the Aleatoric Milieu. While the scale for a city and a building defers, the principles and theories of an Aleatoric Milieu remains unchanged. The first part investigates Museums and the City and how an Aleatoric Milieu is useful in applying its principals to the public space. The second part consists of Museums that are analyzed according to the Aleatoric Milieu.

A. Museum as an embodiment of the Collective Memory of the City

In order to legitimize the memories in a specific time and place associated with social space, a *museum* is a viable place to understand the context, thinking and the collective memory associated with city culture. Through the act of accruing and choosing what to keep or discard, through the inclusion or omission of a plethora of medium; mixed media, paintings, sculpture, collections of small or large "everyday objects" in different time periods, museums collect the evidence of a period in civilization. Museums present a vision of the past, a perspective or commentary to existence, or chooses venerate significant eras, people, corporations or events. Museums represent and display selected works, making ideas come alive to visitors, the museum's users. They investigate, interact and encounter objects in an enclosed spatial element – the architecture, which shapes the ideas and message concurrent to recent perspectives surrounding the items and objects the museum displays.

A city can be represented as a building while the building type to represent a city is the museum. In order to represent cities, holds artifacts, the museum in many forms as depictions of culture brought together in a city. They include everyday objects, created works of art, writing, music making or cuisine. Artifacts or items that are created and can be stored characterize multiple cities and the era, their values, principles, and the economy. With the complexities of the museum as a representation of a place, due to its public nature, one can argue it is managed as a city. The museum form becomes an embodiment of the collective memory of a city, therefore, is a suitable building type for an analysis using the Aleatoric Milieu.

1. Buildings and Cities Exemplify One Another

Considered one of the first writers of modern architectural treaties, Leon Battista Alberti already proposed in the mid fifteenth century that the creation of a house entails the considerations for the building of a small city:

> *For that reason, in building it, one will have to take into account almost everything that relates to the construction of a city.*[1]

In building a small house, products that relate to how people eat, sleep, play and work are considered to include construction methods that are contemporaneous to its era. The scale of the building also relates to the consideration given its functions, purpose and interrelationship of programming for the task of daily living through design. Therefore, not only can a city be represented as a museum, a building encompasses the city's context in its inauguration.

Not only does a building represent its context, the perspective arose in the nineteenth century that describes how historical elements can actively contribute to the future. Patrick Geddes, a Scottish biologist, sociologist, urban theorist and town planner alludes to the fact that a city, due to its preservation of history, can become a museum. Geddes explains history as:

> *the very essence of our growing sociological re-interpretation of the past to see its essential life as continuous into the present, and even beyond, and so to maintain the perennation of culture, the immortality of the social soul.*[2]

Geddes, in 1892 had repurposed an abandoned tower in Edinburgh, Scotland, renamed it as Outlook Tower and symbolized his ideal – the city would be the representation of a living museum. A camera obscura - a system of mirrors and lenses - allowed the city to be viewed from above. Geddes believed that such an experience would help citizens participate in the gentle renewal of the urban fabric, producing an evolved city. It visibly demonstrates how:

> *The evolving city of Geddes's post-Darwinian imagination would, of necessity, gently bring its historical fabric into modern usage – as a living museum itself.*[3]

Although greatly differing in scale, the continued discourse of the city as a museum continued again in the 1970s. The Italian architect Aldo Rossi's book *The Architecture of the City*, explores the "hypothesis of the city as a manmade object, as a work of architecture or engineering that grows over time."[4] The physical structures of a city, its elements and products, can only represent a city in its ideals and an expression of its time and place. Cities can also help its inhabitants project a past as well as build for the future:

> *The value of history seen as collective memory ... is that it helps us to grasp the significance of the urban structure, its individuality, and its architecture ... Thus the union between the past and the future exists in the very idea of the city that it flows through in the same way that memory flows through the life of a person.*[5]

Individuals imbued with arguably the ideas that a city generates, inevitably construct urban artifacts that are intertwined by social construct and form a memory of place and life in their users.

Rossi, together with Alberti and Geddes, establishes the idea that preservation of the collective memory that exists in the creation of a house or building can culminate in the creation of a city.

Figure 3-1 The Outlook Tower is seen on the left hand side, overlooking the city, painted in white.

b. A Microcosmic City Represented in the Museum

Since museums can be the collection of artifacts or a created art form – they are generated by a city, thus inevitably linked. In Aldo Rossi's words,

> *Artifacts either enable us to understand the city in its totality, or they appear as a series of isolated elements that we can link only tenuously to an urban system.*[6]

The museum therefore, can become the holding place for the culture, history and memory – through existing within the architecture of a city as well as housing the artifacts that symbolically preserve the thoughts and ideals of the city.

While the museum exists as a city in microcosm, a few elements can be easily distilled as a comparison regarding institutional features, artifacts linked to a shared economy and the sense of belonging between them, the museum as a miniature functional city.

Firstly, a city's institutional elements include law and policing; the museum hires security and educates 'do not touch/climb' elements to its artifacts. Services in a city are its transportation, water and waste management, institutions of learning and a diversity of shops and resources. Similarly, museums facilities include shops, restaurants, office space, storage, and a variety of galleries to house painting, sculpture, multimedia, etc. A museum possesses designed accessibility, ramps and elevators similar to how a city has its roads, railways, and transportations.

Secondly, a city is diverse in nature; the districts it entails are like a variety of exhibits in museums. The collections of urban artifacts of museums are comparable to buildings that demonstrate the economy and the material wealth and culture of a city.

Finally, the sense of belonging is also similar; the city consisting of a physical home, workplaces and locations of leisure, while the museum offers the notion and representation of work, home, and leisure. Both possess a physical space to experience with family, friends, or oneself. The city is a location to consider or rediscover the user's sense of place in the world.

The physical organization or program in a shared economy, as well as being a location for mutual experiences, the museum is a microcosmic city. Therefore, in creating a museum, it becomes a repository of memories as well a place of shared experience that can be adaptable to influencing the community, city or ideals it represents.

c. Museums in a City

Museums collect things created out of the economy of the city, necessity to collect historical significant aspects that would otherwise be destroyed by progress, as well as existing as a validation of a city's endurance. By demonstrating evidence of security and creativity, it gives hope to its current citizens.

In Heinrich Wagner's handbook for Architecture published in 1893, the Darmstadt professor had already described the museum as the 'cultural gauges' of a nation. Wagner had classified the museum in his handbook under the section entitled 'Buildings for Education, Scholarship, and Art.' This demonstrates that museums in his opinion, can educate, holds a certain prestige and inspires creativity, effectively gauging a nation in this regard.

Lewis Mumford describes the relationship between the museum and the city, where the museums exist as a necessary reservoir for the history the city. It is created through accumulation:

> *Layer upon layer, past times preserve themselves in the city until life itself is finally threatened with suffocation: then, in sheer defense, modern man invents the museum.*[7]

Not only are museums now collections of culture and history, Mumford also explains that the museum represents:

> *the most typical institution of the metropolis, as characteristic of its ideal life as the gymnasium was of the Hellenic city or the hospital of the medieval city.*[8]

Paul von Naredie-Rainer, author of 'The Museum as an Institution,' concluded as the responsibility of a museum to possess a lasting and active impression in the social realm:

> *As a living form of memory, the museum should not simply content itself with just archiving these things, however; it must instead address the question as to how the experiences contained in them can be made useable for us, and even more, how the present can be measured against that which is timeless.*[9]

When a city can be compared to artifacts or rooms in the absence of scale, it is through the consideration of an embodiment of ideas the created works represent, providing new perspectives for which to analyse and understand design. These ideas presented in various spatial scales can either add value or detract from the object's significance. Addressing its correct proxemic within the Aleatoric Milieu as a Node or in a path can help edify how displays and objects are presented within a museum.

As a representation for a city, municipality or nation, museums ultimately embody the city and its ideals. As a reflection of the city, the museum's permanence, existence, and methodologies testify and seek to represent the perspectives of the civic population. Museums as described as 'cultural gauges' of a nation, consisting of 'collections of a city,' as well as a 'living memory,' begs for the creation of physicality that engages its users. How this 'living memory' is narrated, and how its users can create personal memories in experiencing and encountering the past or the present in new perspectives. An architectural theory can postulate how users navigate a museum and how that relates to user experience would greatly benefit from an analysis using the Aleatoric Milieu.

2. Aleatoric Milieu in Museums

Museums replicate urban modes, and in Jacques Herzog's words, "It is like a city on a reduced scale."[10] The way a museum is designed is directly related to how it will be managed by the curators and influenced by those who fund its projects. Curators, however, possess the discretion to choose between the program, purpose and function of museum spaces.

The Aleatoric Milieu also fits well into Mark O'Neil's new epistemology of museums, as *navigation design* allows the inclusions of narrative displays while social dimensions include a theory of justice that architecture exists to encourage healthy human interactions with programmed hospitality that is visitor friendly.

Mark O'Neil's publication in Museum Management and Curatorship published in 2006, entitled "Essentialism, Adaptation, and Justice: Towards a new epistemology of museums," takes into the account of three possible concurrent perspectives of the purpose of museums. Through the evaluation of perspectives of essentialist, adaptive and ideological perspectives for the existence of the museum, O'Neil's analysis creates a new epistemology for museums. It is a theory where museums 'know' objects, visitors, society and themselves.

According to O'Neil, museums fall loosely and often overlap in these categories: essentialist, adaptive and ideological museums. His goal is to:

> *"break away from an excessively individualistic and dualistic epistemology in order to develop a more participatory and collaborative approach across all dimensions of museum knowledge."*[11]

Essentialist museums strive for the preservation, research and display of objects, while adaptive museums focus on conservation and preservation, and ideological museums exist to support power structures. Despite the categorically different critiques, O'Neil outlines the importance of museums to preserve, research, display, conserve, and supports a power structure.

O'Neil epistemology on museum is a method "which integrates all the forms of knowledge which museums acquire, produce, deploy and disseminate."[12] His contribution in analyzing and developing a museum epistemology that infuses justice for the visitor – effectively rendering them users – in a museums that display objects in a narrative. In O'Neil words, museums that consist of:

> *"a broad epistemology, with an integral theory of justice, which supports object-based, visitor-centered, flexible and storytelling displays, has the potential to enable museums to contribute even more than they have hitherto to the creation of a culturally rich, humane, just and tolerant society."*[13]

The goal then, for O'Neil, are museums that utilize an inclusive and approachable narrative displays that focus on visitors experience and objects benefits the society it serves. Similar to the Aleatoric Milieu theory, it possesses an understanding of building design for an inclusive and hospitable built environment that welcomes the cross-cultural user.

O'Neil's desire for inclusive museums is one that considers a theory of justice that benefits the general public while also hinges on the conviction that:

> *museums can only be as good as their analysis of society and their awareness of the reality of people's lives.*[14]

This is a powerful statement that can be applied to the proxemics that differs from each culture and can often not be generalized, but learned and understood. Design that is aware of a museum's user demographic is fundamental to a museum's effect on the society it serves.

Since an Aleatoric Milieu is an architectural theory that investigates design from a user's perspective of navigation and a spatial consciousness that is aware of proxemics, it physically creates a location that can house O'Neil's suggestion of a museum epistemology that is object oriented, user-centred with flexible storytelling displays. Navigational design would be aligned with creating a narrative in museums since it includes a narthex that introduces a set of displays. A path to visible nodes of featured objects can be lined with additive information supporting the featured object at the node. In addition, using appropriate proxemics that correspond to the program of each space can positively support the culture where the museum is located, while also supporting an epistemology such as O'Neil's.

The practical result of designing a building with the Aleatoric Milieu can hospitably contribute to a 'culturally rich, human, just and tolerant society.'

a. The Aleatoric Milieu within a City and Building Scale.

At a city level, it is advantageous to consider the aspects of an Aleatoric Milieu or the lack of one. For example, missing nodal points help identify opportunities for business ventures and overlaid with factors such as types of business, high pedestrian traffic areas or accessibility can contribute to a nodal destination on an already established path. Although there is charm and mystery in locating tucked-away stores within city infrastructure, it would require considerable effort from technology and devices available with modern city navigation. The Aleatoric Milieu theory strives to design for cities and buildings that can be intuitively navigated.

Nodes in a city scale can be institutional buildings, that there are either government or private, such as city halls court houses, police headquarters, transportation terminals, educational facilities, galleries, cultural centres, or necessary things such as stores or activity centres or resorts. Paths in a city scale are its roads, either covered or open walkways, of public scale that are shared with cars or people and lined with shops, houses or closed to accessibility – with fences, hedges, or railings on bridges. The narthex part in a city scale would be signs from a freeway for the point of decision making, or an intersection of paths where nodes as orientation or destination points are visible from a street view or peaking out the tops of buildings from the street like the tops of cathedrals or high rises.

Within a building scale, the navigational narration of a building analyzed with the conditions of an Aleatoric Milieu can provide a new language to describe designed space. Within the context of a museum, *navigation design* can also vary in scale. For example, exhibits themselves can become nodes, or within this exhibit certain display case or design feature that is given special attention becomes a node. While stairs and ramps may be paths to the exhibit nodes, lit up aisles to certain displays can also be those paths. Furthermore, the private or public personal dimensions of a space and its adjacent social dimension can translate to the effectiveness for which displays or exhibits are housed.

The Aleatoric Milieu can help identify weaknesses to nodes that are not visible from a narthex, thus rendering it inaccessible, elusive and ineffective. If the gradation of intimacy and density that does not follow the social scale of the space makes an awkward transition from public to personal space that can cause user discomfort. It can also identify the useful elements that conform to the Aleatoric Milieu theory and how the use of architectural materials and awareness of creating 'atmospheres' strengthen Navigation Design.

A built environment that strives to be accessible, open and concurrent to its users should be designed with 'eyes on the street,' in both city and building scales because it adds safety to the visible environments that would be therefore lively due to its visibility. The Aleatoric Milieu is a strategy for accessibility and hospitality which includes a natural narthex for decision making, a path to travel, and a node which is a desirable destination visible from the point of decision.

B. Case studies for an Aleatoric Milieu

The following case studies have been chosen due to their general possession of navigation design, proxemics and architectural interest to discuss the Aleatoric Milieu. For example, methods of circulatory paths are linked with narthex and nodes with the addition of addressing different scales of public, social, personal, and intimate dimensions.

By analysing the Aleatoric Milieu in the following museums: the Newseum, the Korbach museum, Kunsthaus Bregenz and the Caxia Forum, navigational design coupled with human dimensions can be analyzed to find how the building narrative flows and the effects of those factors may have for the museum user.

- The Newseum, a building in public dimensions that consists of multiple paths to exhibit nodes, was chosen for its public scale.
- The museum in Korbach is a locally renovated and repurposed museum that preserves historical dwellings, focuses more on social and intimate scales with paths that were once the leftover alleys between buildings.
- Kunsthaus Bregenz, a building that utilizes simple floor plans in public dimensions and paths through a staircase, was chosen for its unusual paths.
- Finally, the Caxia Forum in Madrid possesses strong nodes of entry and a vertical spiral staircase pierces all floors congruent to the characteristics of a path and chosen for its very effective narthex.

Each Museum is described with its architectural features, specific characteristics of its location and an estimation of the museum user demographic. Its analysis is concluded with an Aleatoric Milieu diagram and how it has been applied to each respective building.

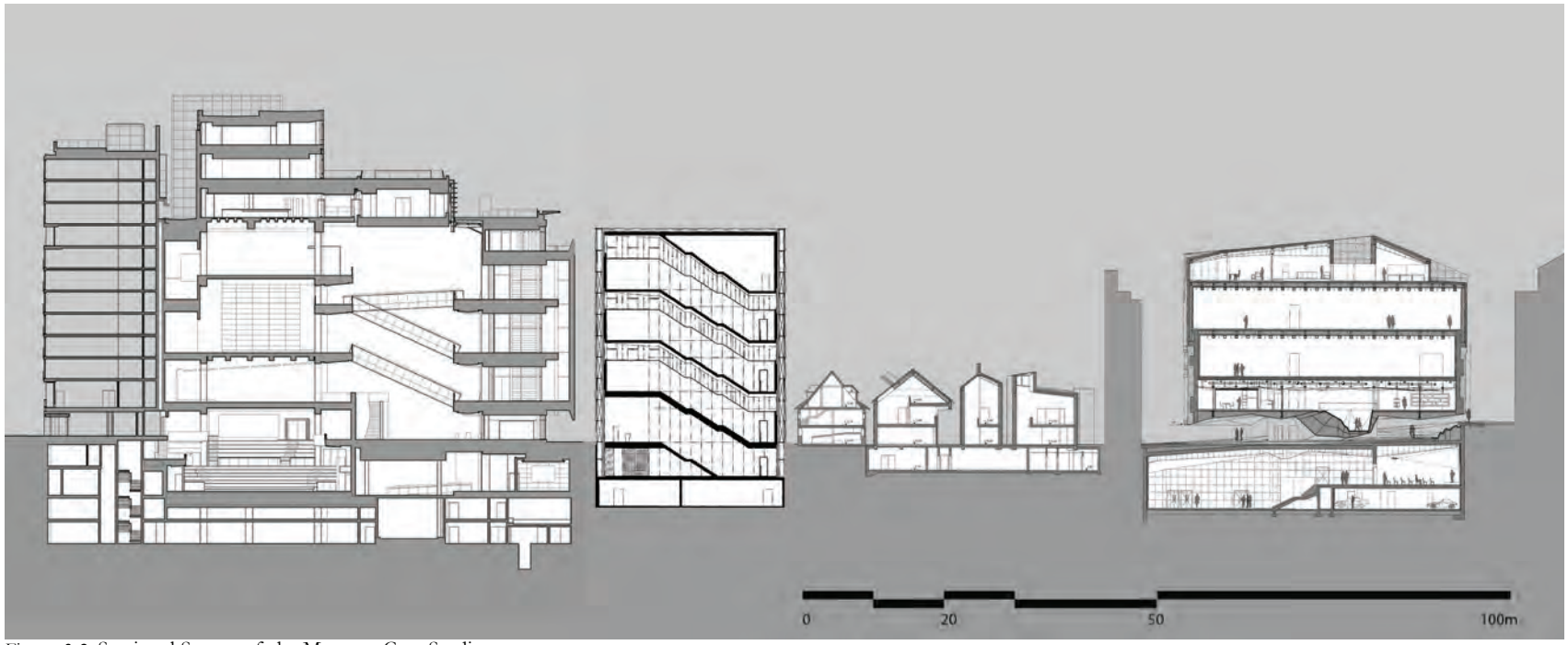

Figure 3-2 Sectional Spaces of the Museum Case Studies.

1. Newseum in Washington, D.C.

In the capitol city of the United States, where the scale of buildings and streets are of grandeur, in a typically grid-like organization of city street changes to a nodal typd of wayfinding in Washington D.C. The Newseum located there addresses the scale of the nation in monumental scale as shown in Figure 3-3 on page 75.

The project architects, formerly known as Polshek Partnership Architects, now Ennead Architects LLP, designed a Museum of news that was inaugurated in 2008 named Newseum with a budget of 450 million US dollars.[15] It is located on the corner of 6th Street and Pennsylvania Avenue in Washington, D.C. It is situated beside the Canadian Embassy facing the National Gallery of Art and close to other Smithsonian museums in the National Malls which are all buildings of monumental scale.

Also known as "America's main street,"[16] Pennsylvania Avenue is America's ceremonial route for presidential inaugurals motorcades for visiting heads of states and state funeral procession. Addressing this eight lane road is a plaque of similar scale as shown in Figure 3-4 on page 75. Etched upon a 75 foot high 50 ton Tennessee Marble, the First Amendment, part of the Bill of Rights to the United States Constitution reads:

> *Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances.*[17]

Not only does the main south façade of the Newseum consist of First Amendment plaque, but adjacent to this plaque is a 4,500sq-ft window of low-iron glass curtainwall. The transparent nature of the building design alludes to the metaphor of an open society and free press as a guiding principle of the design. The steel and glass clad building maintains daylight with solar shading screens that reduce some of the cooling load. Rubber floors are from recycled tires while Ipe wood flooring are from sustainable-yield forests.[18]

The museum is a mixed use building of 58,500 square meters consisting of a multi-media museum, a residential tower and administration office for the Freedom Forum along 6th street with each program having their respective entrances. Funded by the Freedom Forum, the museum's purpose is to advocate for the free press as well as to celebrate the freedom of speech. A six-level high-tech interactive museum with installations designed by Ralph Appelbaum Associates, the Newseum traces the history of news reporting from the 16th century to the present day. The Newseum offers visitors 23,000 square meters of exhibit space, 15 theatres, 14 major galleries, two interactive broadcast studios shown in Figure 3-7 on page 76, a 120-seat documentary theatre, and as shown in Figure 3-10 on page 76, a 535-seat 4D theatre time-travel experience.[19] The Newseum features the exploration of new history, electronic news, photojournalism, world news and methods in which media have covered major historical events as demonstrated in Figure 3-14 on page 78 and Figure 3-15 on page 78.[20]

Figure 3-3 Newseum Site Plan.


