

1-1-2010

Corporeal architecture : a material response to sensorial experience

Michael PM Blois
Ryerson University

Follow this and additional works at: <http://digitalcommons.ryerson.ca/dissertations>



Part of the [Architecture Commons](#)

Recommended Citation

Blois, Michael PM, "Corporeal architecture : a material response to sensorial experience" (2010). *Theses and dissertations*. Paper 982.

This Thesis Project is brought to you for free and open access by Digital Commons @ Ryerson. It has been accepted for inclusion in Theses and dissertations by an authorized administrator of Digital Commons @ Ryerson. For more information, please contact bcameron@ryerson.ca.

Corporeal Architecture:

a material response to sensorial
experience

by

Michael P.M. Blois

BArchSc Ryerson University 2008

A Design Thesis|Project

presented to Ryerson University

in partial fulfilment of the

requirements for the degree of

Master of Architecture

Toronto, Ontario, Canada, 2010

© Michael P.M. Blois 2010

I hereby declare that I am the sole author of this thesis|project.

I authorize Ryerson University to lend this thesis|project to other institutions or individuals for the purpose of scholarly research.

Michael P.M. Blois

I further authorize Ryerson University to reproduce this thesis|project by photocopying or by other means, in total or in part, at the request of other institutions or individuals for the purpose of scholarly research.

Michael P.M. Blois

Corporeal Architecture: A material response to
sensorial experience
M.Arch 2010
Michael P.M. Blois
Master of Architecture
Ryerson University

Abstract

The following abstract was sent as an email to Adrian Blackwell one week prior to my thesis defence. Adrian is a Professor at the University of Toronto, and a member of my thesis committee.

Adrian,

Before the review next Friday, I would like to provide you with some background information about my thesis project. I have attempted to summarize the main focus of the project and briefly outline the context of the design work. In addition, my research document from the Fall term is attached for your reference. Feel free to glance through it if you get a chance.

My project began with an interest in sensory experience and the means by which the body engages in architecture. Numerous threads were explored- studying the work of Aalto, Scarpa, Holl, Zumthor and the writing of Pallasmaa; examining the work of artists like David Rokeby and Michael Awad; research about perception and sensation, through Deleuze, J.J. Gibson, Frampton, Frascari... And through personal experience: documenting sites in the city through different seasons, visiting the American Folk Art Museum (and others) in NYC.

The project developed into a critique of the critique, referring to the ocularcentric critique. This critique argues that vision has been the focus of architects and designers at the exclusion of the other senses. This critique is a point of departure for my work, which seeks to add a new layer—through a study of the links between the senses (intersensoriality) as they occur in the experience of architecture. I have identified a number of key moments in architectural experience that highlight these links and provide a venue for experimentation (moments when a number of the senses are at play). Together with a number of threads and supporting ideas, the design portion of the project tests materials, forms and conditions in order to bring the links between the senses into focus. This design research is contained within my proposed, small addition to an existing branch Library on Queen Street West.

-Michael Blois

Acknowledgements

I would like to begin by thanking my family, David, Diane and Matthew Blois for their support throughout the process of working on this project. I would also like to thank my girlfriend, Lisa Milne for her patients and moral support over the past year. I would like to thank my classmates who have also been working tirelessly on their own projects. Their critiques, suggestions, precedent references, distractions and studio culture have all contributed significantly to the project as a whole. A special thank you to my project supervisor, John Cirka. Our weekly discussions were a highlight during this process. The breadth of his knowledge on this subject provided me with a comprehensive scope of reading material and perspectives. I especially appreciated his commitment to my project and the high standard of quality that he held it to. Finally, I would like to thank my committee members, Colin Ripley and Adrian Blackwell for their insightful and challenging critique.

Dedication

for Lisa

Contents

| | |
|--|------|
| Abstract | v |
| List of Figures | xiii |
| Introduction | 5 |
| Background information | |
| In Search of a Corporeal Architecture | 11 |
| A sensory approach | |
| The critique of the critique | |
| Understanding the senses | |
| [Landscape vs Geography] | |
| A strategy of intensities | |
| [Studies] | |
| The garden analogy | |
| Transitional elements | |
| Case study | 43 |
| Revealing Sensory Connections | 59 |
| Approaches | |
| Narrative | |
| Sensory connections & conclusions | |
| References | 101 |

List of Figures

Fig. 1.1 Dome over Manhattan.

Buckminster Fuller. <www.bfi.org/slideshow-images/dome-over-manhattan-1960>

Fig. 1.2 Ranges of the Senses.

Malnar, J. M., Vodvarka F. (Eds.) (2004). *Sensory Design*. p.151.

Fig. 1.3 The Perceptual Systems.

Gibson, J. J. (1966). Senses considered as perceptual systems. p.25.

Fig. 1.4 A sketch, the District School Center.

Valeriano Pastor. In *Body and Building: Essays on the changing relation of body and architecture*. p.267.

Fig. 1.5 The Pantheon. Photograph.

Malnar, J. M., Vodvarka F. (Eds.) (2004). *Sensory Design*. cover image.

Fig. 1.6 The Sauzet Home.

Sauzet, M (unknown). *Sensory Phenomenology as a Reference for the Architectural Project*. p. 157.

Fig. 1.7 Chapel of St. Ignatius. Photograph.

Malnar, J. M., Vodvarka F. (Eds.) (2004). *Sensory design*. Photo insert, plate 10.

Fig. 1.8 Japanese Tea Garden.

Kondo, Dorinne (2005). *The Way of Tea: a symbolic analysis*. In Howes, David (Ed.). *Empire of the Senses: The sensual cultural reader*. p.196.

Fig. 1.9 Alvar Aalto. Villa Mairea. Main Stair.

<<http://caad.arch.ethz.ch/aalto/description/villa/photos/>>

Fig. 2.1 American FolkArt Museum.

Photograph by M. Blois (2010).

Fig. 2.2 American FolkArt Museum.

Photograph by M. Blois (2010).

Fig. 2.3 Three-Dimensional Section Slice.

Base Drawing traced from <www.twbta.com/#/2649>

Fig. 3.1 Therme Vals.

Weston, R.(2004), *Plans, Sections and Elevations*. p.204.

Fig. 3.2 Therme Vals Stair.

Weston, R.(2004), *Plans, Sections and Elevations*. p. 204.

Fig. 3.3 Plan Drawing.

Weston, R.(2004), *Plans, Sections and Elevations*. p.205.

Fig. 4.1 Photograph. Centennial Library.

Canadian Architect. Vol.51 (9) p.42.

Fig. 4.2 Photograph. Centennial Library.

Canadian Architect. Vol.51 (9) p.46.

Fig. 4.3 Three-Dimensional Section Slice.

Base Drawing traced from Canadian Architect. Vol.51 (9) p.45.

Fig. 5.1 Rendering. Circulation Spine.

<www.officeda.com>

Fig. 5.2 Rendering. Exterior.

<www.officeda.com>

Fig. 5.3 Three-Dimensional Section Slice.

Base Drawing traced <www.officeda.com>

Fig. 6.1 Seinajoki Library. Photograph.

The Architect's website, <bdonline.co.uk>

Fig. 6.2 Seinajoki Library. Photograph.

The Architect's website, <bdonline.co.uk>

Fig. 6.3 Plan Drawing.

Weston, R.(2004), *Plans, Sections and Elevations*. p.149.

Fig. 7.1 St. Ignatius. Photograph.

<www.stevenholl.com>

Fig. 7.2 St. Ignatius. Photograph.

<www.stevenholl.com>

Fig. 7.3 Plan & Section Drawings.

Weston, R.(2004), *Plans, Sections and Elevations*. p.227.

Fig. 8.1 Ronchamp. Photograph.

Weston, R.(2004), *Plans, Sections and Elevations*. p.104.

Fig. 8.2 Ronchamp. Photograph.

Weston, R.(2004), *Plans, Sections and Elevations*. p.104.

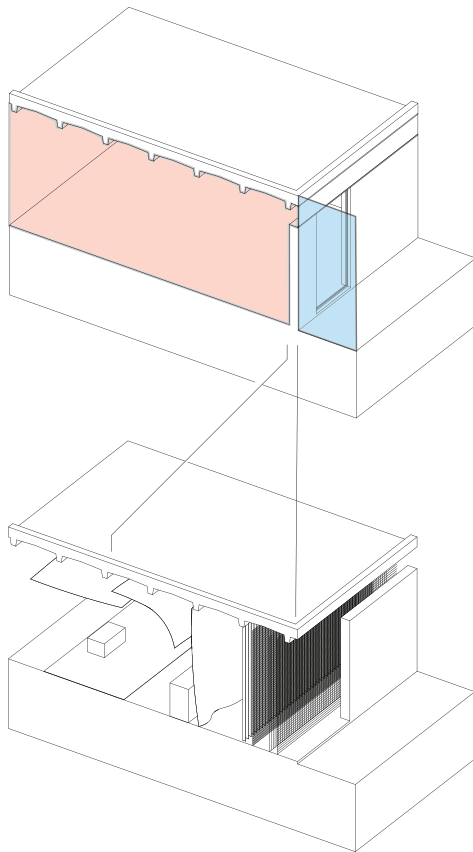
Fig. 8.3 Site Plan & Plan Drawing.

Weston, R.(2004), *Plans, Sections and Elevations*. p.105.

does this
text have
a smell, a
texture or a
taste? can
you hear it?

In much of contemporary architectural theory and practice, discussion of the body is reduced to a functional and anthropometric consideration. In addition, an unintended consequence of our highly conditioned and controlled indoor environment is a disconnected relationship between our bodies and our environment.

Building envelope as separator or as mediator?



standard interior exterior separation

VS a layered separation

The senses.

Each of the basic five are more accurately described by a larger set of perceptual systems that relate to more specific phenomena. The basic orienting system, the auditory system, the haptic system, the taste-smell systems, and the visual system.

**There are strong linkages
between the senses in our
perception of architecture.**

An architectural method that
expresses and brings focus
to these connections offers the
opportunity for the body to
engage with architecture.

Introduction

The philosophical alienation of the body from the mind has resulted in the absence of embodied experience from almost all contemporary theories of meaning in architecture. The overemphasis on signification and reference in architectural theory has led to a construal meaning as an entirely conceptual phenomenon. Experience, as it relates to understanding, seems reduced to a matter of the visual registration of coded messages—a function of the eye which might well rely on the printed page and dispense with the physical presence of architecture altogether. The body, if it figures into architectural theory at all, is often reduced to an aggregate of needs and constraints which are to be accompanied by methods of design grounded in behavioural and ergonomic analysis. Within this framework of thought, the body and its experience do not participate in the constitution and realization of architectural meaning.” (Gartner, 1990, in Frampton, p. 304)

There is a growing disconnect between the body and architecture, especially in this digital age. Computerized methods of architectural production are often seen as an end in and of themselves, rather than for their true role as tools to achieve a desired result. Many current architectural theories are self-referential and focus on architecture as image. One might extend this to demonstrate that the relationship

between the body and architecture has changed drastically in recent years. For example, if we were to begin to move through our built environment on reclined, floating scooters, and computer and robotic systems eliminated the need to directly engage with buildings, this condition would represent a new relationship between architecture and the body. However this potential future portrayed in the popular Disney film WALL-E is not a reality; we continue to walk through our buildings, coming into contact with their materials and experiencing the effects of their spatial qualities. Furthermore, the compelling nature of architectural renderings and computer-generated form have captured the attention of architects and architecture students. This reality often moves the focus away from a more detailed and experiential consideration of materiality.