Figure 3-4 Newseum on Pennsylvania Avenue on axis with the White House.

a. The Aleatoric Milieu of the Newseum

At a pedestrian approach from across Pennsylvania Avenue, the large internal screen is designed to be visible as if the building is a large projection screen. While sequentially from external human dimensions, it is a public scaled path that approaches the building, as the image in Figure 3-6 on page 76 shows. Public dimensions are squeezed below the marble slab's overhang that can be considered the far-phase of social dimensions. Beckoning visitors even closer to interact in a personal dimension, a sidewalk display of 80 front pages from newspapers from around the world are displayed.

Through either the Newseum store or welcome ramp, visitors encounter the central atria of walkways along the glass wall which is the open window to the world. A 40ft by 22ft media screen projects hangs beside a news helicopter shown in Figure 3-8 on page 76 and Figure 3-9 on page 76.[21] Visitors of the museum are encouraged to take elevators to the top floor terrace above Pennsylvania Avenue as seen in Figure 3-5 on page 76. There, John Russell Pope's 1941 National Gallery of Art as well as I.M. Pei's East wing is visible among other landmarks. Starting from the terrace, visitors are suggested to spiral down around the exhibit around the central lobby to see the 14 major galleries, a suggested path of 1.5 miles or 2,414 meters long.[22]

Figure 3-5 Newseum's Terrace on the top floor.

Figure 3-6 Newseum Street Entrance.

Figure 3-7 Interactive broadcast studio.

Figure 3-8 Atrium view of the Newseum screen visible from the street.

Figure 3-9 Newseum's Entrance Lobby.

Figure 3-10 Newseum 4D Theatre.

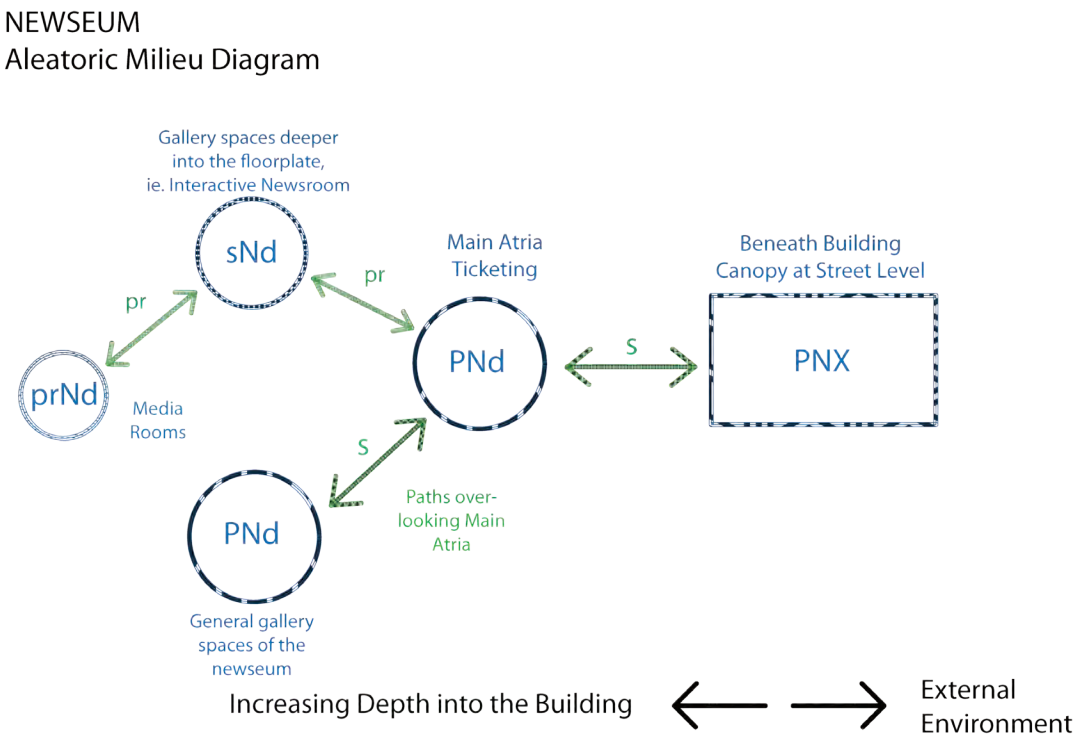

Figure 3-11 The Aleatoric Milieu Diagram for the Newseum.

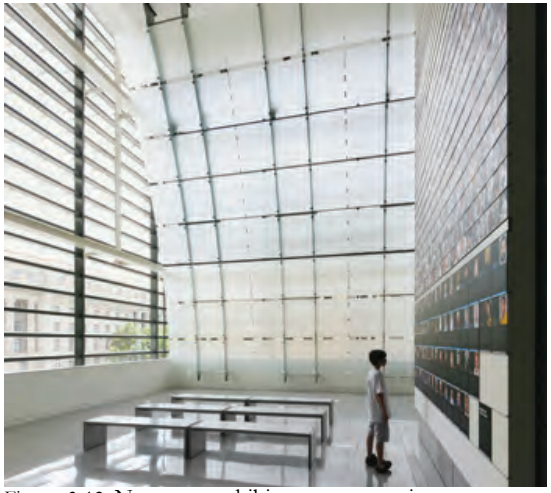

Figure 3-12 Newseum exhibit commemorating reporters who have lost lives on the job.

Figure 3-13 Newseum showing a part of the Berlin wall.

Figure 3-14 Newseum Exhibit.

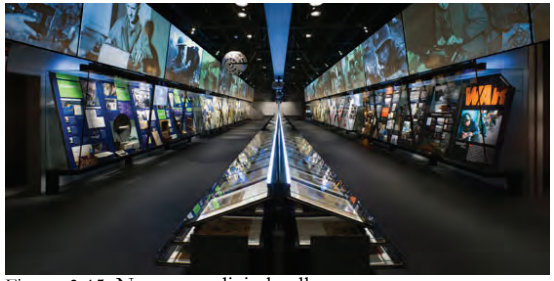

Figure 3-15 Newseum digital gallery.

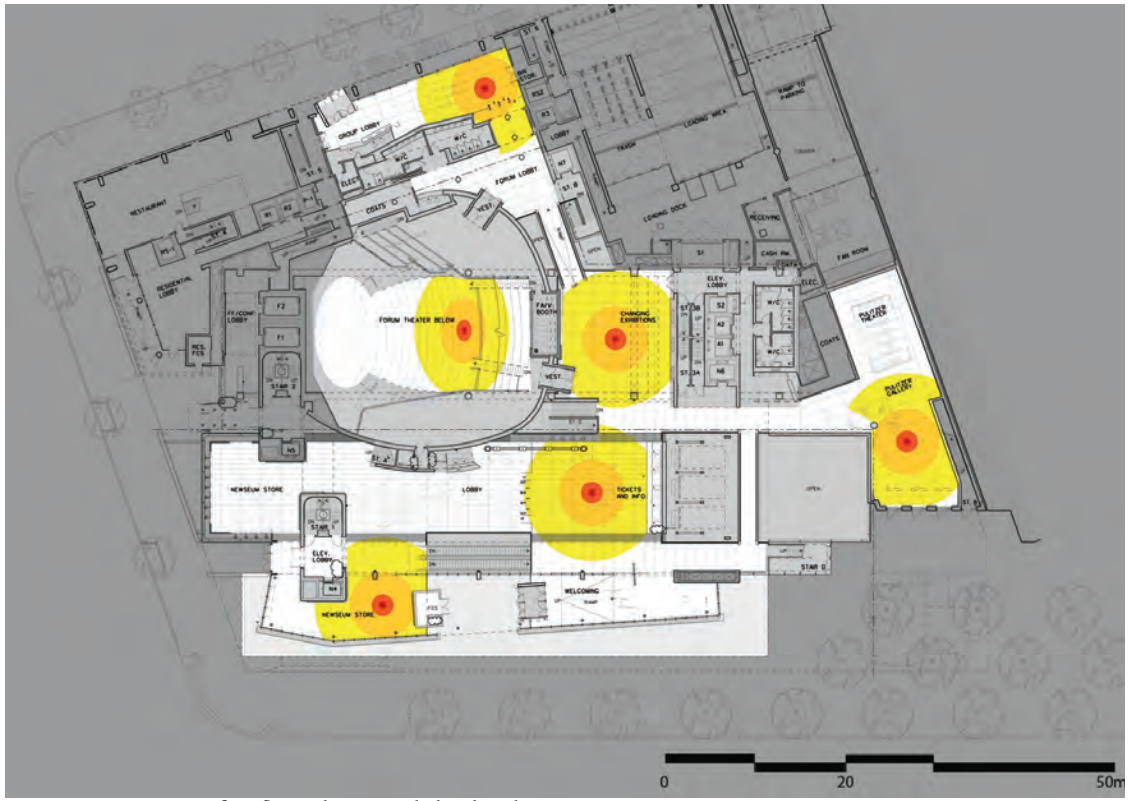

Figure 3-16 Newseum first floor plan at grade level at the entrances.

The paths between the exhibit nodes lack a defined social dimensional space. The floor plate shows that paths are generally social in scale with the widths of personal scale. The sectional conditions of the space shows how its paths, due to high ceilings and transparent finishes, results in paths of public dimension that surround the atrium. The lack of gradual dimensional scale change weakens the desirability of nodal exhibits, like Figure 3-12 on page 77. The exhibits also extend beyond public dimensions while the walkways, elevators and stairs are within personal and social dimensions as seen in Figure 3-13 on page 77.

Therefore, personal encounters and identifying moments of the museum visit are architecturally reinforced but solely rely on exhibition and curators to create social, personal and intimate scales between visitors and the exhibits.

b. Analyzing the Aleatoric Milieu

The sections with Hall's diagrams of human dimensions and aleatoric milieu analysis show a sequential increase of nodes from the entry: a social-public-social-private nodal progression to the deepest part of the floor plate. Figure 3-11 on page 77 illustrates this Aleatoric Milieu of the Newseum. In addition, the open atria reinforces the connection the exhibits have to the ideal of freedom of speech and of a democratic government.

There is a general lack of an intimacy gradient in the building design. Its architectural scale generally transition between public and social dimensions while paths do not gradually link to the scale of nodal dimensions where the section also shows a lack of personal scale, as demonstrated in the open floor plan of Figure 3-24 on page 81. This leads to vague architectural direction in which nodes and paths result in a general lack of place.

Paths are obvious in that they are direct and clearly elevated leading to different nodes of exhibits at either corners of the building or larger exhibits that face the internal glazed window facing Pennsylvania Avenue. At the junction of paths is the zone of possible social dimensions, as seen in Figure 3-18 on page 79 and Figure 3-19 on page 79. Vague nodal points can be experienced due to the general public nature of paths with personal widths circling floor plates with an open vertical expanse.

This scale will lead to an illusion of public space with personal to social interactions and a general lack of intimacy. The inference based on the Aleatoric Milieu is that the overuse of public space in museums will lead to the lack of personal reflection and interaction with the architectural space as demonstrated by the section in the proxemics of Figure 3-17 on page 79. The building's strength lies in its ability to address public dimensions at an external level, and internally, the public space that overlooks the volume of a 90ft atrium. In the light is a strong node that helps orient visitors to the Newseum.

Transitions between social dimensions are lacking and if improved upon with gradient transitions, could provide subliminal clarity of navigation that focus visitors on the exhibits and message the Newseum strives to portray. As it currently stands, the museum displays the grandeur of a public address to the freedom of expression.

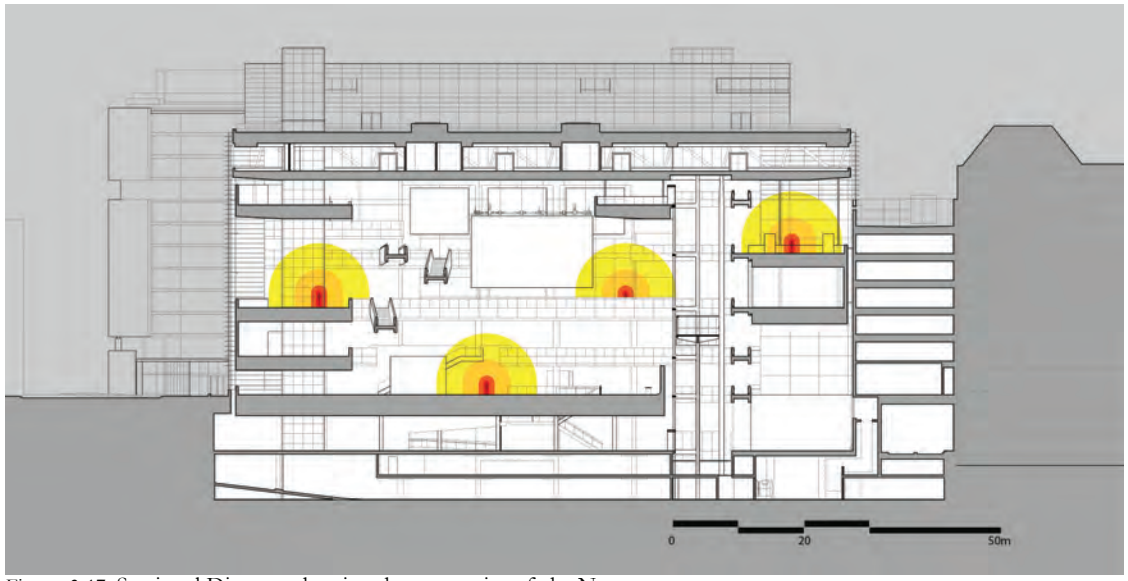

Figure 3-17 Sectional Diagram showing the proxemics of the Newseum.


Figure 3-18 Proxemic scales in the Level 4 floor plan of the Newseum.

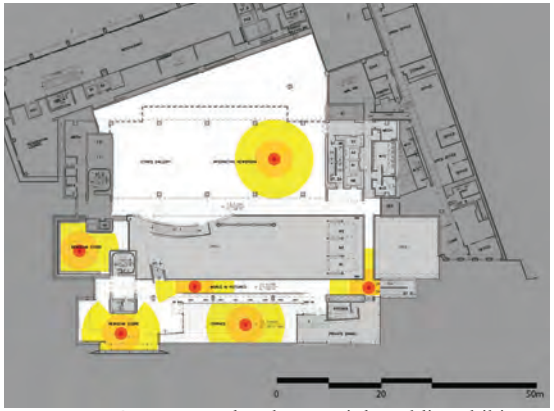
Figure 3-19 Proxemc scales show mainly public exhibits on the first Level floor plan of the Newseum.

c. Aleatoric Elements to consider in design:

- A building is effective when designed with a node that addresses the contextual scale of the streetscape.
- Paths should relate to the dimensions of nodal points of interest to avoid vague spatial design that may result in a lack of place.
- The overall spatial design consist of mainly public nodes which result in less-engaged users. Therefore, by increasing the means of bodily identification through personal dimensions when the majority of proxemics exists in public dimensions, spatial navigation and impressions can improve the quality of hospitality provided by the built environment.

Figure 3-20 Site of the Korbach Museum in Germany.


Figure 3-21 View of the Korbach Museum from the tower of St. Kilian.

2. Wolfgang-Bonhage Museum in Korbach, Germany

Located amidst the pictorially quaint Hesian town of Korbach, Germany where the largest lanes of traffic are typically one lane per direction. The city is dense and almost radial in its plan, seemingly sensitive to the devices of towers as points of nodal wayfinding. Figure 3-20 on page 80 gives an impression of the density of the city and its surrounding fabric. A competition for a regional museum was created near the centre of the town, the museum is comprised of buildings from the 12th to the 14th century with new concrete additions.[23] In mostly intimate and social proportions, it fits the contextual scale of the town.

Berthold H. Penkhues designed a modern intervention that preserves the historical half-timbered buildings, winning a competition for the regional museum shown in Figure 3-21 on page 80. Opened in 1997, the exhibition area is around 1,200m^2, a net floor area of 1,864m^2, within an enclosed space of 11,527m^2. The museum is entitled Wolfgang-Bonhage Museum Korbach after a former mayor of the town.[24]

Its façade sets itself apart from its surroundings where nine historical buildings are renovated into a larger structure, cladding the streetscape in grey stone and glass, also visible internally in Figure 3-26 on page 81. The internal courtyard facing the St. Kilian church becomes the new entrance shown in Figure 3-23 on page 81. The buildings along the courtyard retains the historical white and black lumbered houses and orange roofs exhibiting the buildings itself as an object to display and visible from the street.

Figure 3-22 Korbach museum from the street with St. Kilian church in the background.

Figure 3-25 Porthole skylight that points toward the St. Kilian church.

Figure 3-23 Korbach museum entrace from a shared courtyard.

Figure 3-26 A view of the interal lobby of the Korbach museum mixing elements of wood and concrete, steel and glass.

Figure 3-24 Internal atria in the Korbach museum.

Figure 3-27 Geological exhibit of the Korbach Museum.

Figure 3-28 Between the buildings of the Korbach museum where the illusion of external street extends to a view of the streets of Korbach.

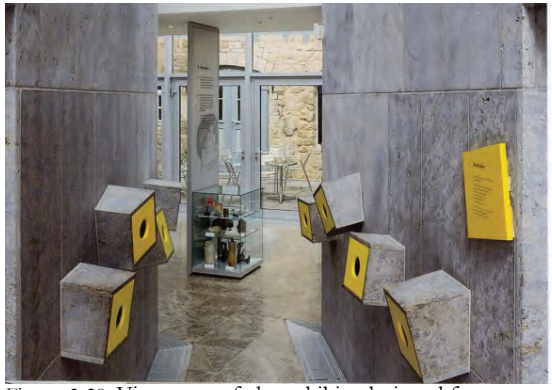

Figure 3-29 Viewports of the exhibits designed for children.

The main entrances of newly clad buildings are detailed with modern asymmetrical forms of concrete and punched windows as Figure 3-22 on page 81 shows.

The building uses the old medieval fire lanes between the buildings as circulation and extending this to the new structure of the building as seen in Figure 3-28 on page 82. It also connects the various levels of the historical dwellings and the new extensions with a glazed two-storey passageway as seen in Figure 3-30 on page 82. Adding architectural interest are the skylights that always diret users to the tower of St.Kilian's Church helping visitors orient themselves inside the asymmetrical and cleanly renovated sections of the houses as seen in Figure 3-25 on page 81.

The focus of this building is the exhibition of history with permanent exhibitions that covers several fields of geology, paleontology, archeology, history, folklore, religious art, society, culture, art and modern industry. Children were also considered while designing the building. There are small openings in yellow boxes along a corridor of two walls as seen in Figure 3-29 on page 82. Pull out drawers as well as 'gold' digging on the lower level where there is a geological exhibition of an old stone building can be seen in the photo in Figure 3-27 on page 81 and a floor plan in Figure 3-31 on page 83.

Figure 3-30 View of the well and exhibit building from the internal passageway with St. Kilian church in the background.

Figure 3-31 Basement floor plan of the Korbach museum.

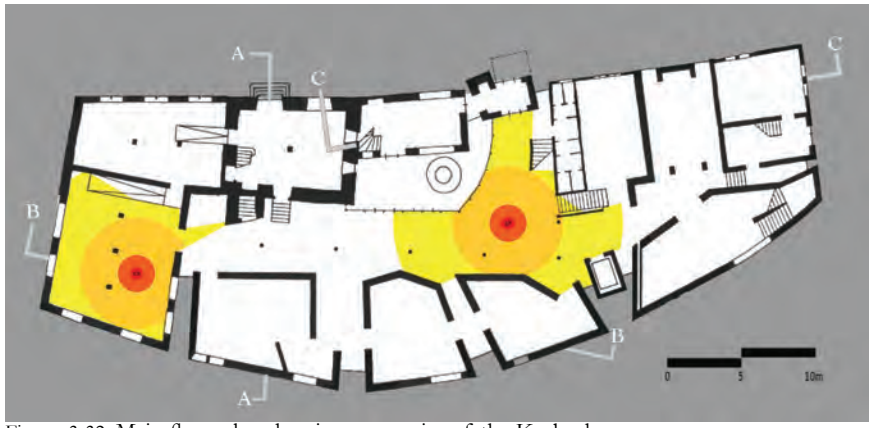

Figure 3-32 Main floor plan showing proxemics of the Korbach museum.

Figure 3-33 Second floor plan of the Korbach museum, showing personal paths and social to public spaces.

Figure 3-34 Third level of Korbach museum showing the social proxemic scale.

a. The Aleatoric Milieu in the Korbach Museum

The narthex of the building leads to a social scale atrium with an overhead path and stairs that lead to social scaled rooms. The image in Figure 3-38 on page 85 and the Diagram in Figure 3-35 on page 83 illustrates this. The refurbished buildings act as natural nodes and former alley paths. This is most visible in Figure 3-33 on page 83. The building consistently remains in scales of social and personal dimensions. Given the domestic settings, the programmatic elements of the museum reflect the smaller scale and cater this local museum towards families with children providing special exhibits to the scale of children to discover.

Figure 3-35 Section A of the Korbach museum shows the new concrete addition, the covered access, and the historical house with a underground geological exhibit.

b. Analyzing the Aleatoric Milieu

The entrance from the courtyard greets the user with an enclosed alley between rustic homes of stone and half-timbered buildings. This creates the impression of personal and social settings for the regional museum of the small medieval town of Korbach. It is most obvious in the section of the buildings in Figure 3-36 on page 84 and Figure 3-37 on page 84. A building of social and personal scale, the plans successfully utilizes the multiple personal and close-phase social proxemics by creating a node that feels public due to the external nature of the open lobby that connects between the old and new buildings. The floor plans in Figure 3-32 on page 83 and Figure 3-34 on page 83 reveal angular openings especially in the new structures that create curious paths and corners which can arguably become a node to new vistas due to the interesting architecture.

The main atrium consists of polished concrete floors and a glass railing walkway with beige wood floors that overlooks the lobby in Figure 3-24 on page 81. This centrally located two-storey alley can arguably be public scale due to the glazed canopy and external walls and well. Preserving the external impressions of the original street alley also gives a perception of greater space due to the fact that they are exterior walls to the buildings since the buildings themselves can act as public nodes.

Figure 3-36 Section C of the Korbach museum showing the entrance from the courtyard.

Figure 3-37 Section B of the Korbach museum that shows an original building on the left and new additions.

c. Aleatoric Elements to Consider in Design:

- Architectural treatment of the area required to access the path can become a point of orientation for navigation purposes and fabricated as part of an extended lobby even if physical space is limited. This is successful if its proxemics are greater than the rest of architectural space
- Glazing and reflective material can increase the size of the perceived proxemics.
- Social and personal dimensions increase awareness of materiality in the built environment.

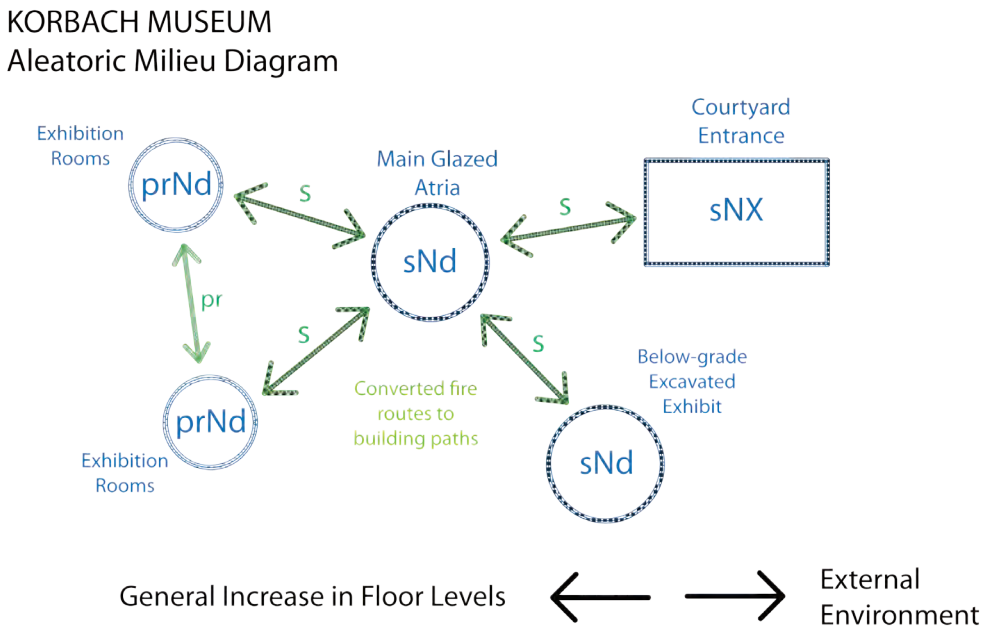

Figure 3-38 Aleatoric Milieu diagram of the Korbach Museum.

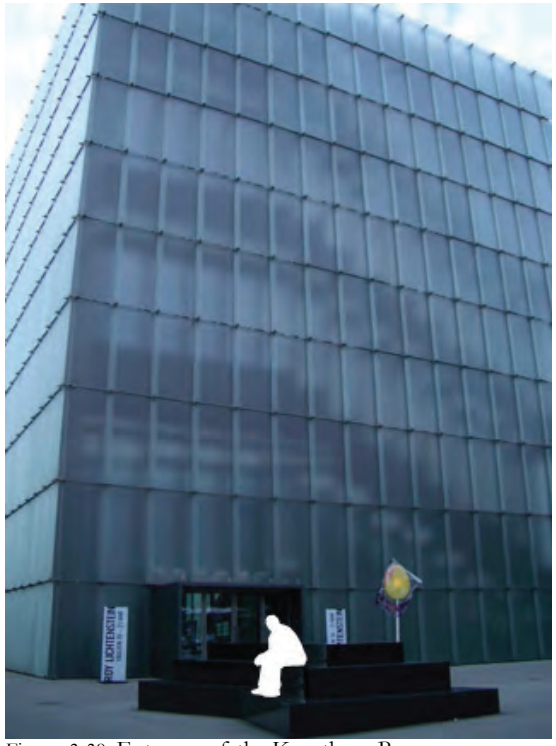

Figure 3-39 Entrance of the Kunsthaus Bregenz.

Figure 3-40 Close-up of emergency exit.

3. Kunsthaus Bregenz in Austria

The Kunsthaus Bregenz museum, designed by architect Peter Zumthor, is located in the outskirts of Bregenz' old city near the shores of Lake Constance in Austria, as seen in Figure 3-41 on page 86. Located close to the shoreline of the city, the building acts like a light beacon at night and lights up in different colours. Although the city fabric appears grid-like and not designed with nodal wayfinding in mind, the museum becomes a node for the ships that pass by.

Altogether, the Kunsthaus Bregenz has 28,000 m^2 of enclosed space with an exhibition area of 1,390 m^2 and a net floor area of 3,340 m^2.[25] The Kunsthaus museum is comprised of two buildings. The exhibition building a translucent white cube-like structure built for temporary exhibitions of contemporary art, as well as a three story administrative building that is painted black. Located between some parking spots, that blends and adapts to the scale of the adjacent buildings of the city.

The façade of the building is clad with 700 overlapping opaque glass shingles, seen in Figure 3-39 on page 86, whose appearance changes due to viewing angle, internal lighting conditions as well as weather.[26] A simple structure of three supporting walls that is accessible by a lighted stair corridor, the exhibition rooms are basked in a meditative light from the ceiling as seen in the sections in Figure 3-45 on page 88. The materials obscures the scale and dimensions of the enclosed space.

Figure 3-41 Site plan of Kunsthaus Bregenz in Ausria.

Figure 3-42 Stairs in the Kunsthaus Bregenz leading below grade.

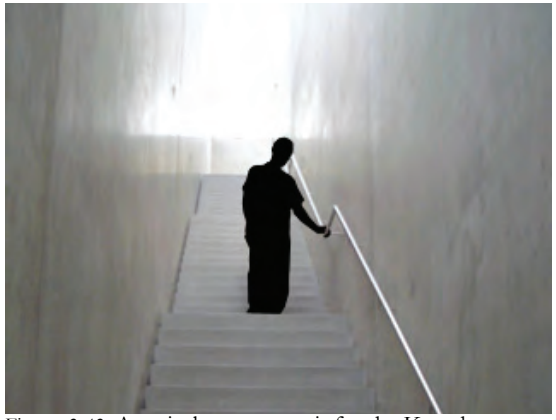

Figure 3-43 A typical museum stair for the Kunsthaus.

From the perspective of the river, the block of translucent glass gives the impression of ambiguity due to the lack of conventional cues like windows or doors. At night, it becomes a beacon of light instead of an ephemeral mass that blends with the sky. The two buildings, the translucent exhibit volume and the administration building, create a backdrop to which a café spills out into. Stairs are visible through the translucent exhibit building, adjacent to the administrative building that is painted black adding scale to the enclosed open space and café addressing the street.

a. The Aleatoric Milieu in Kunsthaus Bregenz

The entry on the ground floor, is detailed with a dark ceiling with filtered light entering from the sides of the building. With concrete walls as the main structural element of the building as seen in Figure 3-47 on page 88. The stairs, the smallest dimension in the building, is designed with a social dimension as shown in Figure 3-42 on page 87 and Figure 3-43 on page 87. As an architectural gesture, overhead lighting that uses the same ceiling materials as the exhibit floors creates a public dimension that seems to extend beyond the naturally lit ceiling. The floor plan and section shows the social and public proxemic of the building in Figure 3-44 on page 87. This creates a meditative space of seemingly limitless dimensions with visitors dwarfed by the scale of the space.

Figure 3-44 Section B and Ground Floor Plan.

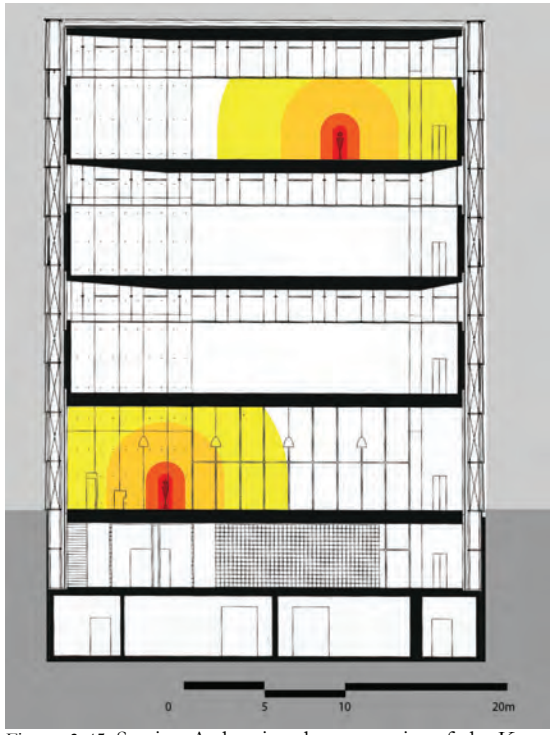

Figure 3-45 Section A showing the proxemics of the Kunsthaus Bregenz.

The exhibit floors utilize floor heights that are a little past public dimensions and additionally, makes use actual screened daylight to renders an imitative sky further creating an ambiguous ceiling height to observe contemporary art. Figure 3-48 on page 89 shows the actual scale between the person and the ceiling height. The aleatoric sequence is between public and social nodes with the social nodes being the stairs that mediate between the exhibits in public nodal proportions.

b. Analyzing the Aleatoric Milieu

Nodes are created by the curator's discretions: an art piece on the wall, partitions, or clusters of seating in the open plan as visually depicted in the image in Figure 3-46 on page 88. The basic paths between these nodes are created by the stairs leading to each floor.

The building successfully becomes a node in monumental scale, as it is a beacon of light by the water. Internally, the paths are the lit stairwells while the nodes are the specific pieces of displayed art. Figure 3-49 on page 89 shows the Aleatoric Milieu in a diagram format. This is due to the successful ambiguity of the public social dimension of the internal floors of the building.

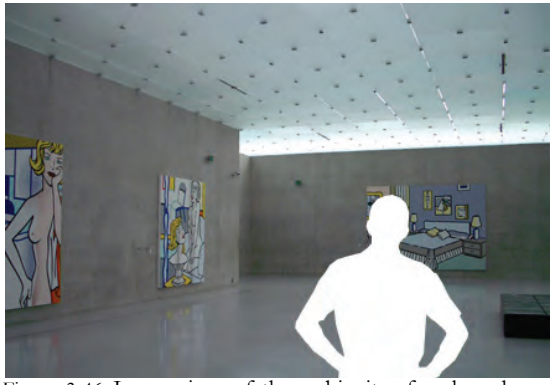
Figure 3-46 Impressions of the ambiguity of scale and how art becomes nodes.

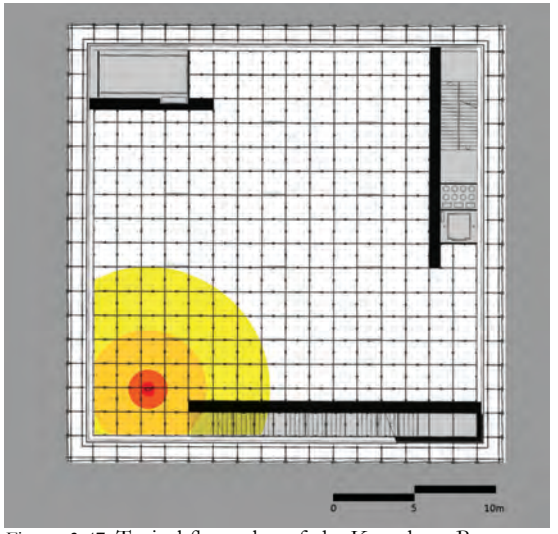

Figure 3-47 Typical floor plan of the Kunsthaus Bregenz; revealing the structure as concrete walls.

c. Aleatoric Elements to Consider in Design

- The absence of architectural references to human scale can create illusions of dimensions that can result to the illumination of nodes.
- Enclosed space can be architecturally designed to reproduce a 'sky' or natural phenomena and extend the impression of human dimensions.
- Paths can be created through stairs of one social dimension.

Figure 3-48 Scale of the building is obscured by the ceiling finish that allows daylight to penetrate the four sides of the building.

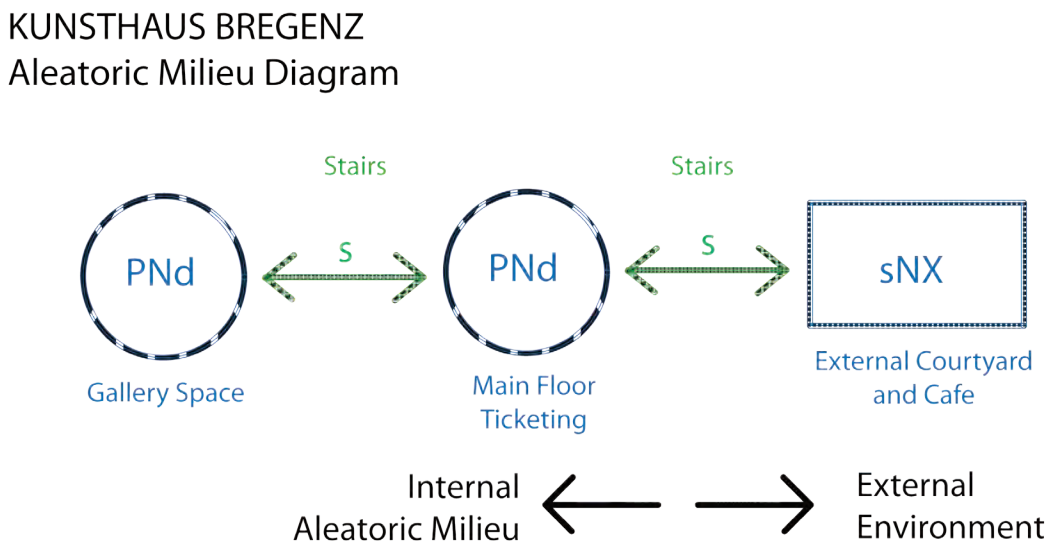

Figure 3-49 The Aleatoric Milieu diagram for the Kunsthaus Bregenz.

4. CaixaForum Madrid

The CaixaForum in Madrid, Spain is located along its famous Paseo del Prado of the main boulevards in Madrid known for its densely tree-lined, wide and centric avenue. Figure 3-50 on page 90 shows that the builidng is along an axis to a traffic roundabout with an obelesque on Ronda de Atocha demonstrating a way the city that utilizes nodal wayfinding.

Designed by Herzog and De Meuron with a plaza of 650m^2 converted from a gas station, the building makes its presence by floating the building mass and creating sloped site beside a 24 metre high botanical garden wall designed by botanist Patrick Blanc, seen in Figure 3-53 on page 90. The museum retains its original façade of historical industrial architecture, an 1899 power station, as seen in Figure 3-66 on page 94 . They also filled in windows, created new openings and a new top addition with perforated metal moucharabieh or mashrabiya screen above the existing brick wall seen in Figure 3-63 on page 93, a covered plaza seen in Figure 3-51 on page 90, as well as an underground auditorium.[27]

A museum that possesses unique finishes that result in dramatic qualities, the CaixaForum in Madrid is a public place for art exhibitions, musical performances, public meetings and cultural events. Without entrance fees, this socio-cultural centre was funded by the 'Obra Social Fundacion "LaCaixa,"' a program from a savings bank in Spain that promotes cultural and holistic welfare projects for all ages.[28]

The CaixaForum in Madrid is a subtle urban gesture that beckons interest from a slit of darkness on one side of a sloped walkway while the other side extends to the sloped open plaza facing the Paseo

Figure 3-50 Site plan and city fabric of CaixaForum in Madrid.

Figure 3-52 Entrance from grade level from below the building structure of the CaxiaForum Madrid.

Figure 3-51 Underground metallic ceiling gathering space.

Figure 3-53 The Vertical Garden of the CaxiaForum Madrid.

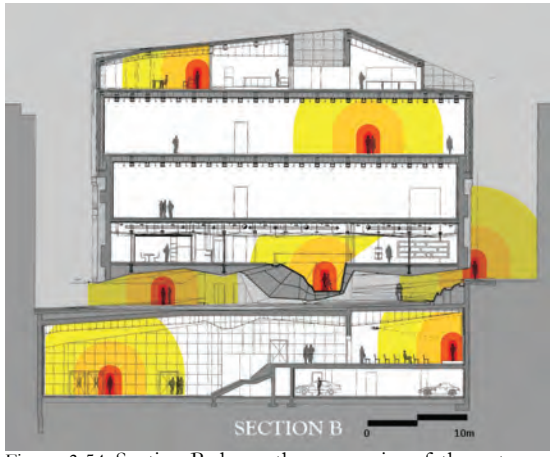

Figure 3-54 Section B shows the proxemics of the entry and visibility from adjacent streets.

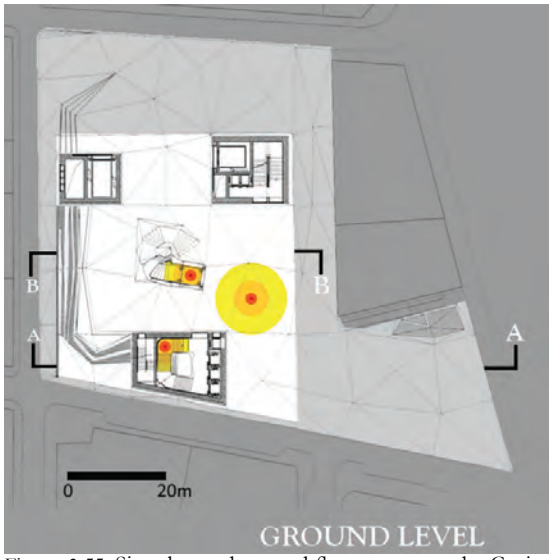

Figure 3-55 Site plan and ground floor access to the CaixaForum Madrid.

Figure 3-56 Section A of showing the proxemics of the theatre and stairwell.

del Prado, as seen in Figure 3-52 on page 90, and illustrated on a site plan in Figure 3-55 on page 91. The plate of triangular faceted metal covers the underside of the building mass reflecting light and adding dimension to a compressed space in the day and reflecting light during the night. Concealing fire escapes and service elevators, in the centre of the space is the main entrance, a spiral staircase that leads upward into the building seen in Figure 3-61 on page 93.