In addition to the current focus of architectural theory, building technology has, and continues to homogenize our sensory relationship with architecture. The interior environments of buildings are numb to the changing and dynamic character of the city

and the outdoor environment in general. As a result, when we move through buildings we do not often think about the effect that materials, spatial configurations and the overall construction have on our experience. However, in moments of contrasts, extremes and the unique, one often finds oneself reflecting on that particular situation. *This floor feels rough, and its incline is forcing me to move slower and perhaps to notice tension in my muscles and the way I am moving through the space.* It is in this, haptic, way that we develop an understanding of the space itself—a judgment of depth, distances and an idea of how long it may take us to move from one location to another. Technology and advancements in construction methods have allowed for interior environments to be strictly controlled and maintained in a way that is almost completely independent from the varying conditions outside. This is not to suggest that these advancements are without their advantages; but along the way, our connection to the daily cycles, varying conditions, moments of intensity and calm have been lost to a neutral and constant condition. While outside, one is aware of one's body and its comfort in an intense way. Traditionally, architecture played the role of the mediator between the fluctuating exterior conditions and a more steady and protected interior. More recently, this role has changed to become that of a separator between two distinct conditions. These relationships and issues are not intended to be interpreted in the romantic sense that we should abandon current practices and move back into vernacular building types. This thesis is instead suggesting that we can experiment with materials and spatial configurations in architecture, in order to re-establish connections between architecture and the body.

The first step in this experimentation is to understand the means by which we 'sense' architecture. Our senses provide us with information about our surroundings which we use to construct our understanding of a place through cultural modifiers, prior experience, personal preference and contextual issues. The senses are the receptors through which we gain all of our knowledge about our surroundings. The senses work together to form this understanding; as many of the things we see are reinforced by also hearing them, touching them and so on. In the section titled *The Senses*, this thesis looks at the work of J.J. Gibson to establish a broader definition of the senses. From which point focus is placed on discussing the links between the senses—specifically the visual and the haptic systems, with the others playing a supporting role.

What does one gain from considering sensory experience? Every building is experienced, it has a particular quality, it expresses something about its making and its sensory character. This in itself is something that is fascinating to study; however it does not necessarily lead to any architectural conclusions. Therefore, it is necessary to establish a strategy for the links between the senses to be explored through architecture. This strategy centers around the idea of intensity. Our sensory system perceives the world in intensities. Everything from small details to those that are overpowering are processed and perceived according to their intensity (Deleuze, 2003). This thesis aims to reestablish the full range of sensations with which we experience the world, within an architectural context.

To begin discussing this line of thinking, the following paragraphs briefly introduce the major sections of this thesis project and speak to its overall intention. The opening section, titled *In search of a corporeal architecture*, is the first window into this area of research and it is structured to support this thesis and to set up a strategy for addressing the design stage of the project. The opening section is divided into subsections, the first of which asks: why should we take a sensory approach? Anthropologist David Howes has been working within a sensory approach to study cultures and societies and he believes that a new dimension and understanding is gained through this perspective. He has written extensively from this perspective and has demonstrated how this approach is finding its way into a number of other disciplines. In addition to providing a new perspective, a sensory approach acts as a counterpoint to many other approaches that do not take human experience into account. Within this perspective the central architectural theory that has emerged is the ocularcentric critique. This is a critique that has been leveled at contemporary architecture for its clear focus on the visual, to the exclusion of the other senses. Architects who are closely linked with a phenomenological perspective have been leading the way in this discussion. Architects, theorists and educators such as Juhani Pallasmaa, Steven Holl and Peter Zumthor argue for a materially rich and sensuous architecture that finds inspiration in human form and experience. There is a tremendous value to this critique; however in light of the fact that many other architectural theorists have taken issue with it, there is an opportunity to add a new layer to the critique. Keith Mitnick concisely articulates the issues by stating,

What could it mean to amplify the sensorial dimensions of architectural experience when all materials and phenomenal effects exist everywhere in equal measure? Would it mean ... handcrafted details and irregular materials? Such characteristics may be desirable, but they are no more or less immediate than anything else. (pp.62-63)

To this end, there is a large body of research that demonstrates a strong connection between the senses in the formation of our perception, more specifically the connection between the tactile and the optical senses. Expanding the critique to recognize the connection between these senses allows for a more thorough understanding of how we experience places, and in doing so provides more opportunities to respond to that experience. The senses act as systems, made up of a finer grain and more specific functioning receptors. The body of the project discusses a strategy for giving expression to the connection between the senses within architecture.

The strategy begins with an examination of body-image vs. body-looks. Body-looks refers to devices such as proportioning systems or forms that represent the shape and dimensions of the body in architecture. By contrast, body-image refers to the comprehensive understanding that we have about how our body functions in the world (Frasconi, 2002). This complete understanding includes issues such as the body's movement through space and levels of comfort. A consideration

of architecture that recognizes body-image over body-looks already begins to move toward a sensorial architecture. Thus, it is necessary to address the full range of human experience and movement in order to allow the body to factor into architecture. Within this framework, a number of examples outline the ways in which this more full connection can take place. *A Symbolic Analysis of the Japanese Tea Ceremony*, an essay collected in Howes' first edited book, demonstrates how the built aspects of the garden serve to reinforce crucial moments in the ceremony itself. Moments of transition are highlighted and some of the more transient elements of the garden are emphasized through a connection between inside and outside with a focus on particular elements of the garden as they relate to the ceremony.

The strategy of spatial configuration enters into the discussion through the work of Maurice Sauzet who developed a sensory approach to architecture after studying in Japan. His study of the path to the temple and its processional qualities prompted him to focus on the path that people take as they move through a building. This strategy is further developed in the project through an examination of the work of Alvar Aalto as a precedent for a focus on materials and their placement relative to their location in the building.

The precedent study combines a diagramming exercise with a written component in order to fully explore each example, and acts as a means to transition between the research and design phases of this thesis. To begin thinking about this topic through an experience-based lens, the documentation of a site on University Avenue, in Toronto, examines the experiential qualities of that place. Traditionally, architects rely on abstract means of documentation and analysis to understand a site. However useful these methods are, they do not accurately portray all of the significant information about the site. It is the transient conditions, the "atmosphere" of the place, to quote Peter Zumthor, which give the site a character that can only be experienced. Through site visits, photography, diagramming and research into the site's history a more complete understanding of the site is revealed. Finally, the design work tests and refines the strategy developed through the research and concludes in a text and image-based proposal that seeks to give expression to the connections between the senses.

Background information

This section aims to define the territory of this thesis project through a brief discussion of some of the primary architects and artists who have demonstrated an interest in this area. A lecture delivered by Peter Zumthor titled *Atmospheres. Architectural Environments. Surrounding Objects*, which was later turned into a publication, provides an appropriate introduction to this section. "Quality architecture to me is when a building manages to move me" (Zumthor, 2006, p.11). The quality that Zumthor attributes to a building's ability to move him is its atmosphere. The first impression of the building, how it responds to its context, to the senses, and the atmosphere that

is created by the changing and more transient elements of the place. He encourages his students and architects alike to listen to the building, feel the temperature of the space and experience the thresholds between inside and outside, and between levels. Approaching architecture from the perspective of experience offers the potential for buildings to thoroughly engage the senses.

The work of artist David Rokeby also explores the experience of built space and the effect of transient elements on one's perception. His installation, *Machine for Taking Time* documented an area of downtown Montreal every day for an entire year. Cameras panned around the scene, recording the changes that took place throughout the seasons. The images were then played back as an animation, panning around the downtown, with each image jumping back and forth in time. The same area of the city would be compared to its counterpart in a different season and it became clear that the atmosphere of that particular site or building had changed significantly. Along similar lines, his long time collaborator Michael Awad has attempted to highlight the importance of these transient conditions through unique methods of photography. He has brought attention to these elements through the use of a photographic technology that captures only objects in motion, and through a photo series documenting the changing streetscape of Toronto. His most famous photograph *Chinatown* captures the moving objects in the scene, including pedestrians, cars and streetcars while the buildings do not appear in the image. This image brings awareness to the way in which temporary conditions, environmental factors and one's vantage point impact the perception of a place. In addition, the still photo itself extends the duration of those events and allows one to understand their impact.

Within this context of an increased awareness of experience and the way a place is perceived, a number of architects have been experimenting with materiality and spatial configuration. One such contemporary approach to this area is to express phenomena; to frame something that is taking place, to display it and to in some way allow it to become a part of the architecture. Philippe Rahm is an example of an architect who operates in this manner. His current research and installation work seeks to architecturally express the forces of air movement, energy transfer and bodily processes. Each installation isolates one of these conditions and creates an 'atmosphere' that brings an awareness to these processes through an approach that sits between art and architecture. In fact, much of the experimentation in this area operates along the line between art and architecture. Architects that will be studied in this thesis include, but are not limited to, Alvar Aalto, Peter Zumthor, Tod Williams Billie Tsien, Patkau Architects, Le Corbusier, Herzog and de Meuron, and Steven Holl.

In search of a corporeal architecture

A sensory approach

"An intense new focus on the cultural life of the senses is sweeping the human sciences and crossing over into other disciplines, including architecture and urban studies" (Howes, 2005, p.322). In this shift, "the senses constitute not so much a new field of study as a fundamental shift in the mode and media we employ to observe and define our own fields of study" (Zardini, 2006, p.22). David Howes is an anthropologist who conducts his research at Concordia University, and has published widely on the role of the senses in the development of human societies and cultures. He has proposed an *anthropology of the senses* in which he examines sense experience in a variety of cultures. In different cultures, there are variations in the emphasis placed on each of the senses. Howes goes on to explain that he "is also concerned with tracing the influence such variations have on forms of social organization, concepts of self and cosmos, the regulation of the emotions, and other domains of cultural expression" (as cited in Malnar & Vodvarka, 2004, p.53). Through this alternative outlook, Howes has developed a body of sensory research; a large portion of which is

applicable to design. He makes the argument that an ocularcentric study of the world does not fully explore all of the issues at play, but if one takes into account all of the modes that humans use to experience the world, a more complete understanding can be achieved. While specifically discussing architecture and the senses Howes concludes,

By foregrounding the role of all the senses as mediators of experience, and exploring how different people bring their senses to bear upon the urban environment in culturally conditioned...ways, sensory ethnography provides a vibrant means for architects and planners to enhance their sense of the polysensoriality of the city...
(p. 330)

Within the realm of architecture, an ocularcentric critique has formed that questions the lack of consideration for human experience in the creation of architecture. Juhani Pallasmaa is a Finnish architect, educator and theorist who is at the forefront of this critique. He posits that contemporary, visual culture has devalued the importance of all of the other senses in architecture.

Architects are only concerned with how a building looks in a photograph or a computer rendering and the dynamic visual environment that can be created through computer modeling. Pallasmaa states that, "in turning into a specialist profession, architecture has gradually detached itself from its intentional background, becoming a discipline which is more and more fully determined by its own rules and value systems" (1996, p.448). He further argues that the only means of artistic expression that finds its way into architecture is a play of forms; and this focus on form has little connection to the way in which architecture is experienced (Pallasmaa, 1996). Artistic expression is concerned with experience and a relationship between the creator and those who experience the work. Throughout much of his writing, Pallasmaa argues that architects must rank the importance of human experience at a higher level than self-referential modes of architectural thinking.

In discussing the senses, Pallasmaa states that the senses "'think' and structure our relationship with the world" (2009, p.17). This 'thinking' process involves the processing of sensory data with the influence of prior experience, cultural modifiers and preference factors. In many ways, the most influential authors on this topic are in agreement on the way that humans experience the built environment. In his latest writing, Pallasmaa brings a new viewpoint to the topic as he examines the role of the hand and craftsmanship in the experience of the built world. This notion becomes very useful when thinking about the design process and the crafting and sequencing of materials and spaces. The craftsman understands the material, the method and the way to bring out the beauty of that material. Pallasmaa argues for the value of physical models (in our digital age). "The three-dimensional material model speaks to the hand and the body as powerfully as to the eye, and the very process of constructing a model stimulates the process of construction" (2009, p.57). Within this ocularcentric critique, Pallasmaa and his contemporaries declare the need for a hands-on approach to architectural thinking that centers on the body's experience of the built world. "A strong architectural experience always produces a sense of loneliness and silence irrespective of the actual number of people there or the noise" (Pallasmaa, 1996, p. 452).

In support of Pallasmaa's critique and as a means to explain why the senses have largely been left out of architectural thinking, Jim Drobnick (2005) discusses the 'white cube' or museum and gallery architecture that is devoid of a significant sensory experience. Drobnick's essay appears in *Empire of the Senses*, and it examines the cultural and political ambitions that lie behind the omission of sensory stimulation in the civic architecture of the last 100 years or so. Our built environment has become sterile and devoid of odours and textures, and surfaces have been leveled to ensure accessibility. The author believes that this reality has "its roots in the deodorizing campaigns of the late eighteenth century, and this 'olfactory intolerance' has continued in earnest ever since, widening its scope from urban and public spaces to interior and domestic domains" (Drobnick, p.266). These campaigns were a part of the "civilizing process" in which the lower classes were subjected to "the development of manners" through their interaction with the arts

(Drobnick, p.266). According to Drobnick public buildings, including museums and galleries have long had the responsibility of “disciplining and disinfecting the subordinate classes” (p.267). As these building types are open to anyone naturally there is a mixing of classes, and historically the lower class has looked to these encounters to develop an image of a life in the upper class (Drobnick). “The rationale of hygiene as a tool for social engineering and/or exclusion is one that continues to this day; advocates for the homeless must continue to go to court to protect access to libraries and other public places” (Drobnick, p.267). With this social role of public buildings in mind, what place do the senses have in these environments, and can they be engaged without negating this ideal? Or perhaps the theory that a short stay in a public building will somehow transform an individual or cause them to aspire to a ‘more civilized’ lifestyle is a flawed model



Figure 1.1 Dome over Manhattan.

in itself. Despite the possible conclusions, it is necessary to respect the history of this practice and ensure that the addition of a meaningful sensory experience does not impair a building’s ability to serve society in this way. The work of Buckminster Fuller can be used to draw a parallel to this sensory deprived environment. His utopian idea for a dome over Manhattan, Figure 1.1, dramatically highlights the ambition to control our built environment and separate it from changing weather conditions. The advent of air conditioning certainly intensified this separation; and has caused a disconnect between inside and outside.

To further expand on the topic of the ‘civilizing process’, a discussion about the birth of the streetlight in Paris provides additional insight into the late eighteenth century campaigns. The city, as experienced in darkness has been a topic of discussion through the centuries. Different aspects of the city are perceived at night and activities conducted in this dark environment are

understood to be mysterious, dangerous and perhaps illegal. This mysterious, dark environment has been the subject of mythology, such as that of the flâneur. This dangerous or uncontrollable notion of darkness in the city prompted authorities to illuminate Paris in the eighteenth century. In order to institute control over society, especially the lower classes, they must be seen. Initially, lanterns were mounted outside the door of a residence in order to illuminate the front steps of the home (Schivelbusch, 2005). Those who ventured out into the darkness of the city were required to bear a torch to announce their presence and to allow them to safely traverse the dark streets (Schivelbusch). Later, the government moved the lanterns from the individual homes to hang above the center of the street. This position was chosen for symbolic reasons, in that the roads are provided by the state and it was made clear who was in control (Schivelbusch). From this point on, the lantern evolved into a lamppost and eventually the city became fully illuminated at night. The mystery, adventure and nocturnal experience of the city were lost. This is of course not to negate the practical results of this illumination but instead to highlight the contrast in the experience of the pre-modern city. A lack of contrast is a common reality of the contemporary city and its interior conditions; for example, homogenous lighting washes out many of the subtle and experiential elements of the space. The importance of this contrast is clear if one thinks of the power of film to engage the imagination with its out-of-focus and often ambiguous backgrounds. In describing the experiential quality of an Islamic courtyard, Frampton describes,

the sum experience of which is affected by the movement of air or by relative humidity, or by the intensity of light or darkness, heat and cold, or by the aroma of material, or by the most palpable presence of enclosure or by the body's own momentum, gait and weight as it passes in and out of the domain. (1988, pp.11-12)

There is a wealth of literature and discussion about the way architecture is experienced. This writing can also be supplemented by one's own experiences and memories. Without applying to much thought to the subject, it is clear that the senses play a substantial role in our experience of architecture and more specifically, have the ability to stimulate profound experiences. Throughout this section it has become clear that a sensory approach to understanding our modes of cultural expression has a strong potential to combat sensory deprivation in architecture. One such exploration from this perspective is the study of the sonic experience of the library, put forth by Shannon Mattern (2007). Her approach serves to conclude this section and to introduce the discussion of how the senses can be addressed in architecture.

In her approach of "designing the sonic experience", the major concern is the relationship between different forms of media and the users of the library (Mattern, p.160). Each form of media, books, audiotapes and films, requires a different type of space for their viewing. The proximity between these separate zones is also important in determining the acoustic quality of the spaces.

A further layer of this study is the discussion of the use of the space, that the quality of the space or the design cues should communicate to the user what type of activity should take place within a given area. This concept is referred to as “conditions of attendance” in which it is understood that different forms of media require or benefit from particular conditions (Mattern, p. 150). For example, a “dark environment with little ambient noise” is appropriate for viewing a film (p. 150). And in such a space it is understood that one should be focused on the film, and should not be talking loudly, for example. In the design of a sonic experience, Mattern poses the following questions:

How do the physical spaces of the library and the media in its collection sound? How do the relationships between librarians and patrons, and among patrons themselves, sound? How do both people and media make the architecture resonate? How is the ear engaged when the hum emanating from a pod of copy machines invades an otherwise peaceful reading room? What happens when laughter erupts from children’s story time, enlivening the activity of the lobby, then spirals up through the atrium, reaching the ears of scholars in the special collections? What are the poetics of these breaches of spatial closure—and how can they be acknowledged and dealt with pragmatically? (p. 153)

Although this example seems to be quite specific to the sonic environment, it outlines the overall purpose of this study; one must look beyond the functional requirements of programming, materials, etc. to address the experience of architecture. As Howes and Pallasmaa suggest, much can be gained from a sensory approach. Our understanding of places can be enriched, connections can be reestablished and architects can create environments that engage the senses.

A critique of the critique

The majority of phenomenological and experience-based critiques of contemporary architecture focus on the issue of ocularcentrism. This term refers to the predominately visual nature of contemporary architecture and the way it is portrayed in the media. This critique hinges on the position that architects, students, and schools of architecture privilege the visual aspects of their work, not only in the presentation but also in the conception of architectural projects. As previously suggested, our experience of architecture involves all of the senses in combination to construct an understanding of a place. In this critique, it is argued that all of the senses should be given consideration in architectural design. This is a reasonable statement, however it neglects a large body of research that indicates that the senses, specifically the haptic and visual systems, are strongly linked. This strong link suggests that the visual system and its prevalence in architecture is not necessarily a bad thing since many of the other perceptual systems are also at work. Using this

information, this section and the following section seek to expand and focus the existing critique and begin to frame the position taken in this thesis.

Before unpacking this issue it is necessary to briefly introduce J.J. Gibson (1966), whose book *The Senses Considered as Perceptual Systems* acts as a background for much of the writing on this topic, and on our understanding of the senses in general. Gibson theorized that the five senses are more accurately described as systems, in which minor senses combine together. A more full discussion of his work will take place in the next section, and for now it is only necessary to understand that the senses operate as systems. His work initiated the more recent discussion on

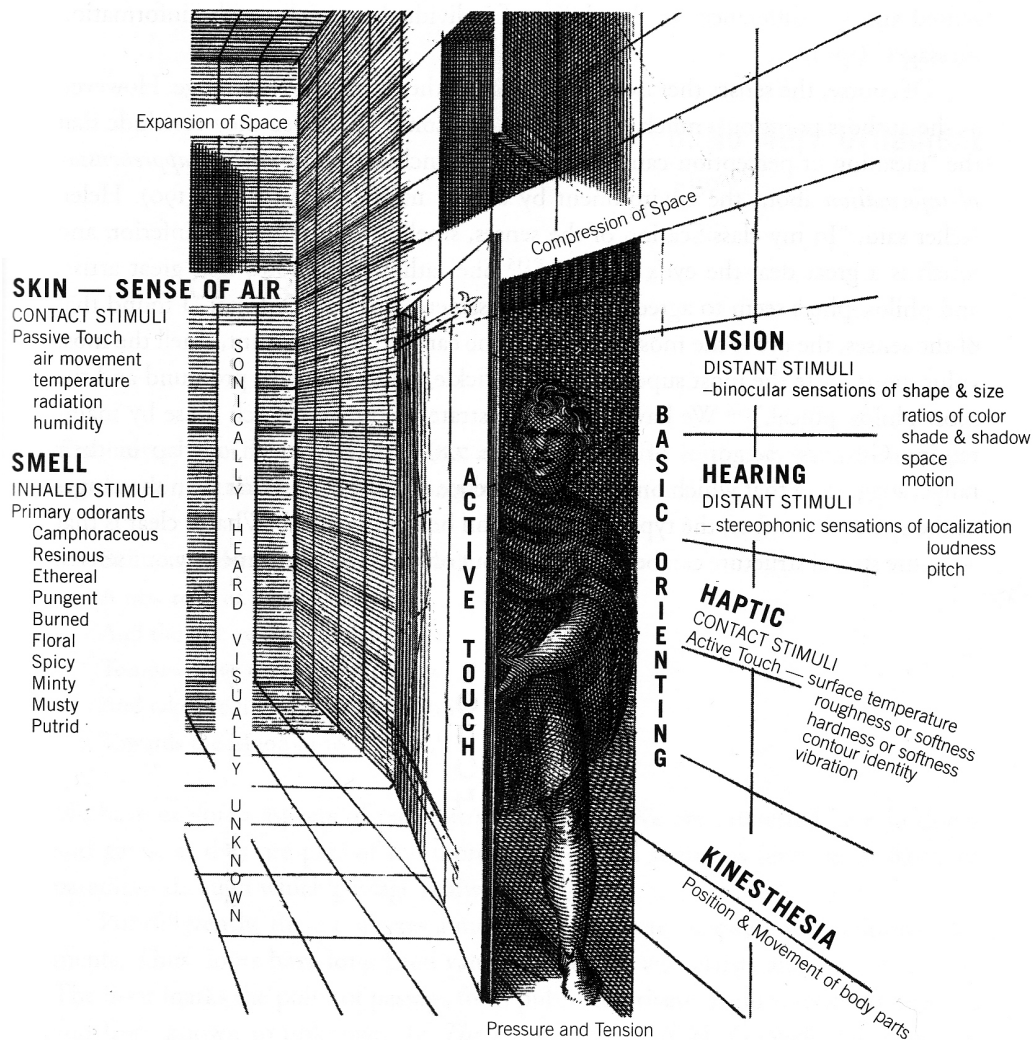


Figure 1.2. Ranges of the Senses.

the connections between the senses. “Touch and vision in combination often yield a redundant, doubly guaranteed input of information” (Gibson, p.53). This statement introduces the theory that the sensory systems are closely connected and work together to create a full picture of the world. The Visual System collaborates with all of the other systems to register information about objects through the medium of ambient light (Gibson). Movement, depth, texture, and colour are all detected through this system. The haptic and the visual systems are together responsible for spatial experience or the understanding of three-dimensional space (Gibson). “We may spot or recognize objects more easily if we hear a relevant sound at the same time” (Durie, 2005, p.36).

Figure 1.2 illustrates how these systems work in combination and have a direct connection to architectural experience. In this diagram, the systems are broken down and attached to architectural elements. The diagram depicts a scene in which a person is entering a space, has contact with a door and as the transition between the two spaces takes place, the text in the diagram describes the senses at play.

Looking deeper into these connections, an area of this study is involved with subjects who have a rare condition known as Synaesthesia that allows them to taste a colour or see sounds (Howes, 2006). In a less extreme case, synaesthesia refers to “bringing many or all of the senses into play simultaneously” (Howes, p.162). To append this definition, “Synesthesia points to the complexity of sensory ratios, the rich connections inherent in multiple sensation sources, the tingling resonances and bodily reverberations that emerge from simultaneous joint perceptions” (Feld, 2005, p.181). Howes offers the model of ‘intersensoriality’ in place of the term synaesthesia to extend this concept to recognize sense hierarchies, inherent in this mixing process (2006). For example, the character of wood is fully understood by viewing it and touching it to reveal its texture, by smelling and by hearing its acoustic properties within a space (Pallasmaa, 2009).