The main floor that overlooks the external plaza that is accessed from the cave-like entry spiraling upwards consists of washrooms, libraries and meeting rooms. Ventilation as well as a suspended ceiling of a triangular framework of neon lights reflects on a metal floor as seen in Figure 3-67 on page 94. Suspending the plaza below are eleven ties to the beams of the second level, a sandwich structure of variable thickness and height stiffeners form an assembly of interlinked caissons suspended from the ties. The library shelves and welcome desks of dark wood are also suspended from the ceiling.

Additional programmatic elements include a theatre that extends below grade, under the sloped plaza facing the main entrance complete with a lecture room, sound room and parking spaces and a two level lobby shown in Figure 3-57 on page 92.

Above the first floor, two levels of uninterrupted exhibit space span twenty-one metres. The top level has been designed for an office and restaurant, “sculpted” to the skyline to include terraces. The restaurant is seen in Figure 3-68 on page 94. The perforated metal mashrabiya screen – hung outside the glass curtain wall of the third floor – is cut from a pixilated framework that

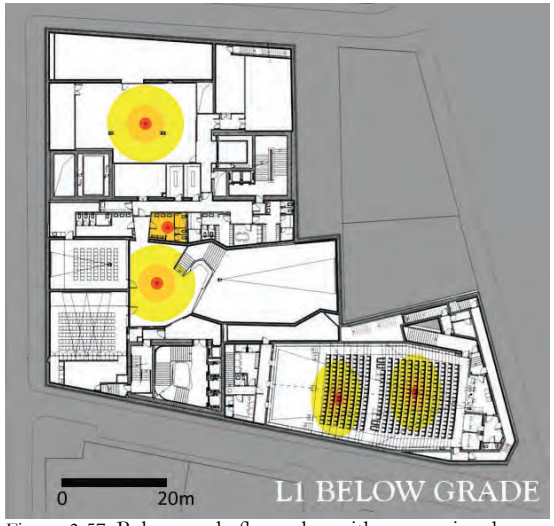

Figure 3-57 Below grade floor plan with proxemics showing the theatre and lecture rooms.

Figure 3-58 Cafe at the highest level above the galleries in social proxemic dimensions.

represents maps of Spain and Portugal. The screen filters sunlight during the day and transforms into a beacon of light during the night.

Unifying the seven levels of varying programs together is a smooth white plastered staircase that opens like a cone towards the sky, spiraling outward while ascending upward, allowing daylight to be observed at the lowest level seen in Figure 3-65 on page 93.

a. The Aleatoric Milieu in the Caxia Forum, Madrid

The three main program elements act as nodes as they are architecturally treated with distinct characteristics. Figure 3-65 on page 93 demonstrates the proxemics of the CaxiaForum in Madrid. Within each stratum of nodes, each level has its specific nodal points and paths that allow users to access its services and exhibits. The first floor level is primarily social and public nodes seen in Figure 3-59 on page 92. Two stories of galleries above this are public proxemics and left to the discretion of curators to design seen demonstrated in Figure 3-60 on page 92. The level act as nodes with a social path of vertical stairs connecting between them.

Below grade is the theatre, finished in copper tones with soundproofing textures, the silver and chrome main level, gallery spaces in white, and top level cafe is bathed in filtered light and angular nooks. The main path to these nodes is the white inverted conical stairwell. These proxemics are illustrated in Figure 3-56 on page 91.

While an internal narthex is lacking in this building design, the external courtyard is intentionally recessed from the street showcasing the building as the public narthex to the building. The

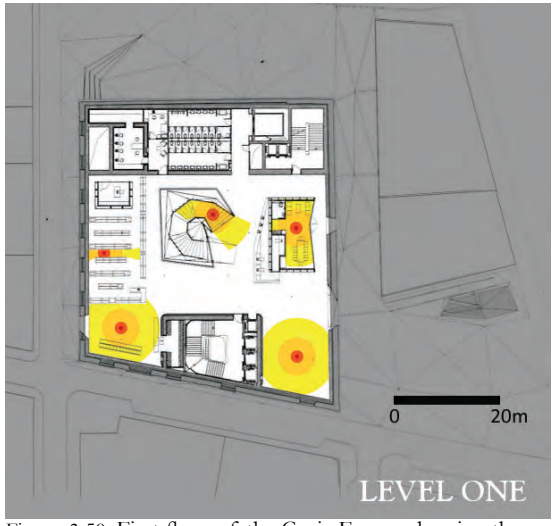

Figure 3-59 First floor of the Caxia Forum showing the library and amenities.

Figure 3-60 Typical gallery open floor plan and rooms.

Figure 3-61 Stairway entry into the CaxiaForum Madrid.

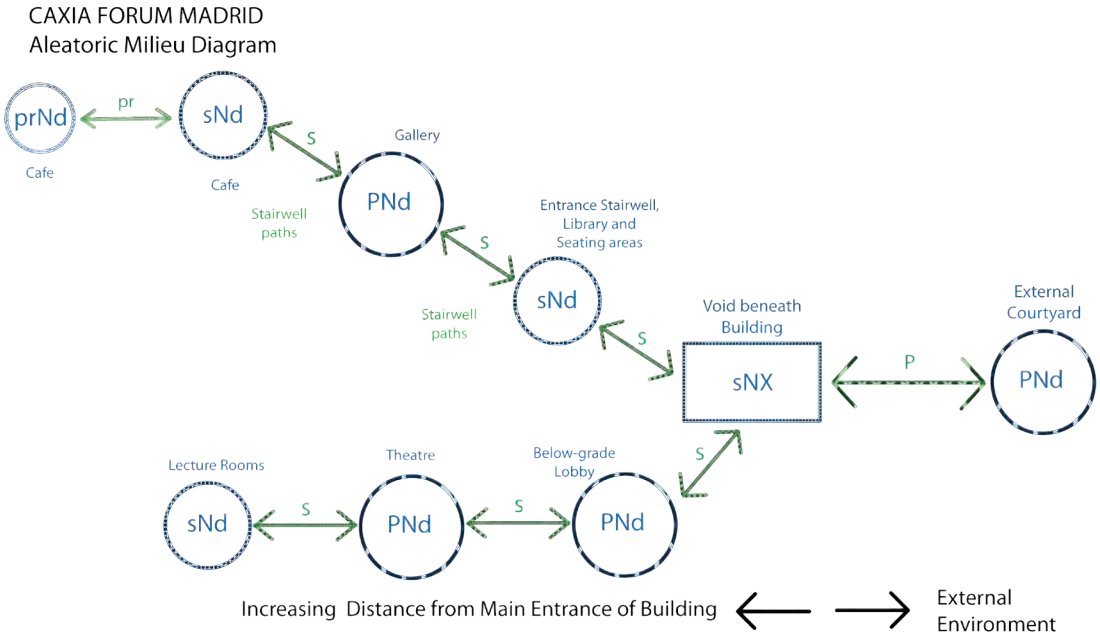

Figure 3-62 The Aleatoric Milieu Diagram for the CaxiaForum in Madrid.

Figure 3-63 The copper façade of the café.

Figure 3-64 Courtyard in front of the CaxiaForum Madrid adjacent to the vertical garden.

Figure 3-65 Stairwell that acts as a verical path in public proxemics.

entry at grade level contains a strong social node which is the stair that reaches from the cave-like opening. Considering the public narthex as the courtyard, the cave-like entry acts as a social narthex buffer for the external and internal realms of the building on the first floor. Upon entering the spiral stairs, multiple paths to activity nodes are visible from emerging from below to multiple paths where the activity nodes are located: library, washroom, meeting rooms. They are accessed by taking a path around the entrance stairs and main inverted conical stairwell. Figure 3-54 on page 91 shows how the proxemics of the entry, the nodal levels, and the underground space addresses the adjacent street.

In a similar way, the theatre below grade has a lobby, a public narthex to the theatre and room nodes. The exhibit spaces are of public scale that are, white and brightly lit to allow pieces of art to be nodes. The café at the top level is of social and personal proxemics for visitors to digest their experiences seen in Figure 3-58 on page 92.

b. Analyzing the Aleatoric Milieu

The entry into the building is effectively dramatic due to the metallic finishes of the entry, sound echoes and travels toward the public narthex courtyard to the adjacent street, Paseo del Prado.

The main path to the nodal levels is the inverted conical stairs that opens upwards. It effectively provides a consistent space that connects the strata of uniquely designed levels that become nodes due to their distinct design elements. Thus, the vertical stairs functions as a public path and as it opens upward, encourages additional light to enter strengthening the desirability of the elevated nodes.

Finally, as a whole building, the levels act as nodes while the main path is the stairwell. Within each level, besides the lobby of the below grade theatre level, there lacks distinct paths that encourage travel to specific nodes within each level to attract its users to explore.

c. Aleatoric Elements to Consider in Design

- Similar architectural treatment to a space that is distinctive from other spaces can be considered a node due to its consistent design
- Stairs can be considered vertical paths with each floor as nodes and function as a device of orientation that unifies eclectic design elements of a building.
- Sound is an effect device to design within a narthex to attract its users to engage designed space

Figure 3-66 Side street leading to the CaxiaForum in Madrid.

Figure 3-67 Gallery of the CaxiaForum Madrid.

Figure 3-68 The café on the top level.

C. Conclusions of the Aleatoric Milieu in the Museums

Building	Percieved Purpose	Architectural Method	Main Characteristic of Aleatoric Milieu
Newseum	To advertise the 'Freedom Forum' on prominent street.	Used a large show case 'window' as façade of building.	A public node is created to address external building environment. Internally, public exhibits are mediated with social to public scaled paths.
Wolfgang-Bonhage Museum	To preserve historic buildings and display the history of the town of Korbach.	Encased older buildings in glass while added new exhibits of similar scale.	Externally imitates the fabric of the city by creating nodes from each building 'structure' while connecting them between a public to social scaled path to create a 'whole' museum.
Kunsthaus Bregenz	To create an uniquely clad exhibit for contemporary art.	Designed with light, where internally in the day is effected by the sky and externally at night, by using lights as a beacon along the water.	The building acts as a node due to its unique cladding, creating a narthex between the administration building and itself. Internally, public exhibit spaces with material design creates an ambiguous scale brings attention to displayed art, allowing them to become nodes. Social paths are created between each exhibit level.
CaixaForum Madrid	To create a cultural centre with a gallery, theatre, café and library.	Designed distinctly clad levels with distinguiably different finishes to differentiate between the programs of the building.	Externally ambiguous, a narthex with a plaza in public proxemics utilizes sound and darkness to invite visitors. Internally, a vertical open stairwell acts as the central public path between a stratum of levels that act as public nodes.

Building	Newseum	Korbach	Kunshaus Bregenz	Caxia Forum
Positive aspects of the Aleatoric Milieu	• Large public node designed on the facade of building address the contextual scale of the streetscape. • The social nodes of newspaper articles along the sidewalk creates an effective entry narthex.	• Architectural treatment of the path in the central lobby can become a nodal point of orientation if social dimensions are greater than the rest of architectural space. • Glazing - especially transparent glass - and reflective material can increase the size of perceived social dimensions.	• Enclosed space can be architecturally designed to reproduce a 'sky' and extend the impression of human dimensions. • The absence of architectural references to human scale adds emphasis to the displays and the building itself.	• Similar architectural treatment to a space that is distinctive from other spaces acts as a node. • Stairs can be considered vertical paths with each floor as nodes and function as a device of orientation that unifies eclectic design elements of a building. • Sound and light can be an effective design device in the narthex to engage users in a public scale. • Materials utilized can create distinctive characteristics create nodes for each floor of the building.
Benefits to considering the Aleatoric Milieu	• Paths are of public dimension with each nodes of public scale result in a lack of place. Increased variety of social dimensions will result in a more approachable and memorable experience of the museum.	• Social and personal dimensions increase awareness of materiality of architectural space, therefore there can be greater attention paid to details in design.	• The entry and exit of the building could integrate the cafe of social scales in a public narthex more to add charm against a starkly bare building.	• Entries into each nodal floor can be incorporated to the narrative design of the building to increase hospitality. This can be done by including a narthex at the entrance from each path to the distinct levels or a social nodal point that leads the user through a narrative of the galleries for example.

Endnotes

1. Leon Battista Alberti, Zehn Bücher über die Baukunst, vol.14, ed. Max Theuer (German edition), Vienna/Leipzig, 1912 (reprinted 1975), 262 (English edition: On the Art of Building in Ten Books, Cambridge, Mass., 1991).

2. Patrick Geddes, *Cities in Evolution: An Introduction to the Town Planning Movement and to the Study of Civics* (London: Williams & Norgate, 1915), 372.

3. Anthony Vidler, "The Space of History: Modern Museums form Patrick Geddes to Le Corbusier" in *The Architecture of the Museum: Symbolic Structures, Urban Contexts.* Ed, Michaela Giebelhausen, (Manchester and New York: Manchester University Press, 2003).

4. Aldo Rossi, *The Architecture of the City* (Cambridge, Mass. and London: The MIT Press, 1982), 34.

5. Rossi, *The Architecture of the City*, 131.

6. Rossi, *The Architecture of the City*, 59.

7. Lewis Mumford, *The Culture of Cities* (New York: Harcourt Brace and Company, 1938) reprinted in Philip Kasinitz (ed.), *Metropolis: Center and Symbol of our Times* (New York: New York University Press, 1995), 22.

8. Mumford, *The City in History*, 639.

9. Paul von Naredi-Rainer, "The Museum as Institution" in *Museum Buildings: A Design Manuel (*Basel: Birkhäuser, 2004), 17-18.

10. Mack, *Art Museums into the Twenty-First Century* (Basel: Birkhäuser, 1999), 44.

11. Mark O'Neil, "Essentialism, Adaptation and Justice: Towards a New Epistemology of Museums," *Museum Management and Curatorship,* (London: Routledge, 2006) 21:2, *95 – 116.*

12. O'Neil, "Essentialism, Adaptation and Justice," *95 – 116.*

13. O'Neil, "Essentialism, Adaptation and Justice," 114.

14. O'Neil, "Essentialism, Adaptation and Justice," 111.

15. Edward Rothstein, "Chasing the News: Mark Twain's Inkwell to Blogger's Slippers," *New York Times,* April 11, 2008, accessed April 12, 2011, http://nytimes.com/2008/04/11/arts/design/11news.html.

16. Barbara J. Saffir, "Polshek's Newsiest Museum Opens in D.C." *Architectural Record,* April 10, 2008, accessed April 12, 2011, http://archrecord.construction.com/news/daily/archives/080410polshek.asp.

17. William Lebovich, "Newseum by Polshek," *ArchitectureWeek*, D4 (22 October 2008):1-4, accessed December 9, 2010, http://www.architectureweek.com/2008/1022/design_4-1.html.

18. Rachel Cooper, "Newseum – Washington, DC Museum of News" About.com. February 4, 2011, accessed April 12, 2011, http://dc.about.com/od/museums/a/Newseum.htm.

19. Rothstein, "Chasing the News."

20. Cooper, "Newseum."

21. Maurice Fliess, "D.C.'s New Newseum: The Inside Scoup," *TravelMuse.* April 18, 2008, accessed April 12, 2011, http://www.travelmuse.com/articles/news/newseum.

22. Fliess, "D.C.'s New Newseum"

23. Matsumoto, Mieko, "Architectural Gem," Museumsnytt.no, February 13, 2009, accessed December 10, 2010, http://www.museumsnytt.no/anmeldelser/arkitekturens-perle

24. Paul von Naredi-Rainer, "Regional Museum: Korbach, Germany," in *Museum Buildings: A Design Manual* (Boston: Birkhauser, 2004), 232-233.

25. Paul von Naredi-Rainer, "Kunsthaus: Bregenz, Austria," in *A Design Manual: Museum Buildings*, (Boston: Birkhäuser, 2004), 196-197.

26. Ludwig Abache, "Kunsthaus Bregenz, Austria: Peter Zumthor 1997," Galinsky, 2001, accessed December 10, 2010, http://www.galinsky.com/buildings/bregenz/index.htm.

27. Richters Christian, "Herzog & de Meuron." Arcspace.com, March 31, 2008, accessed December 10, 2010, http://www.arcspace.com/architects/herzog_meuron/caixa/caixa.html.

28. "LaCaixa" Foundation. Accessed April 20, 2012. http://obrasocial.lacaixa.es/laCaixaFoundation/home_en.html.

Design for an Aleatoric Milieu

IV

IV. An Aleatoritc Music Museum Design

The term 'museum is from the Greek μουσεῖον and refers to a place that served as the dance floor of the muses. As the muses' mother Mnemosyne was the Greek goddess of memory, the museum represents beauty, exuberance, a place of delight, a performance in response to prior events or for the creation of objects imbued with a collective memory. The word was initially used in the ancient world to designate the schools of poetry and philosophy, and progressed to research facilities attached to collections. The 18th century 'museum' referred to the academy of scholars and secondary to a place housing a collection. The 19th century has the term 'museum' mean a building for safekeeping and presentation of collections as well as the research facility attached to it.[1]

The museum, a "materialized ideological narrative,"[2] is a medium of communication between the curator and its users. This is demonstrated by its fabrication of a normative code of practices and values in its displays, integration of facts while omitting others, selection of historical artifacts, corporate products, natural organisms, technological devices, or art works. The narratives that museums weave are their tools of communication, even to 'cultivate national character' through the museum's role as 'central nodes in the narrative networks.'[3] Utilizing narrative to evoke histories surrounding objects while the selection of an object provides a perception of the culture of a previous era, can be a new experience or a recollection for the users visiting the museum.

The Aleatoric Milieu in the context of a museum can aid in curating clear narratives incorporated within the building structure's navigation and tailor a proxemic scale specific to the intended interaction with the displayed object. Grand rooms can be created to provide adequate space for an object's appreciation while smaller niches craft a sense of intimacy when viewing delicate pieces of art or mementos with space that correspond to the intended proxemics of its users when interacting with displays.

In order to create an Aleatoric Milieu that is at its core the derivation of hospitality in buildings, a music museum is designed. To demonstrate an Aleatoric Milieu, an "Aleatoric Music Museum" that investigates the situations of two supervisors and 30 children - an Ontario minimum standard - that walks through the museum and occupies space with their figurative proxemics paints a narrative in this design section.

In considering the Aleatoric Music Museum, the most effective for the institution and challenging of spatial arrangements that demonstrates an Aleatoric Milieu is a 'sequence of nodes,' that is described in Table 2-3 on page 101. While the public to social proxemic scales for Aleatoric Milieu consist of another option, a 'central node to multiple nodes' applying that design can result in a radial type of design, similar to how offices are laid out from central elevator cores, or a pantheon type arrangement with a central node – consisting of a circle of light in public proxemics and niches of nodes in social proportions. The most challenging then, would be to create the 'sequence of nodes,' which each exhibit informs the next visible node, adding to the narrative and layering experience with polite and informed space that does not detract from the museum experience.

The music museum consists of an entry narthex that provides a visual into an internal node that acts as an orientation device of public scale. The internal public node is an experiential performance space that will serve as an anchor to the various paths and nodes that explores different instrument types used in the performance, musical genres or periods depending on the hypothetical program of the museum. In addition, the analysis of how children and adults move through this space that has used the Aleatoric Milieu theory will further inform proxemic spatial usage and provide a critique of children supervision and people flow moving within a building.

The museum design entitled a "Musical Museum" will demonstrate an Aleatoric Milieu within a museum with the consideration given to the design of sound including an experimental auditorium. Light and texture is considered as aspects to highlight a node while narthex spaces will be decision-making points to multiple paths that point to various nodes. The Music Museum seeks to demonstrate the Aleatoric Milieu as an infused perception of space - an informed perspective of *proxemics* and *navigation design*.

The application of the Aleatoric Milieu is most beneficial when utilized in the early stages of design development and will help gauge the type of activities with dimensions and provide a proper scale for new designs. Therefore, the Music Museum will be presented in the design development stage.

A. An Experimental Musical Milieu

A music museum brings together a myriad of ideas and thoughts to a static building utilizing sound to create a specific atmosphere in the given space.

Through an understanding of how composer Augusta Read Thomas uses sound directly to shape space, the medium used as the tapestry of the landscape of sound, the technicalities involved in sound design and spatial elements of the Aleatoric Milieu can add to how sound is experienced within a public proxemic.