More evidence that supports how the connection between these two systems constructs our understanding of space comes in Deleuze’s discussion of figuration in painting. Our perception or understanding of the body in the painting is not only generated optically, “but take[s] on a sculptural or tactile quality (depth, contour, relief, etc.), producing the illusion of a three-dimensional world behind the frame” (Smith, 2003, p. xxv). This phenomenon is captured by the term *tactile-optical* space. We use cues provided by paintings, and to extend that argument images in general to construct an understanding of space that involves its tactile qualities. Deleuze develops this theory further to uncover colour as the critical element that renders this intention. The ‘haptic vision of colour’ refers to our sense of colours and “presents a strong eye-hand relation” (p.xxvi). In this, ‘haptic space’ visual references denote tactility, through depth, contour and relief, as previously mentioned (Smith). According to Deleuze, the paintings of Francis Bacon employ this strategy of colour, the “juxtaposition of pure tones arranged gradually on the flat surface” (p.xxvi). Through several examples, it has been made clear that the sensory systems work together, in some combination, to construct our understanding of the world. One only needs to look as far as the

surface in front of them to confirm this phenomenon. Without touching the surface, one can see its level of reflectivity or coarseness and will infer about how that surface would feel if they were to touch it. This haptic vision, in combination with prior experience, communicates the temperature, smoothness/roughness, hardness, as well as other characteristics.

Intersensoriality is interesting in itself however, it is not until Howes begins to discuss the cultural aspect of this model that it becomes useful architecturally. Within various cultures, the senses are associated with different experiences and groups. Howes provides the example, “the upper classes were customarily considered to be fragrant or inodorate, while the lower classes were held to be malodorous” (p. 165). This example can be quite powerful in the understanding of how we experience the built world. What sensory preconceptions do we hold about a particular environment or element of a building’s program, or about proximities between uses? Although these associations differ between cultures, there is likely to be a significant number of similarities, and a study of the implications of this model may hold some clues about the materiality and spatial configuration of a building (that create a positive sensory experience). To this end Howes explains, “a culture’s sensory order is also projected in its architecture” (p. 168). He compares the Inuit Snowhouse (Igloo) to the “modern bourgeois home” (p. 168). He cites Edmund Carpenter who states,

visually and acoustically the igloo is open, a labyrinth alive with the movements of crowded people. By contrast, the proliferation of rooms within the bourgeois dwelling has had the effect of privatizing what were once more social functions (the preparation and consumption of food, the elimination of bodily wastes, sleeping) by confining each to a separate compartment. (p. 168)

As Howes suggests, our choices (speaking about North America for this study) to organize our homes and other building types, in the way that we do has significant implications on how they are experienced through the senses. This expanded understanding of the senses has been explored in several architectural exhibitions, including *Sensorium* and *Sense of the City: an alternative approach to urbanism*. These exhibitions and collections of essays respond to the “focus on the cultural life of the senses” that Howes dedicates his research endeavours toward (2005, p. 322).

Sensorium (2006) collects the work of contemporary artists, practitioners and researchers who are exploring the role of the senses in our digital age. The interesting aspect of this work is that it falls into the realm of an artistic endeavour. It is a response or an exploration of the way we experience the world. And it asks, how can sensory experience be further understood or even enhanced through the use of technology, by ways of prosthetics, robotics and computer systems?

In *the Sense of the City* the introductory essay by Zardini follows the thinking of Howes, in that studies in almost all disciplines have shifted to focus on experience and natural phenomena.

Zardini traces this interest to the widespread concern for sustainability and ecologically friendly policies after the severity of the climate change issue became public knowledge (2006). This shift prompted a view of cities as ecologies, systems or landscapes or other terms that describe this approach to urban and architectural thinking (Zardini). This statement is significant because it outlines the importance of an experienced-based approach to design in this ecologically focused time. The collection of essays within *Sense of the City* seek a new understanding of the urban environment and “they suggest thinking of them as places for our bodies” (Zardini, p.24).

The research presented in this section has made a case for the consideration of all of the senses in architectural thinking. This work also expands the ocularcentric critique to acknowledge the system-based nature of the senses and the way in which they work together. A context for this study has also been established and now to provide a more full understanding of the senses, the next section explores the more scientific realities of the senses.

Understanding the senses

Without delving too far into the scientific or psychological arena, it is important to discuss the various positions that have been formulated regarding the human sensory system. It is valuable to contrast these approaches in order to better understand the conclusion that the authors have drawn who are presented in later sections. Malnar and Vodvarka “suggest that humans commonly experience three kinds of sensory response: first, an immediate physical response to stimulus; second, a response conditioned by prior knowledge of its source; third, a response to stimulus as it has become identified in one’s memory with a particular time and place” (p.21). This is referred to as sensory imprinting. The authors go on to explain that the first is an involuntary reaction, the second produces a variety of reactions based upon our understanding of its source and “the third, remembered sensation, is familiar” but not always reassuring (p.21). The critical aspect of the sensory response theory that the authors put forth is memory and its role in our understanding of the world.

Malnar and Vodvarka state that “sensory data in the perception of built space may seem obvious” however it is rarely a central consideration in the design process (p.41). Traditionally, this sensory data has been confined to the limited definition of sight, hearing, smell, touch and taste. However, that limited scope does not explain the full range of the human senses. There is a body of research on this expanded definition of the senses, in which J.J. Gibson has provided the most influential contribution. Gibson’s work is a benchmark in this field and many researchers, theorists, philosophers and designers reference his work to develop their own theories using his conclusions and terms as givens. The following excerpt from *The Senses Considered as Perceptual Systems* serves to define the ‘senses’ and outline the focus of Gibson’s book,

It has always been assumed the senses were channels of sensation. To consider them as systems for perception, as this book proposes to do, may sound strange. But the fact is that there are two different meanings of the verb to sense, first, to detect something, and second, to have a sensation. When the senses are considered as perceptual systems the first meaning of the term is being used. In the second meaning of the term there is a vast difference between sensations and perceptions... It will be suggested that the senses can obtain information about objects in the world without the intervention of an intellectual process—or at least that they can do so when they operate as perceptual systems. (1966, pp.1-2)

| Name | Mode of Attention | Receptive Units | Anatomy of the Organ | Activity of the Organ | Stimuli Available |
|----------------------------|---------------------|---|--|--|---|
| The basic orienting system | General information | Mechano-receptors | Vestibular organs | Body equilibrium | Forces of gravity and acceleration |
| The auditory system | Listening | Mechano-receptors | Cochlear organs with middle ear and auricle | Orienting to sounds | Vibration in the air |
| The haptic system | Touching | Mechano-receptors and possibly thermo-receptors | Skin (including attachments and openings), joints (including ligaments), muscles (including tendons) | Exploration of many kinds | Deformation of tissues, confi of joints, str of muscle fibers |
| The taste-smell system | Smelling | Chemo-receptors | Nasal cavity (nose) | Sniffing | Composition of the medium |
| | Tasting | Chemo- and mechano-receptors | Oral cavity (mouth) | Savoring | Composition of ingested objects |
| The visual system | Looking | Photo-receptors | Ocular mechanism (eyes, with intrinsic and extrinsic eye muscles, as related to the vestibular organs, the head, and the whole body) | Accommodation, pupillary adjustment, fixation, convergence exploration | The variables of structures in ambient light |

Figure 1.3. The Perceptual Systems.

In contrast to Gibson's approach, Malnar and Vodvarka have carried out their writing using the second meaning of the verb to sense. The inclusion of the "intellectual process" in this meaning refers to the three kinds of sensory response that Malnar and Vodvarka suggest humans experience. This definition is closest to the way architecture is experienced. However, Gibson's work is important because it expands the definition of the senses and provides an alternative

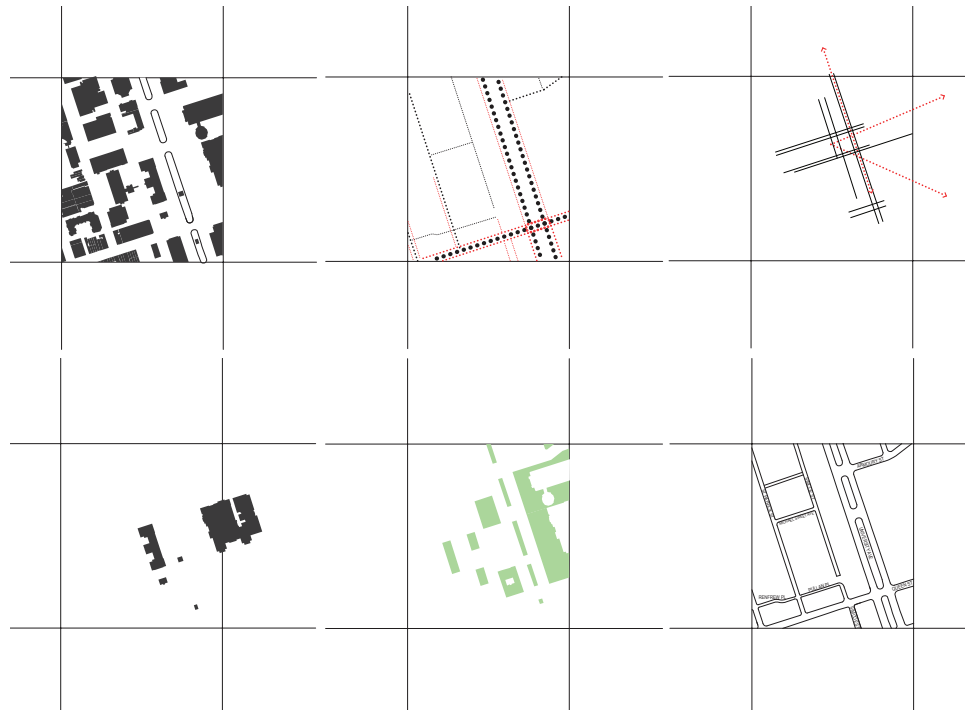
way of looking at the sensory system.

Figure 1.3 represents Gibson's five perceptual systems. These systems replace the traditional understanding of the five senses and suggest connections between them. The Basic orienting system is responsible for picking up gravitational and acceleration forces that lead to the creation of a frame of reference for all of the other systems (Gibson). The auditory system responds to vibrations in the air and is able to detect the direction of the source (Gibson). The haptic system is made up of a number of subsystems that refers to the sense of touch, and is extended to include "temperature, pain, pressure, and kinesthesia (body sensation and muscle movement)" (Malnar and Vodvarka, p.42). The haptic system is the system that is primarily used to describe the sensory experience of architecture.

Thermally, humans function within a finite range of temperature and relative humidity. Through a number of inventions and technological advancements, humans are capable of controlling the interior climate of our built environment with a high degree of accuracy. This level of control has effectively rendered our interior environments "thermally neutral" (Heschong, 1979, p.16). To this end, The American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) has been publishing standards for building codes that have determined our interior environments for over 50 years (Heschong). Heschong argues that there is a lost opportunity (resulting from standardization) that could allow for a rich, thermal interaction with our built environment. She draws a parallel to our nutritional needs; technically, humans could sustain themselves by consuming the "astronaut's nutritious goop" but this would "overlook the fact that it [eating] also plays a profound role in the cultural life of a people" (p.17). Furthermore, in our experience of the world, we enjoy and often seek out extremes. "The skier freezes on the slope, knowing all the while that the lodge waits down below with a roaring fire and some warming libation" (Heschong, p.21). The balance provided by the two thermal conditions in combination, allows humans to safely and comfortably enjoy both, knowing that the other condition awaits them (Heschong).

A somewhat tangential subject of haptic perception further explains the role of the senses in our experience of the world. In this study, O'Neil (2001) traces the haptic way in which ranchers come to understand their land. Much like working in a garden, the ranchers in O'Neil's study repair fences and rebuild barns and in doing so come to form their memory of a place based on physical actions.

In her article for the *Journal of Architectural Education*, O'Neil suggests that the focus on visual characteristics of architecture are reinforced in architectural education. Presentation methods and the visual way in which precedent studies are carried out "tend[s] to stress object rather than experience, and to elicit discussion, critique, and learning primarily on visual character" (O'Neil, p.3). She goes on to argue that students should be presented with a more complete representation of three-dimensional space and should have an understanding of how humans understand space.



THE LANDSCAPE VS. GEOGRAPHY APPROACH

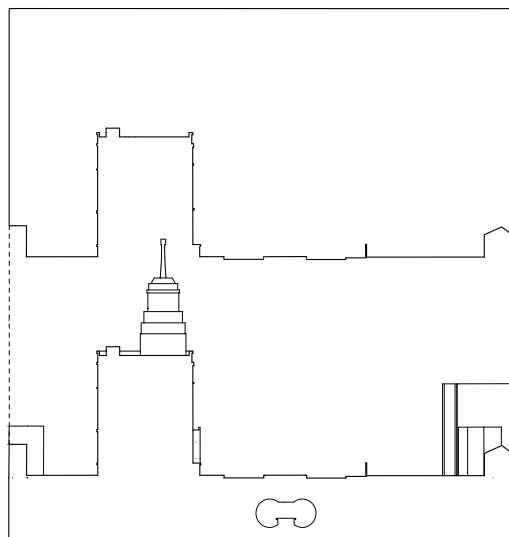
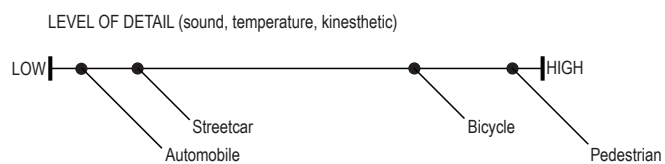
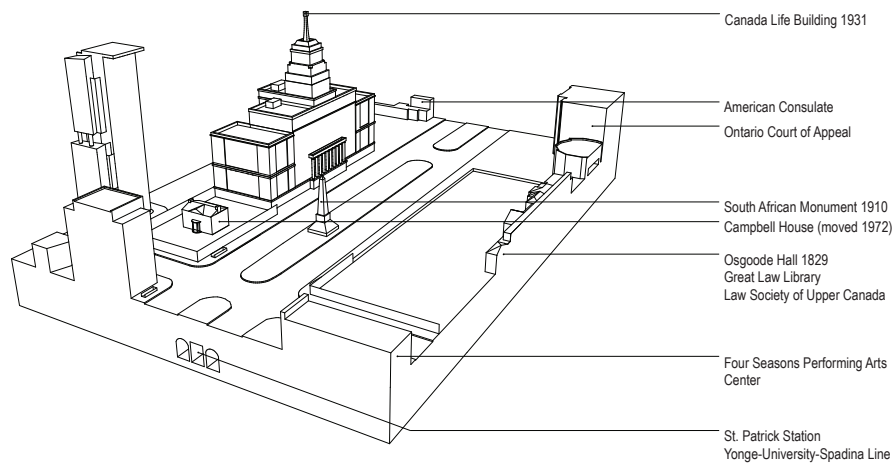
This approach is represented in the diagrams and photographs on the left side of the following three spreads. On these pages, traditional site analysis diagrams are contrasted with an exercise that uncovers the experienced aspects of the site. They are not intended to represent these elements as much as they are intended to highlight their role in the experience of a place. The photographic series also attempts to capture the significance of changing conditions throughout the year. The sun studies are seen as a method of analysis that crosses between the two approaches.

A process which takes place through “touch, positional awareness, balance, sound, movement, and the memory of previous experiences,” as we have heard from a number of other sources (O’Neil, p.4). Her research demonstrates this haptic perception through the study of a ranching community. In her study, she asked members of the community to describe the ranch that they had worked on all of their lives. The ranchers responded primarily with “verbs [such as] buried, cleaned, replaced, took out, reinforced, and set all indicated acts of work and physical activity, which suggest a haptic mode of perception” (O’Neil, p.5). In other words, they constructed their memory of that place through the physical activities they were engaged in. Lumber was hauled a certain distance, fences were repaired in certain areas, and barns were rebuilt in new locations on the site. From this information, O’Neil began drawing the plan of the ranch based upon the family’s stories and recalled memories. She then compared this plan to the actual one and found that the two were very similar. The path as a device for remembering a place emerged as a crucial part of the ‘family stories’ component of the study. Paths or routes traveled while carrying out work or while playing as a child yielded a wealth of information about the objects passed or engaged with along the way (O’Neil). Much of the plan was reconstructed through personal stories that recounted information about objects in this way. The important conclusion from this study is that in our highly visual and highly specialized world, we often forget the validity of personal feelings, emotions and the power of memory in our experience of a place.

A strategy of intensities

The title of this section refers to the means by which our sensory system responds to stimulus. It picks up intensities. Intensity can mean a variety of things, but in this study it is being used to describe a sensory experience that is something other than normal or neutral. It causes one to recognize the event or phenomenon taking place. These intensities may also reinforce particular points in the building: a transition between inside and outside, between rooms, between floors, etc. By extension, a strategy of intensities implies a desire to create a focus on these elements and events and to extend the duration of the experience itself. This section reviews a collection of literature that presents a means to achieve these goals.

Much of the architectural thinking about the body refers to “body-looks” (Frascari, 2002). In other words, when the body is considered in architecture it is imagined as a thing to be represented in the design. For example, a flowing curve or an arch inspired by the female body. This approach incorporates the look of the body into architecture but not the physical realities of the body. On the other hand, body-image refers to a “meaningful [image of the body] that is formed in the mind” (Frascari, p.260). This body-image represents the complete understanding that we have of our bodies and the way they operate in the world, beyond basic anthropometrics. Frascari explains this through the phenomenon of phantom limb, in which an amputee senses the limb



STREET SECTION: THE BUILT ENVIRONMENT VS. THE 'ATMOSPHERE' OF THE SITE

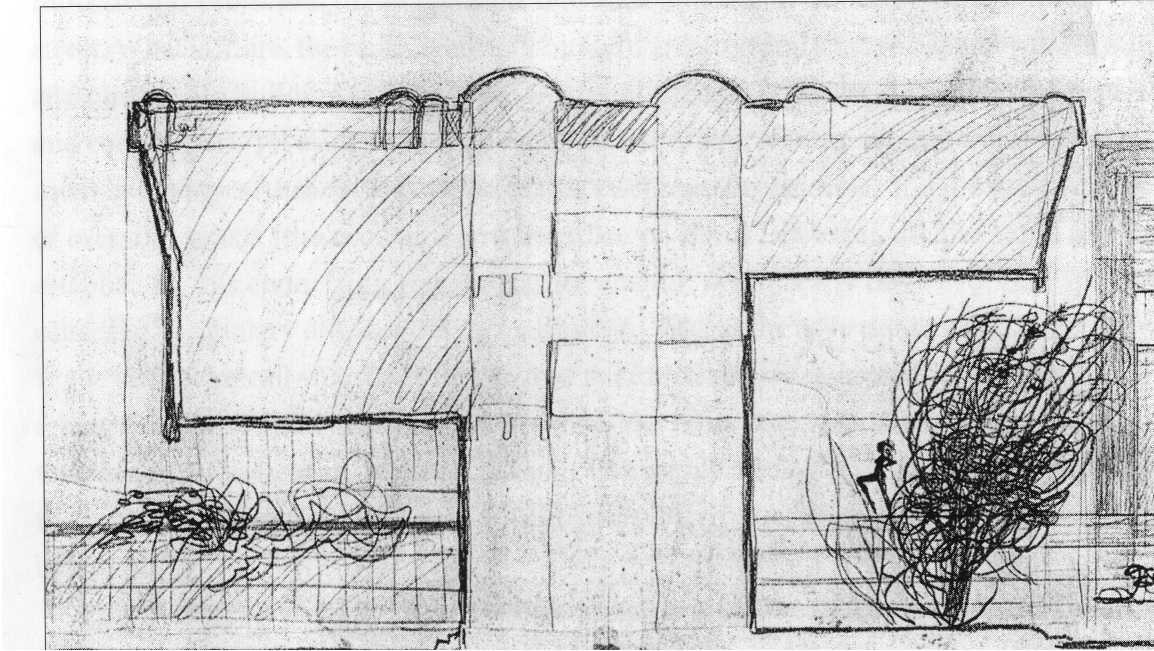


Figure 1.4. A sketch for the District School Center near Dolo.

is still attached and knows its position relative to other body parts. “Constructing architecture through body-image ensures that the imaginal force of human bodies is impressed, received, and vividly transmitted into the built environment” (Fascari, p.261). “Fascari argues the possibility of demonstrating a transmissible method for the incorporation of the body-image in contemporary projects” through an examination of the work of Valeriano Pastor, a student of Carlo Scarpa (Baird, 2002, p.26). In his work, Pastor begins his thinking with “corporeal mimes” or human figures that are demonstrating body postures that are common in everyday life; or demonstrating postures of a dancer or athlete (Fascari, p.266). These figures are present in all of Pastor’s architectural drawings and serve to demonstrate how body-image is a driving principle in his work. These figures are not added afterward to show scale, they are instead part of the early sketches and development of the project. Figure 1.4 demonstrates the correlation between the figure and the section of the building. The balance in the asymmetrical composition is derived from the balancing figure, in frozen motion.

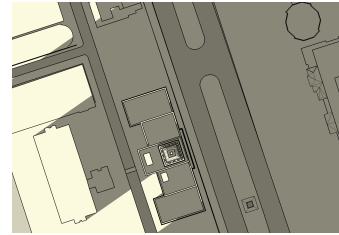
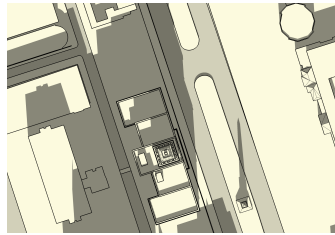
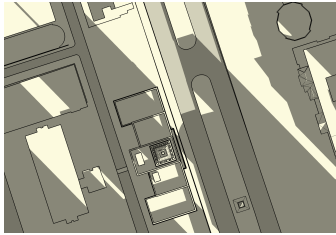
The topic of body-image is an appropriate way to begin this section because it represents a mode of thinking that locates the body at the center of a project’s architectural intention. Along with a discussion of Deleuze, the beginning of this section sets a frame of reference, in which to discuss the remainder of the ‘strategies’.

The translator offers an introduction to *Francis Bacon: the logic of sensation* that sheds light on the major concepts in the work and offers a broader picture of the book as a whole. This discussion

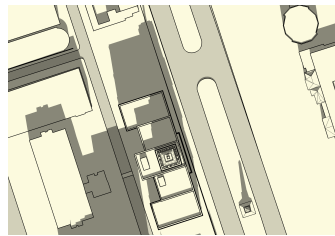
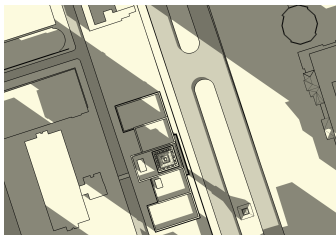
9 am

12 pm

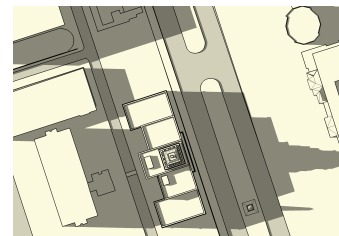
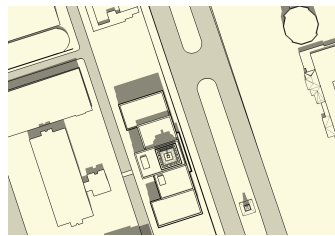
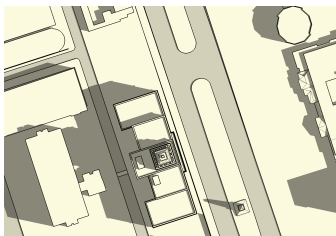
5 pm



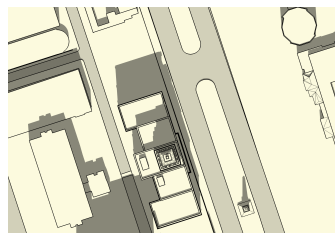
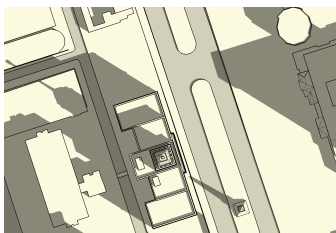
December 21