The theory of the Aleatoric Milieu as applied to the Music Museum to create design and renderings to articulate what an Aleatoric Milieu may look like. It is not meant to be a complete building, but a concretization and application of theory demonstrated in the built environment.

Renderings that include materiality, light and shadow are used to demonstrate nodes. Proposed instrument exhibits that correspond to each performance platform strengthens the node between exhibits, performers, and users as they have vistas and seats in strategic locations. In addition, analysis projecting the proxemics of minimal childcare standards of Ontario have been included in the demonstration of the Aleatoric Milieu.

1. A Central Node in the Music Museum: an Experimental Music Performance Platform

In considering how buildings reflect sound and light from its environment over time, composing music by creating sound specific to a time frame has a similar effect to built works and the 'sense of place' is remembered and recalled. The discipline of creating a particular sound in a set time creates melodies which is the basis of music and composition. Music can be created and composed on sheets of papers and performed like buildings that are drawn then built.

The resident composer of the Chicago Symphony Orchestra, Augusta Read Thomas in her piece Orbital beacons arranged for a large Orchestra in 1998, desired to liberate the standard 'families' or sections of instruments, which resulted in a "reseated orchestra" piece. Musically, Thomas creates acoustic constellations that orbit and glow between a soloist, ensemble, a chamber orchestra or the full orchestra. She explains:

> *Their patterns, cycles, and groupings are constantly shifting, weaving a web of new sounds which move through the orchestra, transforming as they melt into the background or emerge into the foreground. Spatial and antiphonal effects are used in a bold, obvious manner as well as in veiled, subtle ways.*[4]

Furthermore, Thomas was inspired through listening to instruments from another direction and perspective:

> *When I was quite young, the conductor of my youth orchestra would have us play through a movement of a Beethoven Symphony in a "standard" seating. Then, after we traded places with an instrumentalist from another section (i.e. the seating arrangement became scrambled), we would rehearse it again. Suddenly, as a trumpet player, I would be sitting next to viola, flute, and timpani players. This experience allowed me to hear an orchestra differently, and Beethoven's music from another perspective.*[5]

The goal of a Music Museum is to place the audience into a performance and provide a space for the experience of different sounds between orchestral groupings while also providing a new stage for contemporary classical composers such as Thomas.

The Music Milieu includes two such nodes: a projection of traditional sound in a media room as an experimental Philharmonic and multi-purpose performance space.

2. Acoustic Considerations for the Musical Node

There are formulas to musical composition in chord progressions, resolution of chords, and through melodies where harmony is woven with the appropriate accompaniments. Overarching musical forms include tonality, tonal relationships with the consideration of balance and proportion between instruments. However, they are only the means to help articulate the mood and atmosphere the composer wishes to convey. It is a type of communication constructed with sound while a building can dictate or inform the type of music that is created. It is the building that houses these sounds that composers often score and arrange their music around.

For example, at the modification of the church in Germany, the Thomaskirche hung drapes and inserted new galleries near the pulpit to increase speech intelligibility. In order to compensate for these new changes, J.S. Bach's large choral works, including the B-Minor Mass and the St. Matthew Passion was written for the Thomaskirche at Leipzig to a short reverberation time at 1.6 seconds at middle frequencies with at full capacity to enable the string instruments to be clearly heard.[6]

While musical acoustics can be roughly divided into 'resonant', 'room' and 'outdoor,' by composers, they often were associated with a particular building type before the invention of recorded music and the electronic amplification of sound. Since acoustics differs from each performance, the preferred liveliness, or R_t at Mid-frequency for Lecture Halls are around 0.8, Drama Theatres at 1.0, Opera Ballet house at 1.4 and Concert Halls at 2.2.[7]

According to acoustician J. Christopher Jaffe, explains in his book, 'The acoustics of Performance Halls,' 'bad acoustics' are often unfamiliar acoustics:

> *"Today most acoustic designers are aware that sound is directly related to reflecting patterns of sound waves. If you can duplicate the reflection patterns of traditional halls regardless of geometry, you will create traditional sound."*[8]

In order to design a space that accompanies multiple types of musical styles, concert halls now include extra plenums to accommodate reverb and 'tune' architectural space for the performance of music.

Therefore there is a 'tuning the shell,' or the 'hard-cap,' where the upper portions of a performance hall is the portion that reflects the most sound and allows reverberation to persist in time to the required length since the audience in upholstered seats are the more absorptive lower portion.[9]

While aural intimacy are the direct orchestral sounds, which is often the first side-wall reflections,[10] there are also electronic device speakers that can be embedded into the upper portions of performance halls. For example, ERES, or Electronic Reflected Energy Systems, are inserted speakers at various ceiling and wall locations that can be specified at different frequencies to compensate for reflection and reverb in order to electronically tune an architectural space.

The Music Milieu Museum includes a node that has an electronic acoustic ceiling panel that is moveable to bring proxemics and sound to a level appropriate to the direct reflections of certain music as well as supporting sound with a tuned ERES system to avoid destructive interference and minimize the Doppler effect.

3. Seating Design of an Experimental Music Node

The Aleatoric Milieu proposal is for a Philharmonic Music Museum that creates a destination of sound. The position of the seated nodes consists of an amplification of the sound. It is designed to be a living and active type of museum that can grow and adapt to new cultures of music while preserving a valuable past.

The Aleatoric Milieu includes the consideration of space as understood by people who may project their bodies into space figuratively. Thus, hearing has the same component as sight and touch. Schafer comments on the ephemeral nature of sound and the affibility of it:

> *Hearing is a way of touching at a distance and the intimacy of the first sense is fused with sociability whenever people gather together to hear something special.*[11]

Therefore raked seats are located at various levels of performers to allow for the integration of varying sound experiences that correspond to the nearest performance platform. In addition, standing and ambling space are provided to those who want to experience music as the move through space.

Figure 4-1 on page 104 shows the program and floor plan of the Music Museum where one will find the seating and the performance platforms of the experimental music node.

Figure 4-1 Floor Plan and Program of the Music Museum.

B. An Aleatoric Milieu of Sound

The goal of the musical milieu is to become a node to an institution by providing an architectural space to demonstrate its ability to teach and reach out to its prospective clientele – the museum's users – in a concrete and hospitable way.

The proposed music museum will be situated in a university campus in a woody area where experimental music and budding musicians can use the hall as a educational facility and a performance practice hall, as well as, a congregational banquet facility that include elevated stages for performances to occur. The main exhibits are intended for, but are not limited to, instruments of classical nature.

It utilizes an exposed glulam structure, sound dampening panels, light shelves and strategic internal glazing for natural light control to create nodes that are designed to attract users.

Figure 4-2 on page 105 is a general chart of the Aleatoric Milieu on the floor plan of the Music Museum. The flow of the museum is designed to start counter-clockwise at the introductory space in the theatre. After encountering the central node, the intension for the user is to begin the exhibits as previously observed from the introductory space.

By discussing the narthex, path and nodes, the narration of the buildings exhibits is demonstrated in the connection with two parts. Firstly, the introductory exhibits, then the section where the performance platforms are visible from the upper levels. Exhibit nodes are clustered by instruments, while a milieu of sound that strengthens the upper woodwinds and brass exhibits.

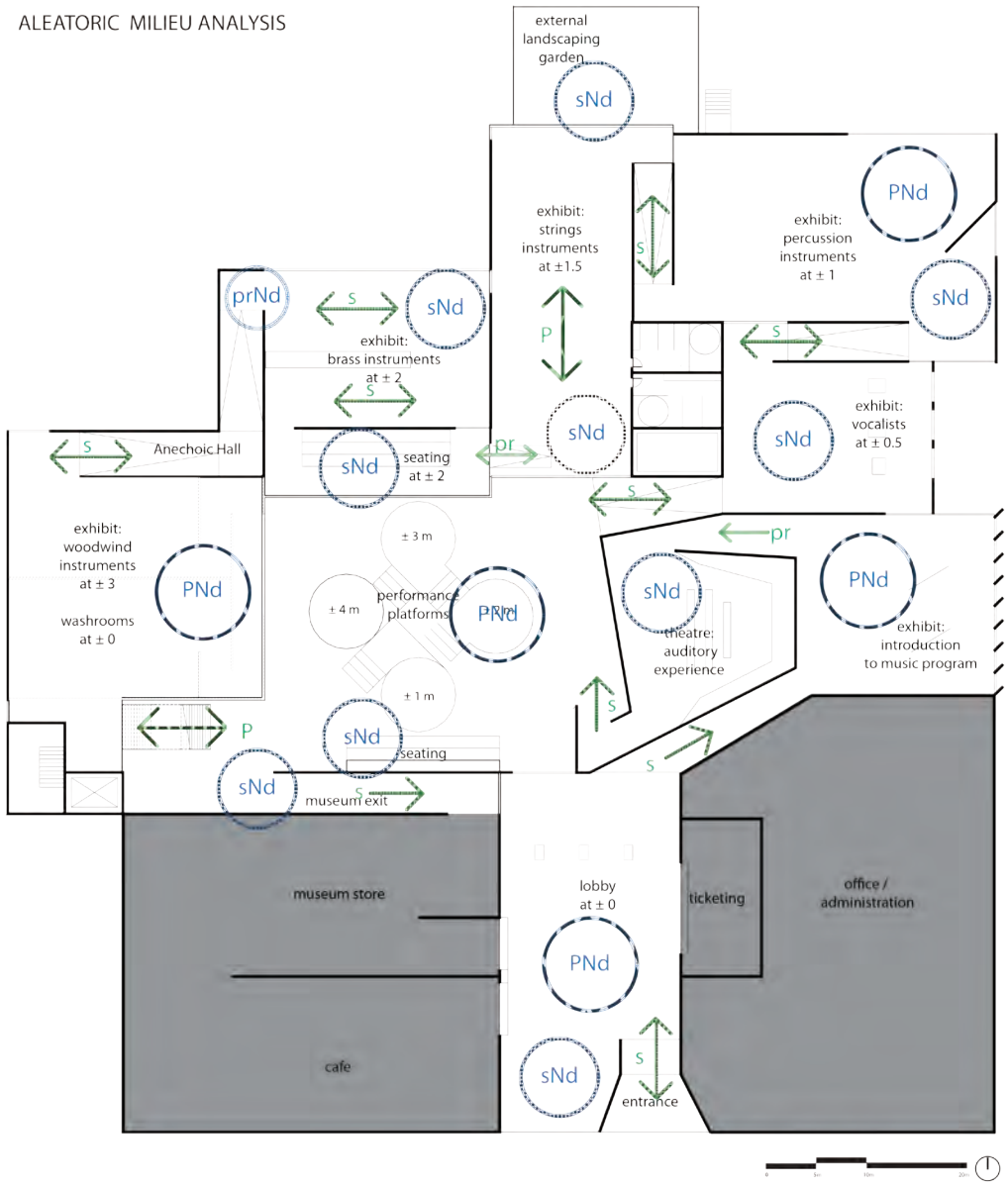

Figure 4-2 Aleatoric Milieu analysis on the floor plan of the Music Museum.

1. Narthex

The narthex is located in the main front entrance where double doors screen weather and also scales down the external public proxemic. Externally, the entrance addresses a public scale, while internally, the public scale provides optional nodes for which the visitor can enter: a cafe, the museum store, a glimpse into the musical node with a ticket booth. In addition, for those indecisive few or waiting individuals, seating is provided in social nodal scales.

a. Aleatoric Milieu Diagram

Figure 4-3 on page 106 shows that the narthex in the context of a museum is parallel to that of a church in its narrative of where the catechumen reside. The entrance is scaled down with double doors to slow down entry as well as narrow the external public scale in a non-intrusive way. The lobby is of public scale connecting to the nodes for ticketing, cafe and museum store. There is also a social node for seating of public scale by the entrance to those undecided or waiting on others. The purpose of the narthex is to provide a choice to those visiting the option to just browse before committing to paying for the experience of the museum. Curious visitors are given the option to peer through the glass to get a glimpse of a central part of the museum, the experimental performance stage.

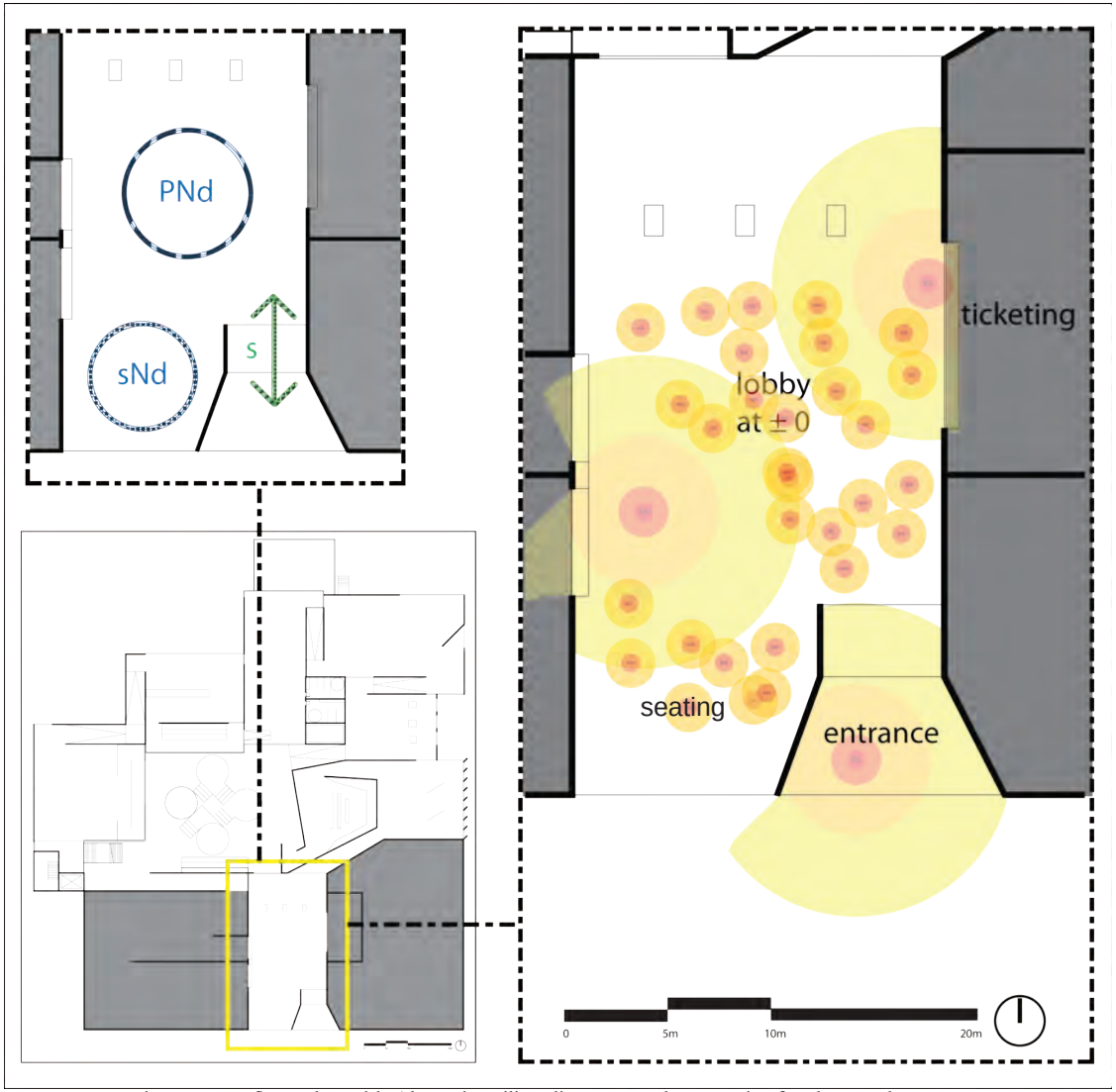

Figure 4-3 Music Museum floor plan with Aleatoric Milieu diagrams and proxemics for the Narthex.

Figure 4-4 Perspective view of the lobby and narthex of the Music Museum at the ticketing booths.

The introductory space to the museum is the narthex of the museum and can arguably be as important as the narthex of the building like the lobby. Figure 4-5 on page 108 is an exhibit of public scale that introduces the music to be performed, its history and significance Figure 4-6 on page 109 is a theatre that shows the performance as a darked and sound proof theatre with optional headphones. It shows the current performance in a classical setting of an audience with the performers on the screen with surround sound in a theatre setting.

b. Rendering

Figure 4-4 on page 107 reveals the internal node to visitors as an introduction to the core of the music museum.

Figure 4-7 on page 110 shows the nodes to the next exhibits while providing an introduction to the type of music experience for which the current museum has been designed.

Upon exiting the theatre, visitors arrive at the main performance space where they are able to witness how the specific score sounds with the instruments separated. Figure 4-11 on page 114 shows the perspective from the restrooms or backstage area of the museum with the perspective of the next exhibit in the distance.

c. Proxemic Diagrams

Figure 4-3 on page 106 also shows that two adults can adequately watch 30 children in this narthex space.The public lobby also shows the entrance into the cafe and museum store as well as the ticketing booth.

Figure 4-5 on page 108 shows the public scale of the introduction room as well as the plan view of windows to the north that show the next exhibits. The theatre space could use more chairs for thirty students but as children often sit on the floor or stand by walls, seating for the three-sided or three dimensional theatre should be adequate.

Figure 4-6 on page 109 depicts how proxemics can be projected through windows, although only figuratively. At the beginning of every path toward the next exhibit, they are figuratively a mini-narthex which is a point of decision that requires further nodes that help motive users to explore the next exhibit.

Therefore, viewports have been strategically placed at the beginning of each exhibit before a path for users to get a glimpse of the next node as a hospitable motivator. In addition, designing in this manner allows museum curators the liberty to design and curate for a counter-clockwise music museum experience, as the viewports work both ways.

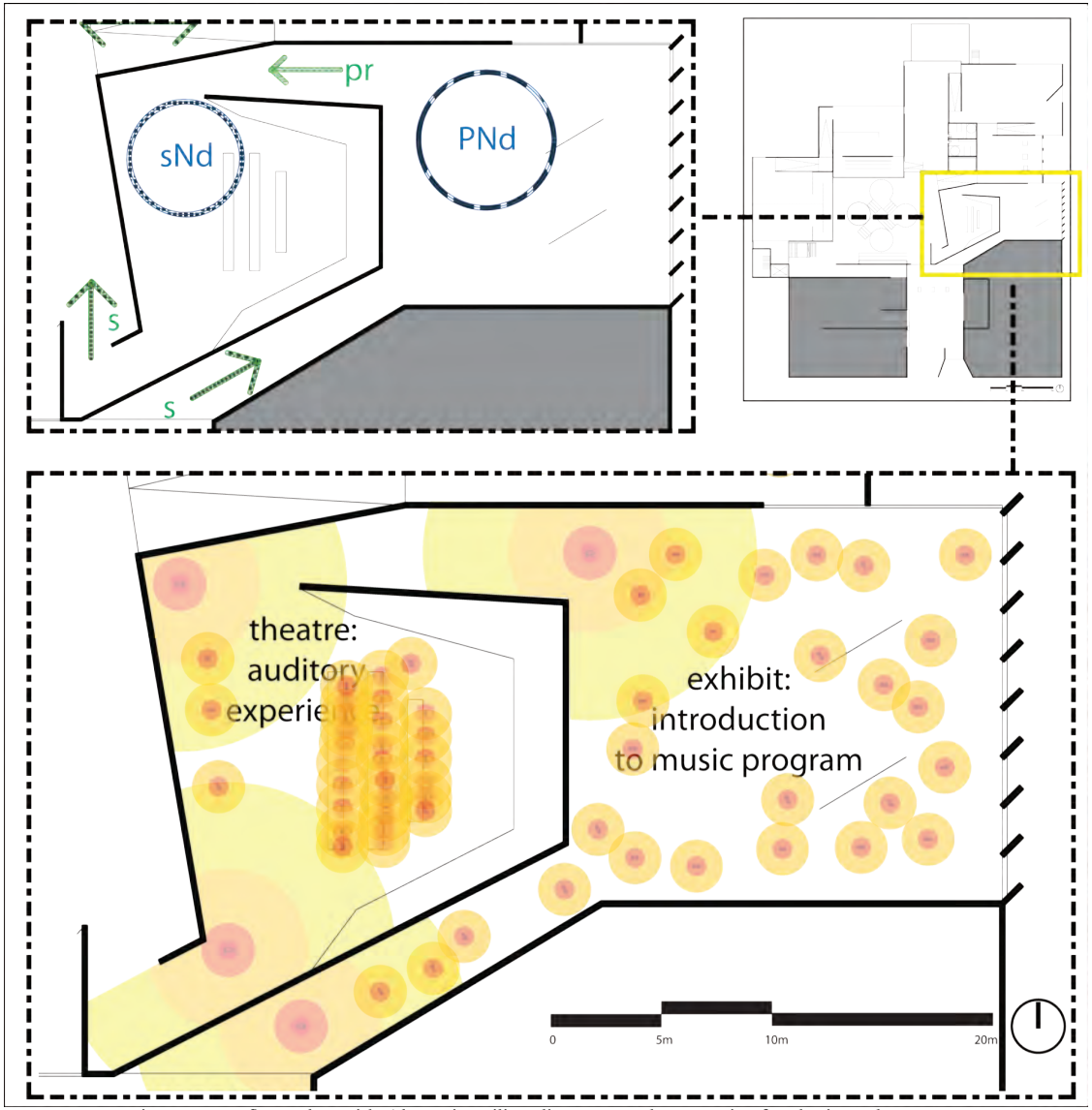

Figure 4-5 Music Museum floor plan with Aleatoric Milieu diagrams and proxemics for the introductory space.