March 21



June 21



September 21

SUN STUDIES

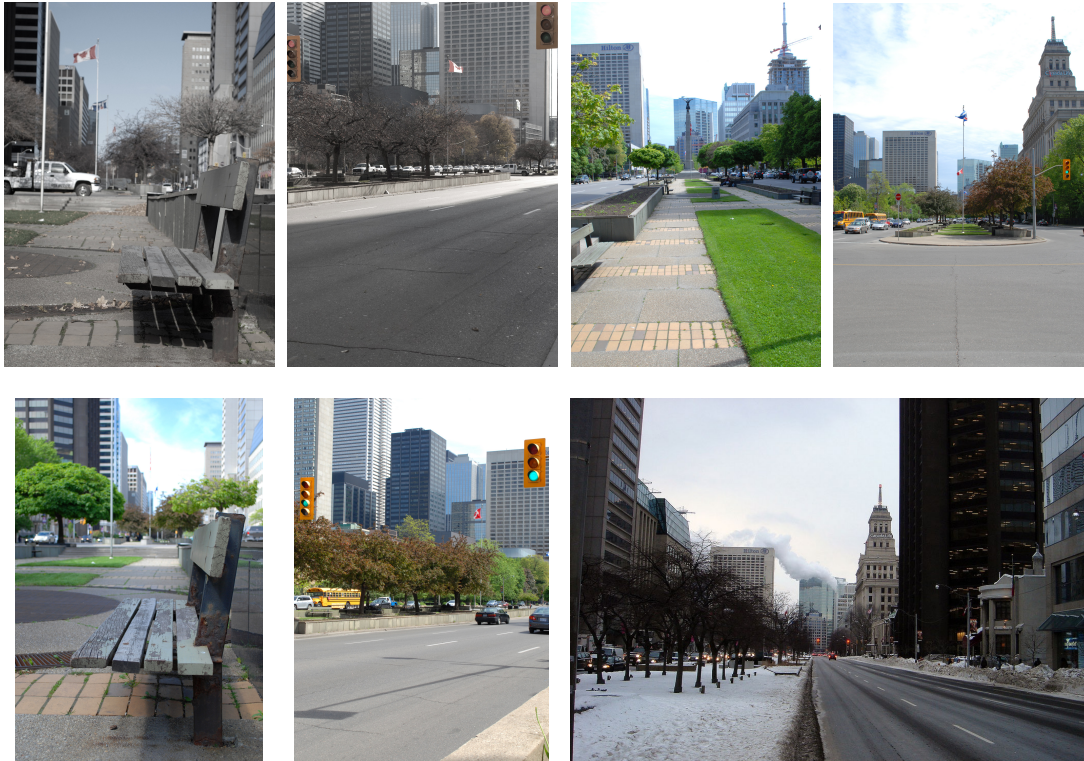
is only scratching the surface of Deleuze's work, however many of the concepts contribute a great deal to this project, and invite the possibility for elaboration later on. Of particular interest to this study are the concepts of landscape vs. geography and 'aesthetic comprehension'.

The geographical world, the world recorded on maps, is perceptual and conceptual; it is an abstract system of coordinates with an unspecified perspective. A landscape, by contrast, is sensory; it is a perspectival world, enclosed by a horizon that moves as our body moves. (Smith, p.xv)

These terms are further linked to sensation that refers to the direct, bodily response to a stimulus; and perception, which requires an abstract coordination of information. These are terms that appear in Gibson's work at the point where he defines the scope of his work and the alternate meanings of the verb 'to sense'. Landscape and geography coexist and it is the rhythm between the two that represent his 'logic of sensation' (Smith). This concept of rhythm continues with the term, aesthetic comprehension. This term describes the way in which an object is perceived



Figure 1.5. The Pantheon



A CHANGE OF SEASON

The landscape analysis of the site begins with the vantage point of the person experiencing the site and then moves into the history of the site, sun diagrams and seasonal changes. A site within the city does not exist as a static entity and it is not experienced as an abstract place with prescribed boundaries. Nor is the building that will occupy that site experienced as a fixed unchanging object. If this condition can be made more evident to the user, they will become more aware of these relationships and the means by which we understand them. Both of these approaches combine to provide a full understanding of the site and to identify opportunities for sensory engagement. *Due to a particularly dry winter, the photograph on the lower right is not my own—attributed to flickr user: IK's world trip.*

University Avenue is not the site for the design stage of the project, but instead it is a site that was chosen to illustrate this approach to site analysis.

or evaluated by a human being. He states that the 'unit of measure' by which we understand an object is not a fixed relationship. An example of a fixed relationship would be: that tree is 10 meters tall. Instead, the unit of measure constantly changes relative to the object being judged. The following example is provided, "this tree is as tall as ten men..." in turn, "that mountain is as high as twenty trees" (p. xvii). It is the rhythm between the unit of measure and the object that allows comprehension to take place (Smith). This theory contributes to our understanding of how we experience a place and offers insight into the act of designing. In the process of designing a space, it is both considered as an abstract system of coordinates, and a space that one moves through. It is also common to evaluate the size of the space one is designing by relating it to the size of the room one is in at the time.

What happens when this rhythm is broken? In this case, Deleuze offers 'the experience of the sublime' or the "experience of the formless or the deformed" (Smith, p.xix). When we are unable to locate the appropriate unit of measure for a given object, we are unable to comprehend its size. Deleuze provides the examples of viewing the vast ocean or looking up into the starry sky. There is a certain uneasiness associated with this experience, however it marks a break in our perception of the world. We become aware of the fact that we cannot comprehend the size of the object and then, as we look away, we become aware of the fact that by some means we are able to comprehend the size of everything else. I believe that it is this experience that conjures feelings of spirituality and moments of reflection. The grandeur of a cathedral or the oculus of the Pantheon come to mind, figure 1.5.

To continue this examination of the body in architecture, it is useful to consider proportion. In many ways, proportion has been thought to answer the question of how the body resonates in a work of architecture. Palladio put forth the argument about abstract proportion, that "those of the measurements are harmonies for the eyes" (as cited in Vesely, 2002, p.38). We understand that proportions are pleasing to us without really knowing why. Similarly, objects work well together in threes. There are a great number of proportioning systems, many of which have come from Greek thinkers. The Golden rectangle, the root rectangles the Fibonacci series of numbers and many others originate in nature; and they can be found in ancient and contemporary architecture. Le Corbusier sought to develop his own dimensioning system which he argued was based on the proportion of man. He called this system, the Modular. Le Corbusier's Modular is discussed in Perez-Gomez's essay in *Body and Building* as a comparison to the traditional approach to architectural proportion. Generally, proportions are drawn from the golden rectangle, as originally formulated by the Greeks. Proportion may also be developed through methods like unit to whole, or standard building material dimensions. Although these methods create a strong result visually, they are somewhat distant from our own proportions. This statement is supported by the previous discussion of body-image and aesthetic comprehension. Our understanding and bodily experience of dimensions and scale are dependant upon a constantly changing relationship

between the object and the unit of measure. In other words, fixed concepts like imperial or metric measurements and even a proportioning system do not play a major role in the process of aesthetic comprehension. Although, Corb proclaims that with a proportioning system derived from our bodies, “we can now ‘feel the intense joys of geometry’ with our senses” (Perez-Gomez, p.189). He enacted this proportioning system on the design of La Tourette Monastery, his final major project in Europe. There is no doubt that proportions are pleasing to the eye and encourage us to explore further, but statements such as the one above are not true of the way our perceptual system actually works. However, these tools are important and as long as they are not thought of as the means to connect the body to architecture, they should continue to be used in architecture. Once one has been attracted, the building must then deliver the sensory engagement that the pleasing proportions and compositions have promised.

In *Sensory Phenomenology as a Reference for the Architectural Project*, author Maurice Sauzet

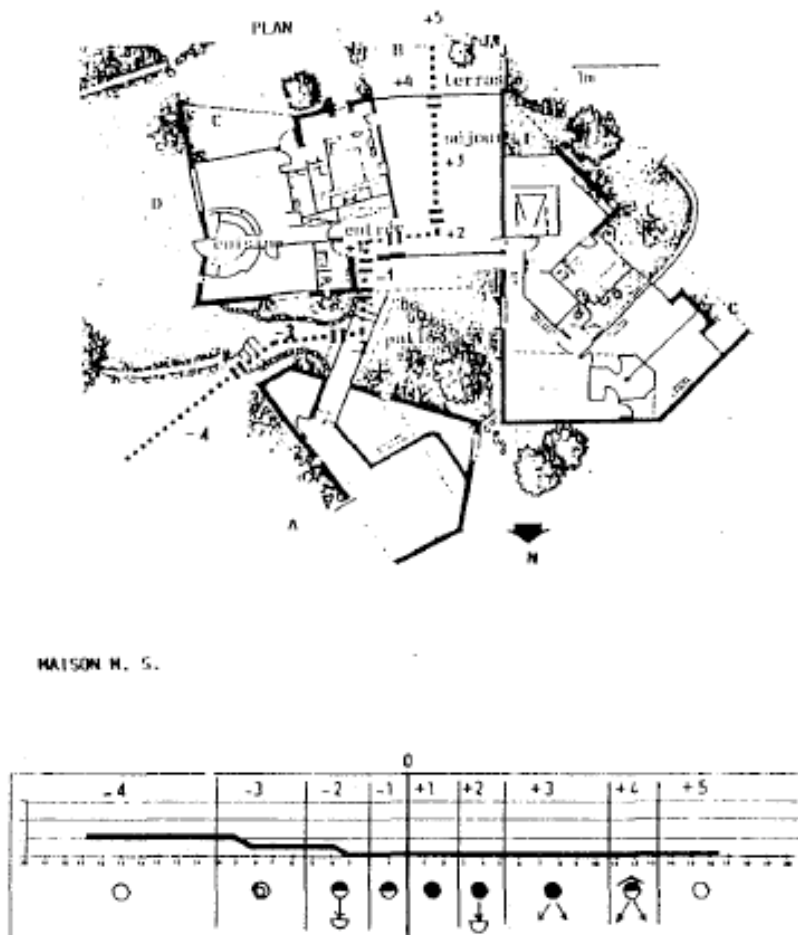


Figure 1.6. The Sauzet Home.

puts forth a strategy for a “sensory arrangement of space” (n.d.). Early in his career as an architect, Sauzet studied in Japan and this experience had a profound effect on his work. While there he studied the access path to the temple which he believes is “literally staged along an itinerary composed in sequences, successive thresholds corresponding to changes of direction, at which impediments force one to step up or down, or to lower the head” (n.d.). He has made an effort to explore this concept in his own architectural work. The result of these explorations is a “sensory arrangement of space with constant reference to the notion of itinerary” (Sauzet, n.d.). The following four strategies outline Sauzet’s approach to a “sensory arrangement of space”,

- The dialectics between inside and outside: The passage from the exterior to the interior is orchestrated in series of semitones.
- The hidden unity: The itinerary organizes a process of progressive discovery in which partial views appeal to the imagination, but the totality of views is never revealed.
- Framing of views: Views are selected and given a hierarchical organization.
- The kinesthetic imprint: Reversals or changes of direction, imposition of certain postures are all used to create breaks in rhythm and successively give rise to direct perceptions of the mystery of the place. (Sauzet)

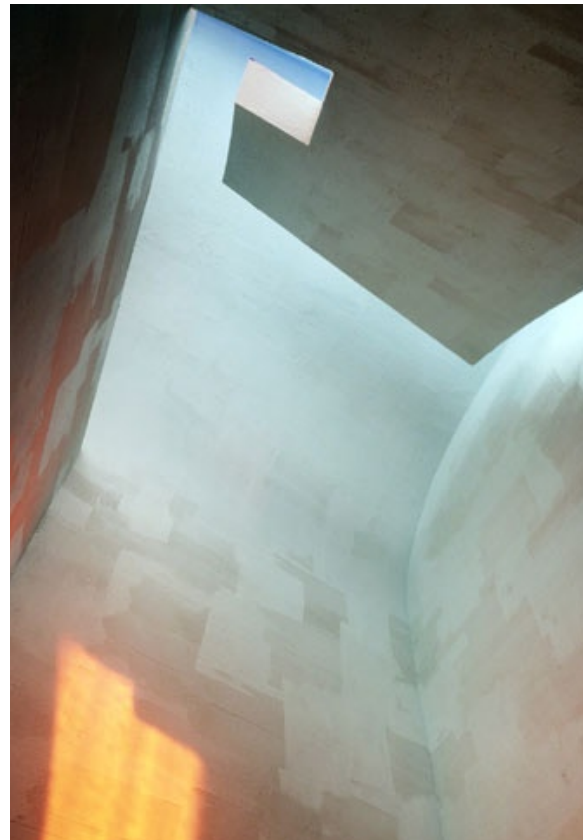


Figure 1.7. Chapel of St. Ignatius by Steven Holl.