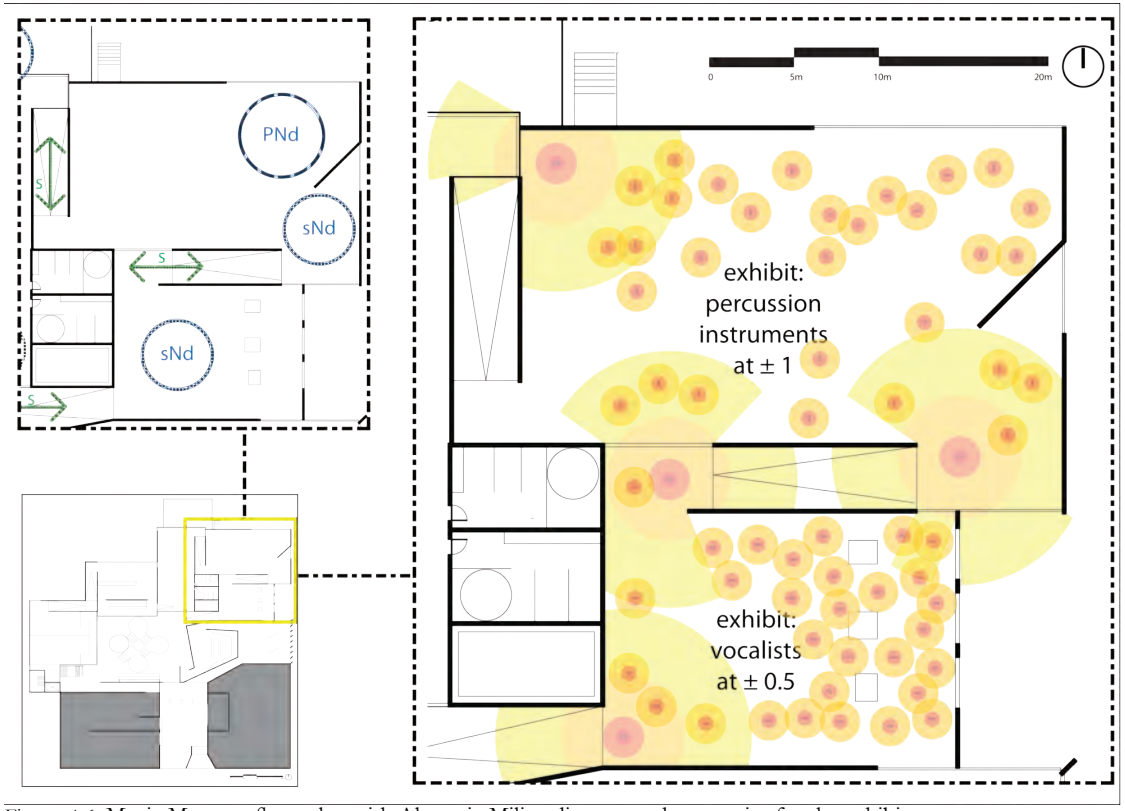

Figure 4-6 Music Museum floor plan with Aleatoric Milieu diagram and proxemics for the exhibit spaces.

2. Public Musical Node

The philharmonic music museum consists of musical nodes, scaled to public dimensions in a main performance public node, while exhibits are mainly social in scale.

The main performance nodes are separated with the lowest section to correspond to low to mid range instruments while subsequent levels and their corresponding exhibits hold higher ranged instruments. The reason being that higher frequencies travel faster and fill a room more quickly than lower instruments. Since the central node is proposed to consist of a mobile ceiling, it is designed to be able to tune and absorb sound as well as reflect initial sound waves to areas designed for audience seating or standing positions. This strenghtens the nodal position of seating and standing arrangements by offering a varied experience of a single piece of music but with the focus of specific instruments or performers at different locations, truly an experenice that can be described as 'orbital beacons.'

The museum can be tuned for various types of music and exhibits with their corresponding insturments used. Curators can choose a specific era or genre to feature in the museum, or even create a performance that demonstrates the evolutions of a specific insturments. The node of music platforms and specific displays visible from exhibit to exhibit untilizes sound and activity. They also introduce the next type of instrument and exhibit, made available for the user to investigate, learn, experience, and admire.

a. Aleatoric Milieu Diagram

Figure 4-10 on page 113 shows the music node as well as their adjacent exhibits as higer nodes other platforms to experience a dynamic performance. It also shows the raked seating along the exhibits.

b. Rendering

Figure 4-7 on page 110 reveals that, internally, the entrance room and introduction to show the narration of the exhibit space through the visual connection of nodes in the next spaces.

Figure 4-11 on page 114 is a perspective from the top most view from the woodwinds exhibit. It shows the proximity of performers to visitors, as well as, the exhibits correlating to the displays of instruments that are around them.

c. Proxemic Diagrams

Figure 4-10 on page 113 shows public proxemics of the woodwind exhibit that faces the performance platforms. However, since the exhibits have not been designed, curators can design nodes and paths in social and personal scales accordingly.

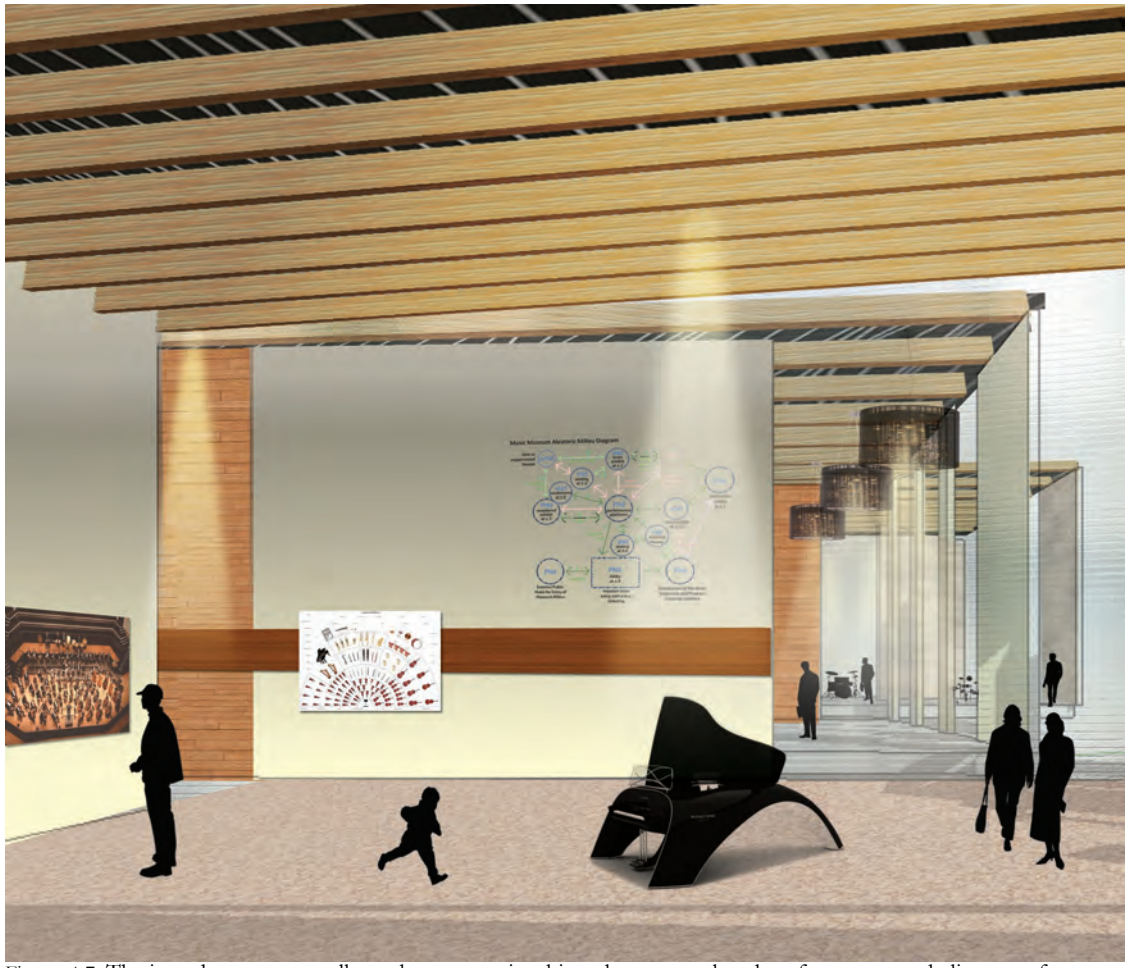

Figure 4-7 The introductory space allows the user to view his or her eventual nodes of progress and glimpses of next exhibits. This view of nodes passively show hospitality by giving a glimpse to further explore. Specific exhibits are not designed into the space, and therefore social and personal scales are not present, except for key pieces to show necessary nodal interest which prompt and guide users or visitors.

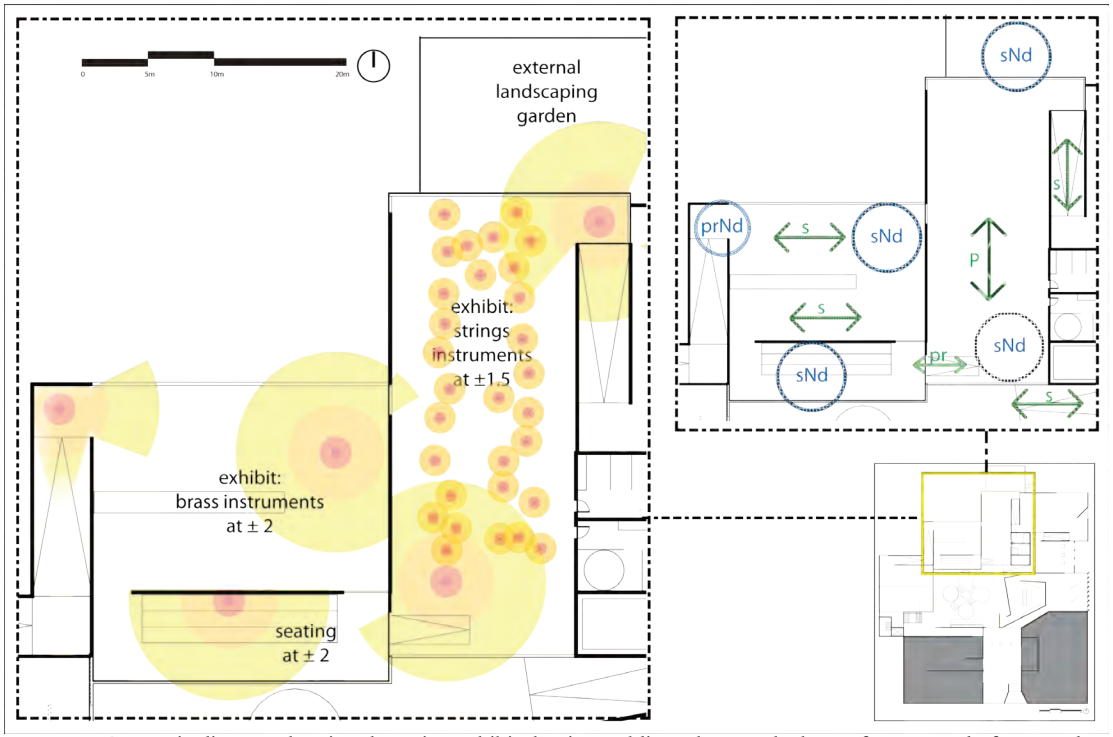

Figure 4-8 Proxemic diagram showing the string exhibit that is a public path towards the performance platform, and the brass exhibit with raked seating before its entry. The beginning of an anechoic hall is also seen in social scales.

3. Transitional and Informative Paths

The paths of the Music Museum link each exhibit to narrate the performance of the central node. The paths can display either the history of the intruments or the pieces, its significance or the intruments with the musical score that will help transition each exhibit in a regular manner. Large enough to read while walking, the information displayed betwen exhibits can be pieces of a puzzle for users as they travel between nodes. For example, the social paths can transition each section of the exhibit from low, mid and high register instrument exhibits.

The paths between exhibits help sound-proof each exhibit and regularly raise each level by half a metre every tweleve metres to match the relative heights of each platform. This ensures that each leaf of the central performance platform can act as a node to some exhibits while being presented as a whole experience.

Most paths are designed to lead from one exhibit to another, intended to provide a visual or auditory narrative transision from one exhibit to another. Its proxemics scale also transitions gradually to show the visitor hospitality through clear transitions with clear nodes to where they will be heading through visual or auditory cues. Paths also direct users through the exhibits of the museum naturally from the anticipation and discovery to experience.

Figure 4-9 The view into the Performace Space from the strings exhibit and public path. It shows the public performance space with a proper public path with stringed instruments placed as possible exhibits at social or personal scales at regular intervals. It does not detract from the main performance public node and is accessible through a social ramp path to optional personal seating. The next exhibit of brass instruments is also visible through one glass panel as a courtesy to its users for nodal and navigation purposes pertaining to the Aleatoric Milieu.

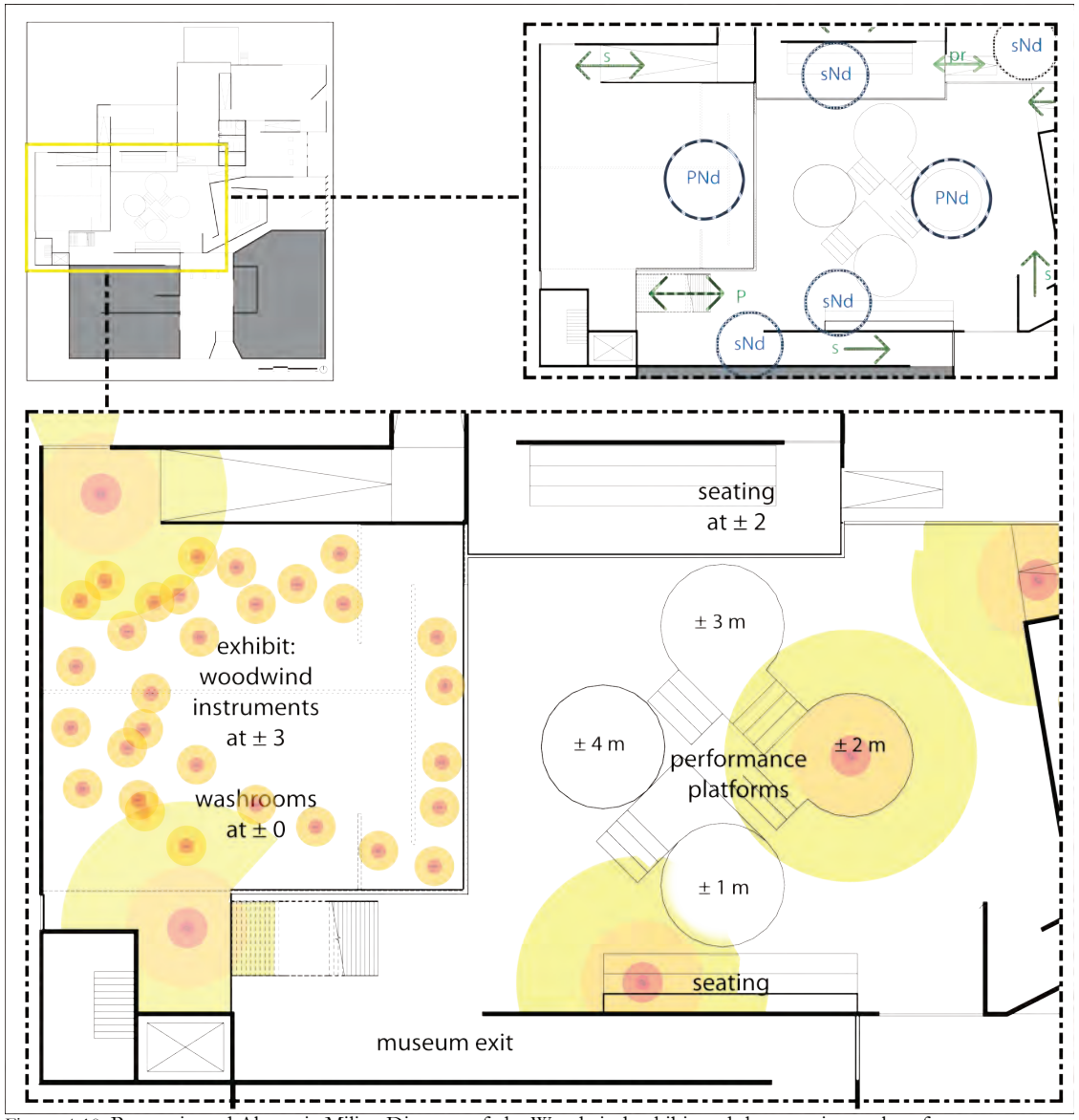

Figure 4-10 Proxemic and Aleatoric Milieu Diagram of the Woodwind exhibit and the experimental performance platforms.

a. Aleatoric Milieu Diagram

Figure 4-8 on page 111 shows the only designed public path from the stringed exhibit that leads toward a view of the central performance node. A steep ramp leads to optional raked seating provided for viewing the performance node before the following brass instrument exhibit.

Another unique path follows this, keeping with the same ramp design that is seen throughout the museum, but is instead an anechoic hall designed as a palette cleanse between the woodwind and brass exhibits. In social scale, since it dampens sound and darkened with lights along the floor to guide, this naturally slows down visitors due to limiting both sound and light becoming more personal experience. It is depicted leading from Figure 4-8 to Figure 4-10 on page 113.

Figure 4-11 A view overlooking the the performance platforms from the exhibit for woodwinds and reed instruments. The corresponding performance platform is within a social distance.

b. Rendering

Figure 4-9 on page 112 shows the public scale of the string exhibit that faces a public node, which is the performance platforms. The entry into the building is also seen in the distance. The next node is raked seating for those who want to stay or walk into the next exhibit.

Figure 4-11 on page 114 is a perspective view of the highest exhibit of woodwind instruments showing the performance platforms with the adjacent raked seating on the first level on the right, while off screen on the left is raked seating as well. The furthest wall is the exit of the introductory space with the entry of the first exhibit in the distance.

Figure 4-14 on page 117 reveals the scale of the performance platforms, the entry into the first exhibit, and the transition from the public path to the raked seating offscreen on the left hand side. Above this persepctive is the stringed instruments and the highest floor.

The ceiling height is aprox 15 metres for the performance space, while exhibits have lower ceiling heights, ranging from around 5 to 7 meters in height to accomodate the exhibits.

c. Proxemic Diagrams

Figure 4-8 on page 111 shows how the public path of the string exhibit highlights the experimental music stage as a node, and provides views to the string exhibit or vice versa if museum curators choose to circulate the music in the opposite direction.

Figure 4-10 on page 113 shows the public scales of the performance platforms and woodwind exhibit. To descend the museum, stairs in social scales or an elevator is provided. There is an exit toward the museum store or toward the lobby where users can retrieve jackets and personal items.

Figure 4-13 on page 116 also shows the scale of the paths as well as the scale of the nodes in relationship to other exhibits.