MATERIAL STUDY
FOR
QUEEN STREET LIBRARY ADDITION

This study looks at texture and the contrast between
different surfaces.



MESH FACADE STUDY
FOR
QUEEN STREET LIBRARY ADDITION

This full scale mock-up tests the idea for a facade that responds to the seasons. In the summer, a mist is cast across the screen; In the winter, the mist freezes on the screen and builds up a layer of ice. The facade also collects leaves in the fall and becomes an element that transforms the building throughout the year.



CEILING STUDY
FOR
QUEEN STREET LIBRARY ADDITION

Much like the material study, this exploration looks at the effect of light over a curved surface. And similar to the mesh facade, this study is attempting to give focus to phenomena; To bring attention to how light falls across a surface through an exaggerated form.



CEILING SHADOW STUDY
FOR
QUEEN STREET LIBRARY ADDITION

The ceiling study also adopts the exaggerated curvilinear form but instead of acting as a substructure to be clad it experiments with an open and a covered condition. The shadows created by the open structure move across the space throughout the day; once again giving expression or focus to the phenomena that makes up our experience of architectural space.

In the remainder of the article, Sauzet provides examples of his own work that exemplify this strategy. Of particular interest is the Sauzet home, 1974, as pictured in figure 1.6. The plan of this house clearly reveals the intention to create a strong connection between inside and outside.

This is achieved through the overall organization of the home around a courtyard, and the framing of views into a larger landscape. The rooms are skewed to one another and therefore achieves the following: a variety of views are framed, changes in direction are generated, and a process of discovery is initiated since the entire scene is not revealed all at once (Sauzet). One important concept that arises from this article is “the kinesthetic imprint” that “give[s] rise to direct perceptions of the mystery of the place” (Sauzet, n.d.). This discussion of mystery also appears in *Sensory Design* and indirectly in Deleuze’s writing. Landscape in its traditional sense, is discussed in *Sensory Design*. A study conducted by Kaplan and Kaplan set out to examine “mystery as a factor in landscape preference” (Malnar and Vodvarka, p.99). Mystery, as defined in their study, “describes not what is there but the degree to which it is suggested that more information is available if we pursue it” (p.99). Five attributes emerged from the conclusion of Kaplan and Kaplan’s study that provide some clues toward a spatial configuration suited for a sensory typology. These attributes are: “screening, the degree to which the larger view is obstructed; distance of view, the distance from the observer to the nearest elements; spatial definition, the degree to which the elements enclose the viewer; physical accessibility, the apparent means of moving through the scene; and radiant forest, the sunlit areas we see beyond the darkened foreground” (p.99).

The space in figure 1.7 illustrates the concept of mystery in spatial configuration. A wall curves outward to conceal the window beyond, along with a portion of the ceiling. One wall curves in and becomes the ceiling, which blurs the boundaries between surfaces and conveys movement. Finally, natural light passes through coloured glass and animates the space as its true source is obscured by the wall. This dynamic colour is a combination of a back-painted wall and the changing intensity of natural light.

The garden analogy

A garden is associated with fragrance, contemplation, careful planning and diligent work. Predominately, the garden is understood through experience. This sub-section evolves into a discussion of the path as an experiential and communicative element within the garden. This is a strategy with direct architectural implications, especially when considering the section of a building. This discussion offers further clues about spatial configuration and serves to reinforce some conclusions drawn on the topic of mystery. Unevenness, abrupt turns, direct routes, and the need to tilt the head are all details that are learned about the garden as one experiences it, and moves along its path. Thus, one remembers the garden through their experience. The way the light filters through the trees on a particular day, the views across the garden to a feature, and a

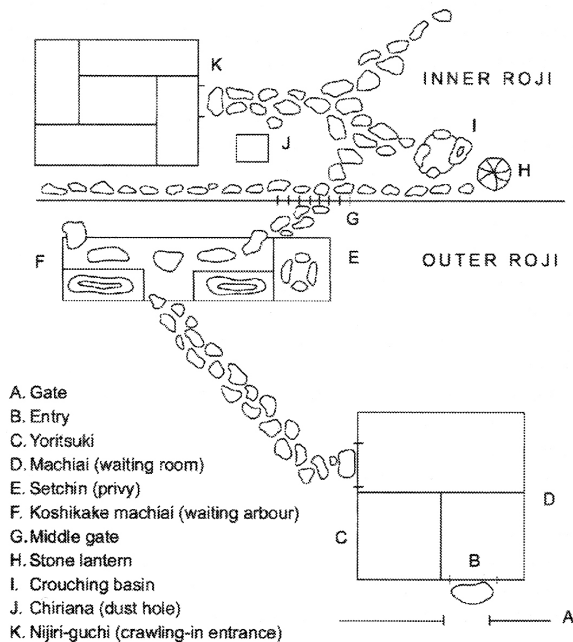


Figure 1.8. Japanese Tea Garden.

bench that directs a view to the pond all build this memory. The gardener on the other hand may construct their memory of the garden based upon their physical labour. Digging, weeding, and reaching to water a plant all communicate things about the place itself. This is the focus of O’Neil’s research (previously mentioned) on the haptic memory of places, and has a clear significance in this discussion.

A further example of the topic of gardens is found in Dorinna Kondo’s analysis of the Japanese Tea Ceremony. The author’s contribution to *Empire of the Senses* begins with a full description of a traditional Japanese Tea Ceremony; more specifically, the version called *shōgo chaji*. The author undertakes a sensory analysis of this ritual in order to better understand its importance in Japanese culture. Of particular interest to this study is the portion of the text that is dedicated to the analysis of the spatial arrangement of the tea garden. “Like narrative, ritual is an unfolding, a sequence of movement with tensions, climaxes and directionality” (Kondo, 2005, p.197).

Figure 1.8 documents the typical arrangement of a Japanese tea garden, which is separated from the outside world by a perimeter fence. The garden is divided into two parts, the outer and inner *roji*. These two areas are further separated by a fence, with a gate (Kondo). The outer *roji* contains two structures, the waiting room and the waiting arbour (Kondo). Each plays a role in the ceremony and provides a different level of enclosure—as it relates to the participant’s engagement with the garden and ceremony. The waiting room is enclosed and the floor is covered with tatami mats; the waiting arbour is covered, but open to the surrounding garden (Kondo). A

stone path connects all structures in the garden. In the outer *roji*, the path is direct and allows quick movement between the waiting structures. In contrast, the inner path is winding and has several branches, which encourage contemplation (Kondo). The passage into the inner garden or *roji* represents a shift from the mundane to the ritual (Kondo). The main feature in this space is the water basin, in which visitors must purify themselves before moving into the tearoom. The tearoom itself resembles the waiting room, and is intended as a venue for the ceremony that does not draw attention away from the event itself (Kondo). The underlying theme of the ceremony is contrast. Contrast between the outside world, the outer garden and the inner garden. Contrast between the pristine wooden structures and the garden. These contrasts carry into the sensory modes to reinforce the beginning and concluding parts of the ceremony. The sonic environment of the garden, for example, participates in this process. It is mostly silent; any noise represents the termination of a part of the ceremony (Kondo). There are also verbal and non-verbal areas of the garden that further represent formality and the “progression of the ritual” (Kondo, p.198). Furthermore, a change of clothing: freshness, the garden: purity, the tea: cleansing, burning of incense: informality, the tea bowl: tactility (Kondo). Each of these metaphors is communicated through sensory modes and experiences. Contrasts and sensory experience strengthen the teachings of this ancient ceremony. “The formality of ritual also enables the participant to forget the contingencies of everyday life and frees the mind for ‘greater thoughts’” (Kondo, p.208). In his introduction to *Empire of the Senses*, Howes refers to the tea ceremony as a “sensory sequencing”, in which there is a mixing of the senses (or intersensoriality as he describes later). Sometimes the senses are working together and other times they are conflicting; “either state may be employed as a social or aesthetic ideology” (Howes, p.9).

Transitional elements

Transitional elements in buildings are the thresholds between inside and outside, between rooms and between levels. Such elements include stairs, doors and pathways, which have the potential to contribute to the mystery or anticipation in the experience of a place. Stairs can be seen as the clearest example of an architectural element that engages the senses, particularly the haptic, and challenges the body physically. While moving up and down one becomes aware of the riser height relative to their level of exertion; change in temperature between levels and the basic orienting system is engaged by changes in direction, and views from a new vantage point. The visual system is highly active as well, gathering information about the steps ahead, the railing, and the space that lies ahead. It also communicates with the haptic system that is actively gathering information as one slides their hand along the railing, as the position of joints change, and as the pressure of touch on a surface reveals its hardness and texture. With all of the systems operating at a high level, one becomes aware of subtle details, textures and ones relative comfort within the space. In other

words, the body is highly connected to its surroundings while in a transitional zone. Similarly, the doorway offers many of these opportunities. “The doorway divides your world, and in doing so, provokes a sense of ‘otherness’” (Unwin, 2007, p.12). This statement echoes the description of the Japanese Tea Ceremony and the importance of the fences and gates that separate the different parts of the garden and reinforce the parts of the ceremony itself. Furthermore, the entrance may announce itself in the building’s form by deforming the surface or creating a sense of movement through materials or juxtapositions. To extend the idea of the doorway as an experientially reinforcing element, these transitions can also be considered in terms of contrasts; light and dark, warm and cold, soft and hard, and so on.

In this study issues of materiality are being examined beyond their functional use and toward their expressional and experiential capacities. Within this more specific discussion, the ocularcentric critique continues to dominate in explaining why our buildings lack tactile and sensorial qualities:

In a world increasingly dominated by the sense of sight and the pervasive demands of visual media, many modern buildings are strikingly lacking in these qualities, all the more surprising given that touch, as Lucretius pointed...is ‘the sense of our whole body.’ (Weston, 2003, p.103)



Figure 1.9. Alvar Aalto. Villa Mairea.

Aalto's work on the other hand, represents a clear departure from the more mainstream handling of materials. In *Materials, Form and Architecture*, Weston discusses Săynätsalo Town Hall as a primary example of Aalto's work that elevates material considerations to a high level of importance. Brick is carried into the main entry to highlight the public nature of the building (Weston). The brick runs all the way to the council chamber at which point the material shifts to a highly polished wood for its acoustic properties (Weston). Frampton further highlights the role of materiality in the experience of this space through a study of the promenade leading to the council chamber. This route is lined with brick on the walls and on the treads of the stairs and "the kinetic impetus of climbing is thus checked by the friction of the steps" (Frampton, 1988, p.12). The resistance of this rough surface is contrasted by the "polished timber floor of the council chamber which announces its honorific status through sound, smell and texture and above all through its slipperiness and its springy deflection under the weight of the body" (Frampton, p.12). The door handles are wrapped with leather to enrich the experience of touch, and in their uniqueness, they make an impression on one's memory (Weston). In his work, Aalto looks beyond the functional requirements and strives to "humanize the physical environment" (Weston, p. 135).

This section has been structured to lead the reader through the argument being made in this thesis. Beginning with a background on this study and a question of why one should take a sensory approach, and then moving toward a strategy for bringing these sensory principals into architecture.