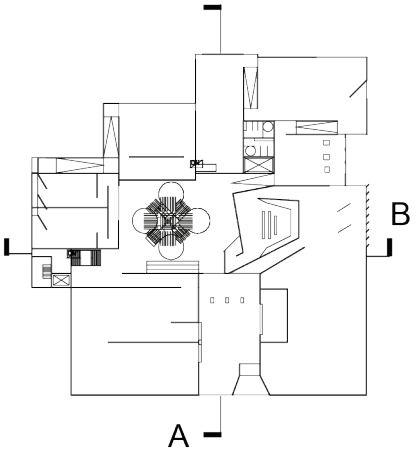

Figure 4-12 Floor plan indicating sections cuts.

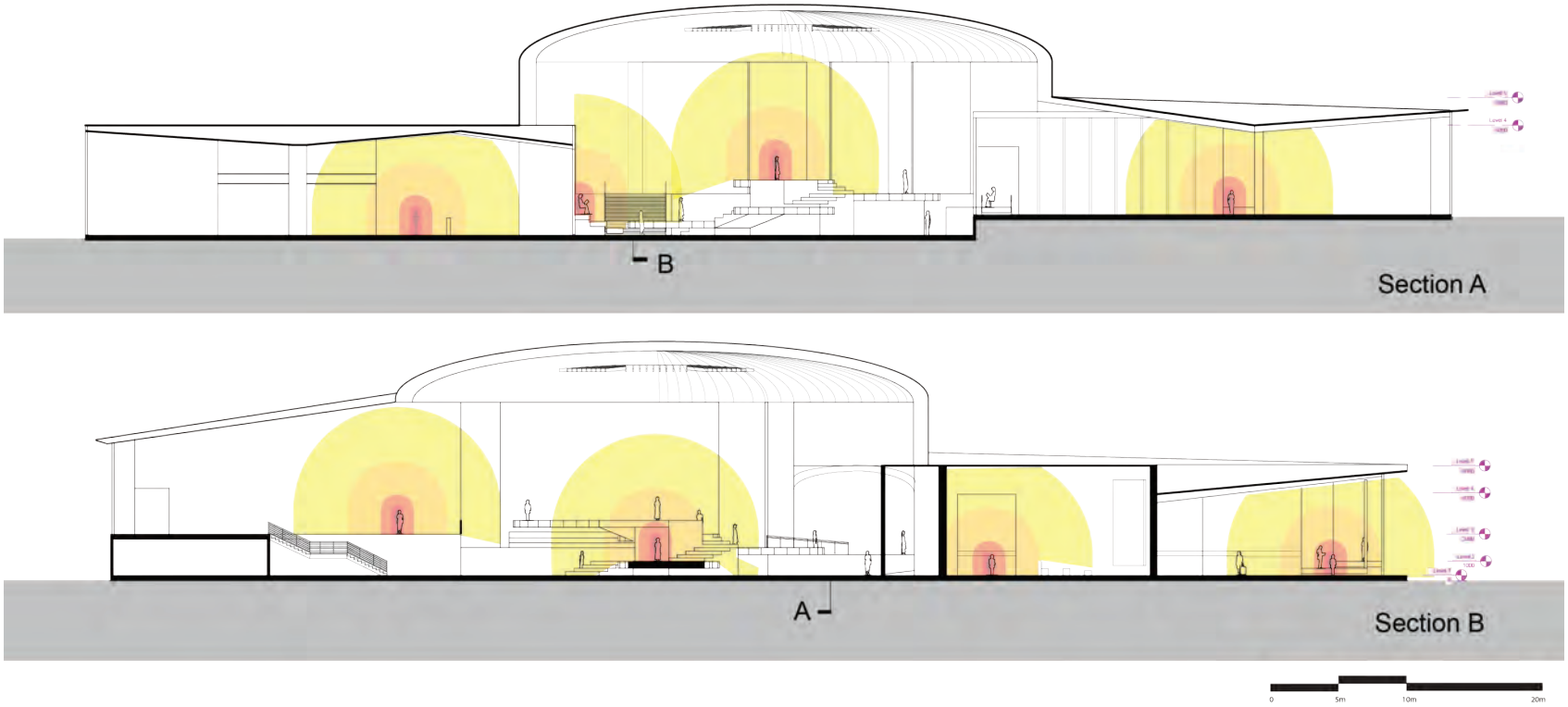

Figure 4-13 Sections indicating proxemic scale.

Figure 4-14 The view from the performance space from the washrooms that lead to the next section of the exhibit nodes.

4. Aleatoric Milieu in the Music Museum

The museum design consists of social nodal exhibits that center about a public node where paths meander around offering both an acoustical barrier from the external building while transitioning between exhibits and the main nodal exhibit.

The additional element in creating the Aleatoric Milieu diagram of the Music Museum are the arrows that depict the visual connections between the nodes. Figure 4-15 on page 118 depicts the diagram that centres around the performance platforms as its primary public node.

In addition, elevators have been placed beside the exit stairs for egress and ease of access. The performance platforms do not have railings but thin metal ones can be envisioned for safety.

The Music Museum explores a sequnce of nodes in public and social scales while also incorporating the condition of museum visitors at a capacity of thirty children and two supervisors. By following the principles of the Aleatoric Milieu, this museum portrays a language of hospitality and accessibility.

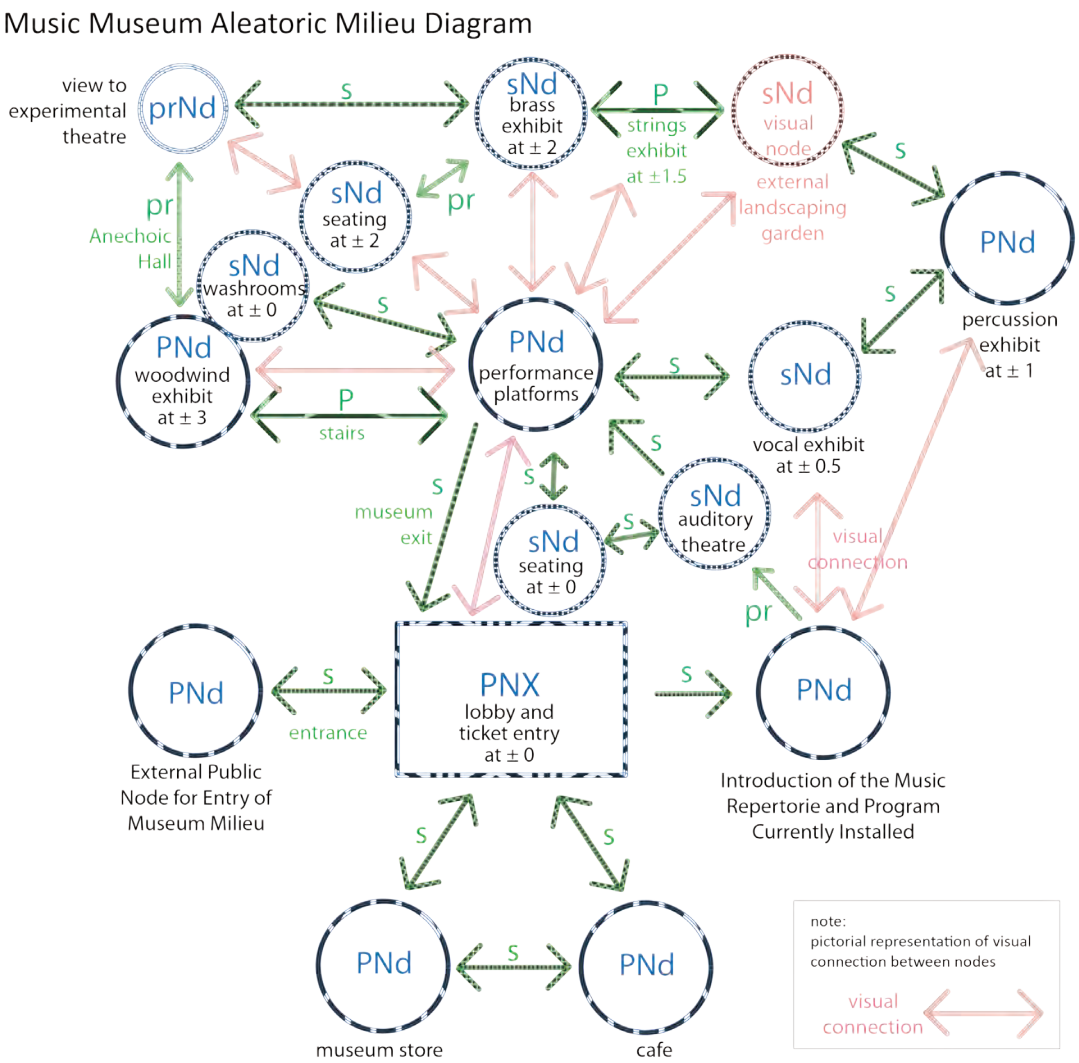

Figure 4-15 Aleatoric Milieu diagram of Music Museum.

C. An Aleatoric Milieu in the Body of Architecture

The built environment is a compilation of multiple stories, people who contributed to its development and usage, while also molds those who dwell there. In considering the Aleatoric Milieu, I am convinced that buildings that encourage hospitality place value on human dignity and uses spatial elements to demonstrate a language of acceptance imbued in its design. The Aleatoric Milieu consists of two principal components: first, it is sensitive to how social dynamics is encouraged or discouraged through spatial arrangements, and secondly, it possess an environment that motivates human engagement through a provocative atmosphere of a place.

The Aleatoric Milieu utilizes *navigation design* that includes the scale of human interactions and influences these interactions by designing buildings in a way that informs its users of their built environment. Research regarding the foundation of an Aleatoric Milieu includes, but is not limited to: Edward T. Hall's study of proxemics, Margaret Visser's encounter with Sant'Agnese Fiori le Mura in Rome in her book "The Geometry of Love," and Christopher Alexander's narration of space through gradations, and of occupant density and physical intimacy in "A Pattern Language." Utilizing light, sound and visual access, the Aleatoric principle of including a gradation of occupant density and physical closeness to *navigation design*, we arrive at an understanding of an Aleatoric Milieu that creates an opportunity to make positive memories by providing a meaningful frame for the activities of humans.

The study of hospitable, accessible and sufficient space in the context of the fundamental concepts of the Aleatoric Milieu can be explored further in a number of ways. Proxemics can be expanded, *navigation design* could be linked to further types of city design and the organization of occupancy density versus privacy investigated to include district or regional proxemic and navigation patterns.

Proxemics can be further be classified according to studies that include people of specific ethnicities, regions or districts, high-density living or low-density living, and city or rural life. This will change the dimensional scale of heights, and the proximity to others that people most feel comfortable the range above one's horizontal vision one is aware of, and how much information an individual processes while in ambulatory motion, bicycle and vehicular transportation. The study of these new proxemics of the various scales human of social dimensions will bring new associations to *navigation design* where a compelling narrative that fascinates both the senses and memory can be incorporated into architectural design. Additional aspects of proxemics considered by Hall is found in "Cultural Proxemics" on page 127.

In addition, the *navigation design* concept derived from Margaret Visser's recollection of a church – extrapolated as containing a concurrent narration in the built environment in the narthex, path and node – can also be seen in ancient city planning where wide streets form a path towards the vista of an obelisk or monument creates either a narthex to the visible node or vice versa. The Aleatoric Milieu can be associated with utopian city diagrams, templates or diagrams as a transcription to a spatial tool - as opposed to a plan based scheme - imbued with proxemics, intuitive navigation and considerations of occupant density and privacy that can be tailored to meet the needs of its users, creating their own utopia.

Drawing from that example of the Museum case studies of experiential public space, one can begin to clarify design principles of spatial arrangements for creating an Aleatoric Milieu. Spatial understanding of voids is that they are created and have meaning based on the environments that encompass them and how human proxemics may interact in the given environment. The Aleatoric Milieu becomes a versatile understanding of how humans interpret and experience their surroundings that can be translated into any city scale, navigational style and adapted to geographically contextual social dimensions.

Furthermore, a series of studies addressing design strategies using the Aleatoric Milieu with specific design for high, mid and low density, and correlating this with necessary factors for human privacy, will add value to this architectural theory followed by a rating system ranking the number of positive Aleatoric Milieu elements within a building or environment. For example, high-occupation density can be controlled in a number of ways that is both hospitable and ensures accessibility. High-occupation density can be monitored through a series of nodes to cluster interest, thus freeing up paths for those who are simply passing. Furthermore, multiple parallel paths to the same node can scale down the proxemic, slowing travel without compromising hospitality or accessibility, while a narthex that is scaled to accommodate expected density will allow users to visually navigate a path before committing to it to traversing it. The need for privacy or areas of respite in high to low density can be studied to meet the needs of those who own and operate such spaces in order to factor in 'livability' for both introverts and extroverts.

By including statistics such as personality, the Aleatoric Milieu can be revised to include conceptual diagrams that correlate to the spatial elements tailored to specific preferences of expressions of hospitality. It can also, through research, be designed to include the navigation design of regions, their respective proxemic and narrative navigation style, with preferred density and privacy factors for particular cultural analysis and application of their Aleatoric Milieu.

Besides considering the aforementioned authors and influences within this thesis, consideration to other authors that have aided in the synthesis and conception of the Aleatoric Milieu. They include Juhani Pallasma, in his consideration given to perceiving space as through the receptors of the 'Eyes of the Skin,' while Peter Zumthor's 'Atmospheres' read spatial design through materials, light and scale and as opposed to depending on signage. [see appendix for Pallasmaa and Zumthor]. Ray Oldenburg in his theory of 'third places' also was considered in creating an Aleatoric Milieu. Oldenburg indicated that there is the necessity to design for and create great public spaces. Jan Gehl has also emphasized the design of an inter-connected city fabric that encourages pedestrian navigation in his 'Life Between Buildings.'

Through considering the importance to not neglect the human corporeal faculties in how it interacts with design in the third dimension with materials used in building, spatial elements need to be considered when creating services that can become third places. While considering the fabric of the city that surrounds those places, the pieces of the architectural puzzle grew. However, by addressing each concern one by one and linking them together to describe a holistic understanding of spatial arrangement, complete with wayfinding, density and the need for privacy, and design that is catered to the proximity for human interaction; concluded with the theory for the Aleatoric Milieu.

Case studies using the Aleatoric Milieu can be applied to buildings and arguably shed light to how an institution, establishment or business can improve revenue, visibility, or marketability to benefit its users. Concurrent aspects of existing designs may benefit from integrating or considering the Aleatoric Milieu. The Aleatoric Milieu theory addresses a proxemic scale, wayfinding, occupation density, privacy, the creation of paths, visible or hidden nodes, as well as, considers how entries or lobbies relate and accommodates its site. Through addressing those aspects, businesses, establishments, or institutions can cater its services, objects, or lifestyle appeal to its users, customers or investors.

The design portion of the thesis, arguably the most challenging narrative to the Aleatoric Milieu had been chosen. Other areas for discourse would be the Public Scales – a central narthex to multiple nodes and a grand narthex through a clear path to a grand node – the Public to Social Scales, a central node to multiple nodes, and Social to Personal Scales.

Finally, architecture, as seen as the backdrop to life, can either reinforce positive experiences or make bad situations worse when lacking the elements of an Aleatoric Milieu. The ideal creation of an Aleatoric Milieu is to aid designers in considering spatial elements in design as it is perceived by the human faculties. In order to turn mediocre experiences into positive ones, instead of frustration and dead ends, architecture can benefit human existence by providing clarity through design. Utilizing the Aleatoric Milieu in design becomes a basis for mutual communication and hospitality.

With roots as an auditory investigation, the premise of proxemics, describes the corporeal dimensions in which humans interact. As a result, the spatial environment that houses these interactions is the architecture, comprised of materials that make space feel smaller or larger due to its reflectivity in light and sound walls that enclose or open up. My instinct is to consider further possibilities by simply defining human spatial elements according to how humans will move led to the investigation of navigation through other authors' definitions and recollections.

The next steps in developing the Aleatoric Milieu can apply to city planning and building design. Restricting factors in transitioning between proxemic scales can control occupation density catered to a particular layout. Analyzing how the increase of nodes may increase or decrease privacy anticipates providing space to accommodate differing personalities. The Aleatoric Milieu ultimately plans and designs a space that includes a spectrum of spatial preferences to bring about hospitable planning and design. "Atmospheres" created by materiality become even more poignant when imbued with the Aleatoric Milieu.

In an era where media is an accessible platform and the visible spectrum is commonly held as the single most important sense, architecture can fail its users if it forgets to design for the diversity of choice, sensual, corporeal and physical aspects of human dimensions and our natural navigation tendencies.

D. Epilogue

This study incorporates human perception of movement in time through space in a narrative in navigation design. Navigation design includes the proxemic scale to create the Aleatoric Milieu.

Proxemics includes touch, movement, language, and time structure. The Aleatoric Milieu synthesizes those aspects and creates physical and spatial structure for positive human interaction in various proxemic patterns.

In addition to designing for spaces that is most hospitable, the Aleatoric Milieu was considered in created space that responds to low traffic and high traffic periods of public dimensions. A solution to creating an environment that interacts with a personal or social dimension accordingly can almost be another thesis.

The most simple of this is to educate the people - who inhabit or work in the space - to move seating and arrangements at certain times of the day. In moderate traffic, furniture and spatial dividers, seating or display can create dimensions that are social and personal in scale. During high pedestrian flow, the number of obstacles to a clear public path can be eliminated to create prominent social nodes to attract visitors.

For example, a shopping mall with a wide public path flanked by shops with social entryways can benefit in adjusting to pedestrian traffic to create hospitable space through the Aleatoric Milieu.

A second aspect of creating an Aleatoric Milieu that responds is furniture and fixtures that can be tucked away to make itself smaller or pulled apart to create more of itself. Chairs that fold out into more seating in low pedestrian traffic for social nodes, and tuck away to allow for a vertical visual node in what is now a public path.

A third and most responsive architecture to the Aleatoric Milieu is the automatic and programmable. Columns can span outward to create social seating in low pedestrian traffic and shrink in high traffic. Walls will move displays outward like branches to create a larger viewing platform for goods in low traffic, and grow upward and shrink in higher traffic.

Lighting can focus on below waist illumination in low traffic to slow down and add contemplation to the space. In high traffic, to encourage a faster pace to ease congestion, lighting is bright and focused on ceiling and above waist-level. Materials can also respond in the same way: highly textured in low pedestrian, thus social and personal in approach. In high traffic, smooth and predictable to create more space for those who need it.

The Aleatoric Milieu can be defined and summarized by the following description.

*The **Aleatoric Milieu***

*is a **process of thought** that can **organize a space** and its structures in a way that **increases** one's **awareness of their surroundings** and **motivates** one to a **specific location.***

*It is **inclusive** through its principle of visible nodes, **preserves human dignity** by providing choice through a narthex, and **hospitable** by accommodating a spatial scale that is reflective of the intended purpose of the space.*

1 ***provides positive opportunities for human interaction.***

sensitive to personal, social *and* public *dimensions within a* geographical context *through proxemics.*

2 ***natural and visceral wayfinding***.

draws people into *a story larger than themselves in a navigation design.*

3 ***considers and includes spatial scale reflective of specific purposes of design.***

conextualizes how people navigate space and why certain arrangements of a program, seating, lighting and material to corresponds to the *navigation speed* linked with *proxemic dimension.*

The Aleatoric Milieu ultimately plans for and designs a space that includes a spectrum of spatial preferences to bring about hospitable planning and design. The following list consists some additional benefits of the Aleatoric Milieu.

- Proxemic dimensions can be further be classified according to studies that include people of specific ethnicities, regions or districts, high-density living or low-density living, and city or rural life. This information and dimensions can be used to create a new scale for culurally-specific or personalized Aleatoric Milieu.
- Restricting factors in transitioning between proxemic scales, the personal, social and public, can control occupation density.
- Analyzing how the increase of nodes may increase or decrease privacy anticipates providing space to accommodate differing personalities.
- Aleatoric Milieu can become a catalyst for connecting people to innumerable possibilities in its applications. It will connect individuals with the same preferred destination or node within the scale they feel most comfortable in that moment in time.
- Aleatoric Milieu Analysis can be applied to buildings and arguably shed light to how an institution, establishment or business can improve revenue, visibility, or marketability to benefit its users.

In an era where interactive media and personal electronic devices is an accessible platform of abundant resources, the visible spectrum is commonly held as the single most important sense. Architecture can fail its users if it forgets to design for the diversity of choice - the sensual, corporeal and physical aspects of human dimensions - and our natural navigation tendencies.

Endnotes

1. Paul von Naredi-Rainer, "The Museum as Institution," in *Museum Buildings: A Design Manuel (*Basel: Birkhäuser, 2004), 13.

2. Timothy W. Luke, *Museum Politics: Power Plays at the Exhibition*. Minneapolis (University of Minnesota Press, 2002), 228.

3. Timothy W. Luke, *Museum Politics: Power Plays at the Exhibition*, 230.

4. "Augusta Read Thomas: Orbital Beacons – Concerto for Orchestra," G. Schirmer Inc. Associated Music Publishers, Inc, last modified, February 6, 2015, accessed June 7, 2012, http://www.augustareadthomas.com/orbital.html.

5. G. Schirmer Inc., Inc. "Augusta Read Thomas: Orbital Beacons."

6. Hope Bagenal, "Bach's Music and Church Acoustics," *Journal of the Royal Institute of British Architects 37*, no.5 (11 January 1930): 154-163.

7. J. Christopher Jaffe, *The Acoustics of Performance Halls: Spaces for music from Carnegie Hall to the Hollywood Bowl* (Norton & Company: New York and London, 2010), 99.

8. Jaffe, *The Acoustics of Performance Halls*,19.

9. Jaffe, *The Acoustics of Performance Halls,* 110.

10. Jaffe, *The Acoustics of Performance Halls*, 17.

11. R. Murray Schafer, *The Soundscape: Our Sonic Environment and the Tuning of the World* (Rochester: Destiny Books, 1994), 11.

Appendix

A

Appendix

1. Cultural Proxemics

Hall has observed interesting proxemic patterns of the perceptual world in the Germans, English, French, the Arab world and in Japan in the 1960s by grouping people within their country of origin. Hall's argument is that people have been taught by their surroundings to occupy space differently due to the varying preferences in preferences that are culturally related. Edward T. Hall has observed that Germans observe intrusion of space as visual access, thus doors are designed to be solid and walls sound proof. The English require a social distance of around 2.4 meters to maintain unwavering eye contact for conversation. The Arabs, like the English stop talking in order to be alone in their thoughts while the American retreats to a physical barrier. In even greater contrast to the Americans, Arabs occupy a closer olfactory boundary when communicating, and view public space as truly public, where no personal bubbles outside of their physical presence exist. The French make use of open and public spaces to counterbalance high density living and operate in radial plans, where the centre of the room or landscape is designated for people of greater honor. Instead of streets being named, the Japanese give the greater importance to initial occupiers of land, naming the block of land or lot within that block chronological numbers that are time sensitive and perceive space to include the objects and the space it encircles.[1]

2. Museum Dichotomies

The functional aspects of the museum exists in multiple dichotomies; the user as a 'high-tech' Trojan horse with technology, that invades the curators narrative. The differential treatment to the idea of objects in different institutional boundaries, for example, the art museums and the science museums, the desirable degree of collaboration between the museum and general users in various stages of acquiring, developing, and the display of exhibits, as well as a discussion of who are the users – since as they change, so does the message of the museum.[2]

3. Byzantine Art and Iconoclasm

Art are clues to the perception of a particular culture's worldview. Byzantine Art was centered on a Christian society based in Constantinople, dedicated in 330, and was the capital of a Christian empire until 1453 when its religious landscape and art became Islamic.[3] Although dulled from its former glory, its abundance and wealth still glitter in churches and monasteries today.

Byzantine Art was known for its 'religious icons' or *eikon* in Greek, included images in churches and vast resources were lavished with care and devotion with their creation, spanning over 1000 years.[4] Byzantine icons became 'timeless,' since it had "received prayers and veneration that passed through them to the 'other' world that they symbolized, and they were expected to reflect the powers of God. Each icon had to maintain its power for century after century."[5]

Byzantine art has been interpreted as a formal, cultural, or political approach can be equally plausible, since artistic production and viewing interwoven due to the treatment of their art. Sculptors in marble, ivory and other materials, enamel-working in gold and glass, manuscript painters of texts and pictures handling and adapting materials into new volumes; create evidence of a society that consumed art and artists who did not work in isolation from one another.[6] However, there existed theoretical reasoning in the literature of Christian apologists to condemn images for the invisible God of the Christians. The debate emerged in the Byzantine iconoclasm, retaining art connected with death and salvation in both churches and funerary monuments, giving Christians a social visibility and missionary armory.[7]

4. Margaret Visser: The Geometry of Love

A poetic, thoughtful and full of information, Margaret Visser's book entitled *The Geometry of Love: Space, Time, Mystery, and Meaning in an Ordinary Church* possess a wealth of insights through multiple disciplines. Within her narrative, she had taken into account: history and politics, theology, anthropology, art history and technology, iconography, hagiography and folklore, symbolism and culture of the community of people who used the building. Familiar with Roman Catholic rituals, Margaret Visser had received her doctorate in Classics at the University of Toronto taught Greek and Latin at York University. Within her book about the church Sant'Agnese fuori le Mura in Rome as the subject, Visser recalls her first visit as 'small and far and sharply vivid." Visser explains that she "recalled grandeur in littleness, gorgeousness of colour (purple, pink, grey and gold in Sant'Agnese's; terracotta, green, and white in Santa Costanza's), and always there lurked hints of the smell of fresh flowers."[8]

a. Narthex

Margaret Visser, in her book, *The Geometry of Love,* refers to the *narthex* as the vestibule of the church; a threshold or 'paradise' for breathing space in preparation for the journey toward 'rebirth'. The sacred enclosure of the narthex was usually dim; since exterior church doors were often kept closed or curtained. New converts awaiting initiation, the catechumens and others had to stand in the narthex during church services as they were deemed 'ceremonially unclean' by Levitical Laws.

Early churches had an enclosed area outside the front doors, a pillared courtyard before the temple, often with greenery and flowers and a fountain. The Latin names is *porticus* since it was pillared or an atrium, the name of the Roman courtyard; or it was a *paradises*, which is 'Paradise,' from a Persian word meaning a "walled-in enclosure" referring to a deer park. Paradise is also the Garden of Eden, where in the book of Genesis sin first entered the world.

It was the desire of Adam and Eve to be greater than their creator by eating the fruit of the knowledge of good and evil in paradise. God, encompassing perfect holiness, love and justice set into action a path of redemption to lift the curse placed on humans: pain of childbirth, toiling for survival as well as the penalty of death. For their act of disobedience, mistrust and doubt in God, animals were sacrificed to clothe Adam and Eve.[9]

Located before the church proper, the *narthex* is symbolic of the *beginning* of the story of the human face. Past the church doors, the narthex or 'paradise' visually leads into the church's central 'road' toward the 'end,' which is the apse with an elevated an covered altar that is in full view from the beginning. The *path* functions as an opportunity for people sit, observing the altar, the *node* for worship. The altar is typically raised to emphasise the importance of the ideas it represents: the physical representation of the coming of Jesus Christ, 'grace abounding' came: far more grace than there is sin, which is in the culmination of the undeserved mercy of God for the redemption of humankind.[10]

b. Catholic Ritual Narrative

Margaret Visser, the author of 'The Geometry of Love,' explains a Roman Catholic ritual where before midnight on the eve of Easter, which narrates the narthex, path and node. A candle is carried into the church from the outside into the altar, symbolizing Christ as he brought light into the world. This is the solution to the curse of sin on humankind from the mythical story of Adam and Eve in Paradise, which was located in the *narthex*, for they acted upon the temptation to become 'like gods.' To enter the church is to step out of Adam and Eve's 'paradise' to encounter God's interruption into human history, the visible *path* towards the altar, the *node*. This procession physically constructing the coming of Jesus Christ, who came 'grace abounding,' with far more grace than there is sin, which is in the culmination of the undeserved mercy of God.[11]

5. Soundscape

To understand the tapestry of sound humans exist in, Raymond Murray Schafer, a contemporary Canadian composer describes environments possessing a myriad of memories and experiences to every individual as being a *soundscape*. It is a term for the study for acoustic ecology coined by Schafer, and can also refer to compositions that create a particular acoustic environment. The soundscape are comprised of *keynote sounds, sound signals* and *soundmarks*.[12]

Keynotes are a musical term that refers to the key or tonality of a particular composition; within a soundscape they represent subconscious sounds of an environment, like the sound of the sea for a maritime community, the continuous hum of traffic within a city, or a photocopier that periodically whirs. *Sound signals* however, are the foreground sounds within the keynotes of a location; in psychological terms, they are the figures while the keynotes are the ground. They are warning bells or sirens within a city, or in the wild, specific animal cries, that "help to outline the character of men living among them."[13] Lastly, *soundmarks* are the unique sounds to a community, that Schafer insists upon its preservation. It is derived from 'landmark' and examples of this would be a clocktower's chime, or a bell tower that signals at periodic times of a day.

6. Peter Zumthor's Atmospheres

Zumthor listed nine explanations of his personal way of building: The Body of Architecture, Material Compatibility, The Sound of a Space, The Temperature of a Space, Surrounding Objects, Between Composure and Seduction, Tension between Interior and Exterior, Levels of Intimacy and The Light on Things.[14]

In The Body of Architecture, Zumthor explains that he means what the entire building is made up of; an anatomy built up of mass, membranes, fabrics, cloth, velvet and silk. *Material Compatibility* explains how Zumthor sees materials reacting to one another in its creation, proximity and weight. *The Sound of a Space* is quite literally how a building creates new acoustic environments. Zumthor explains that *The Temperature of a Space* refers to how materiality provides a type of psychological and physical warmth and coolness to the touch. *Surrounding Objects* refers to how detailed objects have physically placed in a space, while discussing *Between Composure and Seduction*, Zumthor explains the architect's role in creating paths which draw people toward a space, that there is "direction, seduction, letting, granting freedom."[6] Zumthor also explains that the T*ension between Interior and Exterior* are the building's widows and openings, as well as facades of buildings. *Levels of Intimacy* are a building's proximity and weight that create and impose scale on its subjects. Lastly, Zumthor explained in *The Light on Things*, is how light affects people, how deliberately embedding light in material at the end of a tunnel to guide a visitor, or how light can be perceived as mass in darkness.

Zumthor then adds three additional comments; that he perceives *Architecture as Surroundings* and that it is his pride to have built for things people can use and love. That buildings should possess *Coherence* – that architecture is art, consisting of place, use and form. Zumthor concludes that his main goal in architecture is to create *The Beautiful Form*.

7. Third Places

Individualistic thought and the urban sprawl that had allowed the work and home distances to be greater and greater creates a detached hub of social networking connections. People are linked with institutions and workplace, limiting the sense of sharing a common community.

Ray Oldenburg in the 1989 wrote "The Great Good Place" and addresses the solution to urban sprawl by providing what he calls third places, where the first place as home and the second being work. Places located close to the home and workplace can become a 'third place,' which Ray Oldenburg, an urban sociologist advocates as an informal gathering, which develops a functional social community that ultimately matures into civil society and civic engagement.[15]

Third places, needed to be designed for the youth of the city, adults to unwind after work, or the elderly to spend time, where people of all ages can comfortably share a collective space without pretense. It may be a community center, park or café, a place where it is safe, where there is no pressure to spend money and people go to get to know neighbors to see others outside of work and home life, and to be seen. It is where collective memory can be formed, where political influence is found when neighbours discuss the logistics of a networked locale. For example, discussions can arise for when new water pipes would improve infrastructure, how a new library might aid the community, building low income housing may aid families or students procuring education in their particular area. His argument is that providing locations for people to connect with one another outside of commuting from home and work would benefit the lifestyle of city dwellers.

Endnodes

1. Edward T. Hall, *The Hidden Dimension* (New York: Doubleday and Company, Inc., 1966), 4 (Hall, chapter 11 and 12).
2. (Ideas from attending conference 'discursive space' @ the Art Gallery of Ontario, hosted by Ryerson University of Interior Design, 2013)
3. Rowena Loverance, *Byzantium* (Massachusetts: Harvard University Press, 2004), 12.
4. Robin Cormack, *Byzantine Art* (New York: Oxford University Press, 2000), 2.
5. Cormack, Byzantine Art, 2-3.
6. Cormack, Byzantine Art, 22.
7. Cormack, Byzantine Art, 12-13.
8. Visser, *The Geometry of Love,* 3.
9. Genesis 3 (NIV)
10. Visser, *The Geometry of Love,* 29. Romans 5:20-21 (NIV).
11. Visser, *The Geometry of Love,* 29. Romans 5:20-21 (NIV).
12. Schafer, R. Murray, *The Soundscape: Our Sonic Environment and the Tuning of the World* (Rochester: Destiny Books, 1994).
13. Murray, *The Soundscape,* 9.
14. Peter Zumthor, *Atmospheres: Architectural Environments, Surrounding Objects* (Basel: Birkhäuser, 2006), 43.
15. Ray Oldenburg, *The Great Good Place* (New York: Paragon House, 1989).

Selected Bibliography

Abache, Ludwig. "Kunsthaus Bregenz, Austria: Peter Zumthor 1997." Galinsky. Last modified 2001. Accessed April 12, 2011. http://www.galinsky.com/buildings/bregenz/index.htm

Alexander, Christopher, Sara Ishikawa, Murray Silverstein, Max Jacobson, Ingrid Fiksdahl-King, and Shlomo Angel. *A Pattern Language: Towns, Buildings, Construction.* New York: Oxford University Press, 1977.

Bagenal, Hope. "Bach's Music and Church Acoustics." *Journal of the Royal Institute of British Architects 37*, no.5 (11 January 1930): 154-163.

Campbell, Robert. "Architectural Record." *archrecord.* Last Modified November 2007. Accessed December 2010. http://archrecord.construction.com/features/critique/0711critique-1.asp.

Christian, Richters. "Caixa Forum: Herzog & de Meuron." Arcspace.com, March 31, 2008. Accessed December 10, 2010. http://www.arcspace.com/architects/herzog_meuron/caixa/caixa.html.

Cormack, Robin. *Byzantine Art.* New York: Oxford University Press, 2000.

Flemming, John, Hugh Honour, and Nikolaus Pevsner. *The Penguin Dictionary of Architecture and Landscape Arhcitecture.* Fifth Edition. London: Penguin Books, 1999.

Fliess, Maurice. "D.C.'s New Newseum: The Inside Scoup." *TravelMuse,* April 18, 2008. Accessed April 12, 2011. http://www.travelmuse.com/articles/news/newseum.

G. Schirmer Inc. Associated Music Publishers Inc. "Augusta Read Thomas: Orbital Beacons – Concerto for Orchestra." Last modified February 6, 2015. Accessed June 7, 2012. http://www.augustareadthomas.com/orbital.html.

Geddes, Patrick. *Cities in Evolution: An Introduction to the Town Planning Movement and to the Study of Civics.* London: Williams & Norgate, 1915.

Gehl, Jan. *Life Between Buildings.* Bogtrykkeriet: Arkitektens Forlag, 2001.

Gehl, Jan. *Cities for People.* Washington: Island Press, 2010.

Gruen, Victor. *The Heart of a Cities: The Uran crisis: Duagnosis and Cure.* New York: Simon and Schuster, 1964.

Keller, Timothy. *The Reason for God: Belief in an Age of Skepticisim*. New York: Dutton, 2008.

Lebovich, William. "Newseum by Polshek." *ArchitectureWeek*, D4 (22 October 2008):1-4. Accessed December 9, 2010. http://www.architectureweek.com/2008/1022/design_4-1.html.

Lorente, J.Pedro. *Cathedrals of Urban Modernity: The First Museums of Contemporary Art 1800-1930*. Aldershot: Ashgate, 1998.

Luke, Timothy W. *Museum Politics: Power Plays at the Exhibition*. Minneapolis, University of Minnesota Press, 2002.

Malgrave, Harry Francis and David Goodman. *An Introduction to Architectural Theory: 1968 to the Present.* United Kingdom: Wiley-Blackwell, 2011.

Hall, Edward T. *The Hidden Dimension.* New York: Doubleday and Company, Inc., 1966.

Jacobs, Jane. *The Death and Life of Great American Cities.* New York: Vintage Books, 1992.

Fundacion Bancaria Caixa d/Estalvis i Pensions de Barcelona "la Caixa". "la Caixa" Foundation. Accessed April 20, 2012. http://obrasocial.lacaixa.es/laCaixaFoundation/home_en.html.

Lorente, J.Pedro. *Cathedrals of Urban Modernity: The First Museums of Contemporary Art 1800-1930*. Aldershot: Ashgate, 1998.

Loverance, Rowena. Byzantium. Massachusetts: Harvard University Press, 2004.

Lynch, Kevin. *The Image of the City.* Cambridge Mass: MIT Press, 1960.

Mack, Gerald. *Art Museums Into the 21st Century.* Basel: Birkhäuser, 1999.

MacKeith, Peter. "A Full and Dignified Life." In *Archipelago: Essays on Architecture*, edited by Peter MacKeith, 214-224. Helsinki: Rakennustieto Oy, 2006.

MacKeith, Peter, ed. *Archipelago: Essays on Architecture.* Helsinki: Rakennustieto Oy, 2006.

Matsumoto, Mieko. "Architectural Gem." Museumsnytt.no, February 13, 2009. Accessed December 10, 2010. http://www.museumsnytt.no/anmeldelser/arkitekturens-perle.

Meyer, Jürgen. *Acoustics and the Performaqnce of Music: Manual for Acousticians, Audio Engineers, Musicians, Architects and Musical Instrument Makers.* New York: Springer, 2009.

O'Neil, Mark."Essentialism, Adaptation and Justice: Towards a New Epistemology of Museums." *Museum Management and Curatorship. 21:2.* London: Routledge, *2006.*

Naredi-Rainer. *Museum Buildings: A Design Manuel.* Basel: Birkhäuser, 2004.

Oldenburg, Ray. *The Great Good Place.* New York: Paragon House, 1989.

Ontario Ministry of Education. "Information for Child Care Professionals." Queen's printer for Ontario. Last modified September 4, 2014. Accessed June 25, 2014. http://www.edu.gov.on.ca/eng/parents/planning_and_design.pdf.

Pallasmaa, Juhani. "Memory." In *Crucial Words: Conditions for Contemporary Architecture*. Edited by Gert Wingardh and Rasmus Waern. Boston: Birkhauser, 2008.

Pallasmaa, Juhani. *The Eyes of the Skin: Architecture and the Senses.* West Sussex, John Wiley & Sons Ltd, 2005.

Rothstein, Edward. "Chasing the News: Mark Twain's Inkwell to Blogger's Slippers." *New York Times,* April 11, 2008. Accessed April 12, 2011. http://nytimes.com/2008/04/11/arts/design/11news.html.

Rossi, Aldo .*The Architecture of the City.* Cambridge, Mass.: The MIT Press, 1982.

Saffir, Barbara J. "Polshek's Newsiest Museum Opens in D.C." *Architectural Record,* April 10, 2008. Accessed December 10, 2010. http://archrecord.construction.com/news/daily/archives/080410polshek.asp.

Sabbagh, Karl. *Power into Art: The Making of Tate Modern.* Harmondsworth: Penguin Books, 2001.

Sabine, Wallace Clement. *Collected Papers On Acoustics.* Cambridge: Harvard University Press, 1923.

Sabine, Wallace Clement. "Melody and the Origin of the Music Scale." In *Collected Papers on Acoustics*. Cambridge, Mass: Harvard University Press, 1922.

Schafer, R. Murray. *The Soundscape: Our Sonic Environment and the Tuning of the World.* Rochester: Destiny Books, 1994.

Seamon, David and Robert Mugerauer, ed. *Dwelling, Place and Environment: Towards a Phenomenology of Person and World.* Boston: Martinus Nijhoff Publishers, 1985.

Simon, Nina. "The Participatory Museum." *The Participatory Museum.* 2010. Accessed March 31, 2010. http://www.participatorymuseum.org/.

Visser, Margaret. *The Geometry of Love: Space, Time, Mystery and Meaning in an Ordinary Church.* Toronto: HarperCollins Publishers Ltd, 2000.

Weese, Cynthia. "Realities." In *Archipelago: Essays on Architecture*. Edited by Peter Mackeith, 46-73. Helsinki: Rakennustieto Oy, 2006.

Williams, Tod. "Ascension." In *Archipelago: Essays on Architecture*. Edited by Peter MacKeith, 157-164. Helsinki: Rakennustieto Oy, 2006.

Zumthor, Peter. *Atmospheres: Architectural Environments, Surrounding Objects*. Basel: Birkhäuser, 2006.