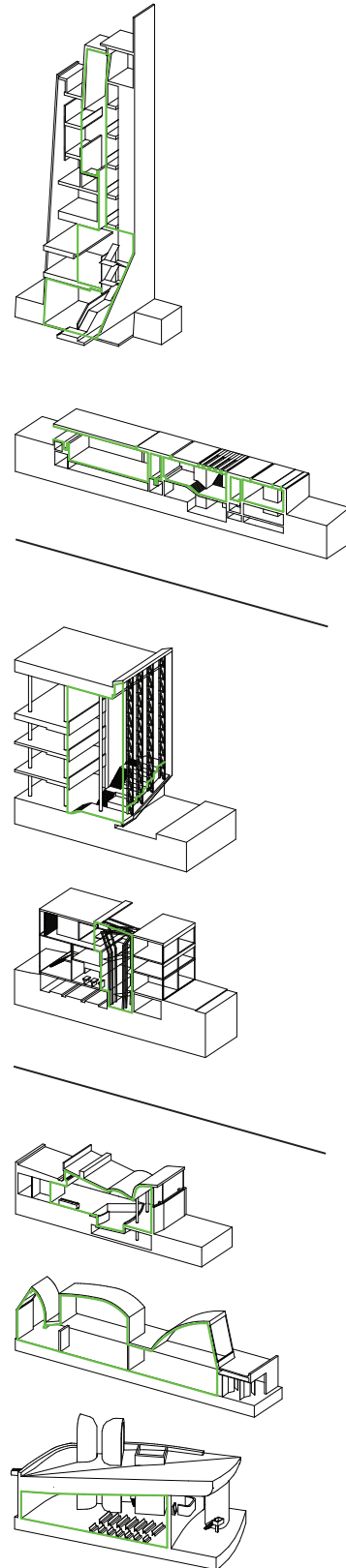
...

Case Study:

A Material and Volumetric Analysis

This section studies seven buildings that elevate the importance of the body beyond its typical, functional consideration. These buildings engage the body in numerous ways, which can be specific to each precedent, or may be shared between a number of examples. Some common themes that these buildings collectively achieve include, creating a sense of movement through the sculptural quality of the roof, and focusing on the path one takes to move through the building.

In most cases these examples also establish a sense of mystery when considering how one moves through the building. As discussed in the first section, the mystery factor plays an important role in how one engages with a building. In many cases the mystery factor is thought to be conveyed merely through visual means, however I will argue that several of these precedents have achieved this in a way that engages a number of the perceptual systems at one time. The buildings studied are from different eras and many of the more recent projects seem to draw inspiration from the earlier examples.



American Folk Art Museum

NYC

Tod Williams Billie Tsien

Completed 2001

8 floors

The American Folk Art Museum represents an enthusiastic departure from the 'white cube' gallery discussed in the previous section. Through the use of a simple, yet robust palate of materials and a diverse circulation system-the building delivers a well choreographed variety in experience. This palate of materials includes, "bush-hammered concrete walls, smooth concrete floors with exposed and polished aggregate, warm planks of Douglas fir salvaged from the bottom of a lake, [and] cold-rolled steel handrails" (Pearson, 2002, p.202). These materials are used to create a different spatial experience in each separate gallery, and to mark the transition from a circulation space into a gallery space.

In addition to the material sequence, the variety in the vertical section creates variety in viewpoints and encourages increased movement through the building. The circulation stairs from the first floor end at the fourth level and a wider and more grand stair links the subsequent two floors; and a small wooden stair, which is almost residential in scale, links two sections of the upper floor. Each stair provides a different spatial experience and their location forces one to move throughout the entire building. The stair pictured in figure 2.2 focuses the visitor on the movement of their body and the movement of the silhouettes viewed through the extruded plastic panels. By contrast, the grand stair case on the fourth floor is at the base of the large void that floods the building



Figure 2.1



Figure 2.2

with light. Within this void, there are moments of overlook from balconies on upper levels and the visitor is given a glimpse into the spaces that lie ahead in their journey.

The craftsmanship of the building reinforces the gallery's collection and becomes engaged with the art instead of detaching itself from it. The kinesthetic qualities of the building engage the body, direct views and maintain a connection between the visitor and the building throughout the experience. Often in a gallery

building, attention is focused on the lobby space to create a sensory experience, and once the visitor moves into the actual gallery space, this connection is lost.

The materials and spatial arrangement of this project engage the senses in a deep and meaningful way. This approach reinforces the connection between the function of the building and its form, with the two working together to create a full-bodied architectural experience.

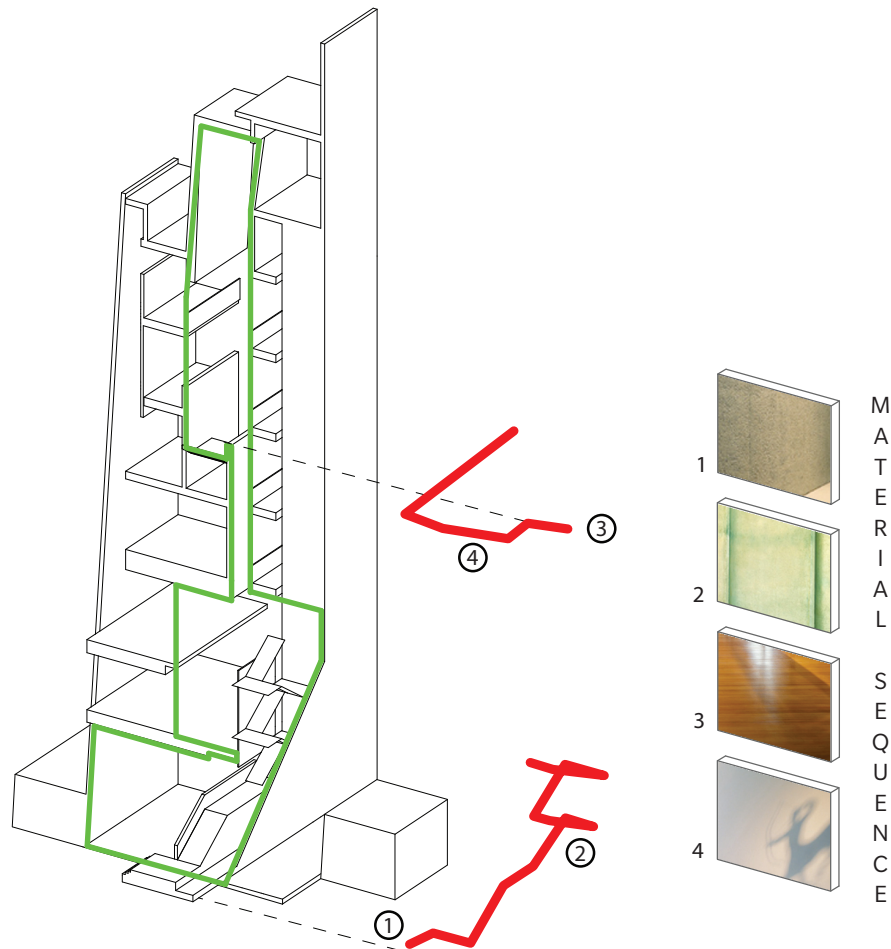


Figure 2.3

Therme Vals

Vals, Switzerland

Peter Zumthor

Completed 1996

3 floors

Located in northern Switzerland, this building responds to the mountainous nature of its site. This connection is reinforced through the palette of materials and the formal qualities of the building. This spa is experienced as one moves through the baths, similar to the way one moves through a Roman or Turkish bath. These baths are constructed as objects, with the slabs of the roof and some walls sitting apart from the neighbouring object to allow slivers of light to penetrate the space.

The experience is further choreographed by the thermal and olfactory qualities of each bath. For example, fragrant flowers and cold water encourage the visitor to move quickly through a space; and the smell and texture of wood in combination with warm water, invite the visitor to remain in a space for a longer period of time.

Much like the American Folk Art Museum, there is a strong kinesthetic quality to this building. One traverses this building across stairs with deep treads, shallow treads; up and down ramps; swimming through or wading across the pools. The 'objects' previously mentioned, break up the space and do not reveal the totality of the space in any one view. Through changes in temperature, olfactory quality, kinesthetic modes and areas of light and dark, this building deeply engages the senses and one's imagination.

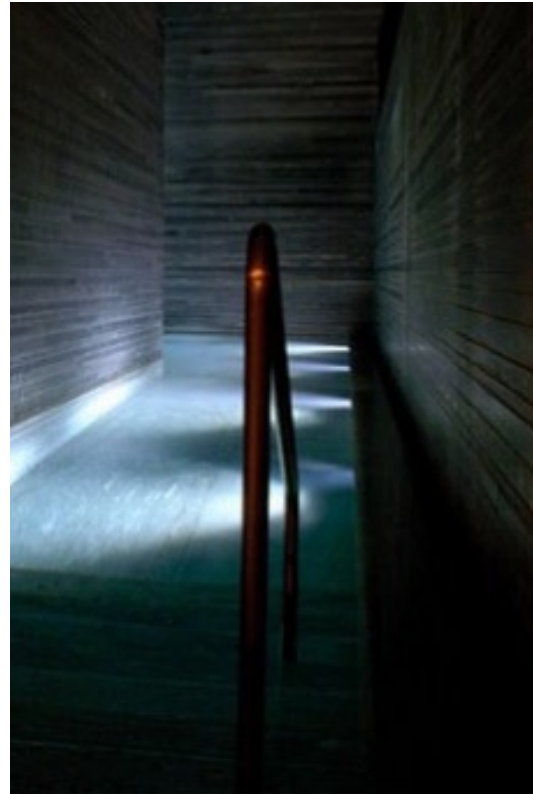


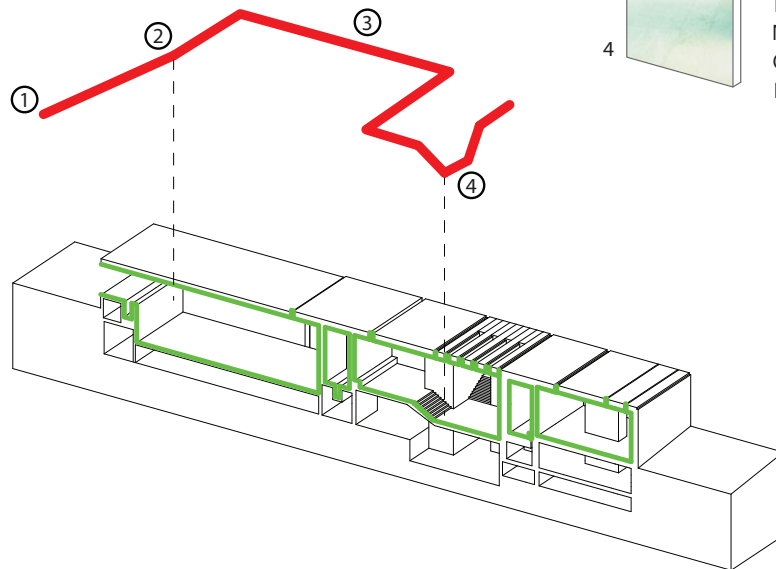
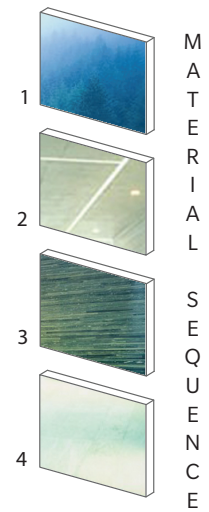
Figure 3.1



Figure 3.2



Figure 3.3



Winnipeg Centennial Library Expansion

Winnipeg, Manitoba

Patkau Architects/LM Architectural Group

Completed 2005

Renovation and Addition

For the purposes of this study, only one aspect of this project will be examined : the southern terraced reading platforms. This portion of the addition connects parts of the old building by asking its visitors to travel up and down its stairs. A dynamic space is created through the movement of people on the stairs, through people overlooking the circulation space and by the strong connection to the outdoors. Shadow patterns animate this space and change its character throughout the day. The steel trusses that serve to resolve the wind load in the wall of glazing also create an engaging shadow pattern on the monochromatic and muted finishes of the circulation space. This addition takes advantage of the circulation element which is required to move a large number of people in a building of this size- and elevates it to become the primary feature of the building. This building was selected because of the experience-based intention of this project that is present in all of Patkau Architects' work. The minimal palate of materials allows the play of shadow and natural light to have maximum effect in the space.



Figure 4.1



Figure 4.2

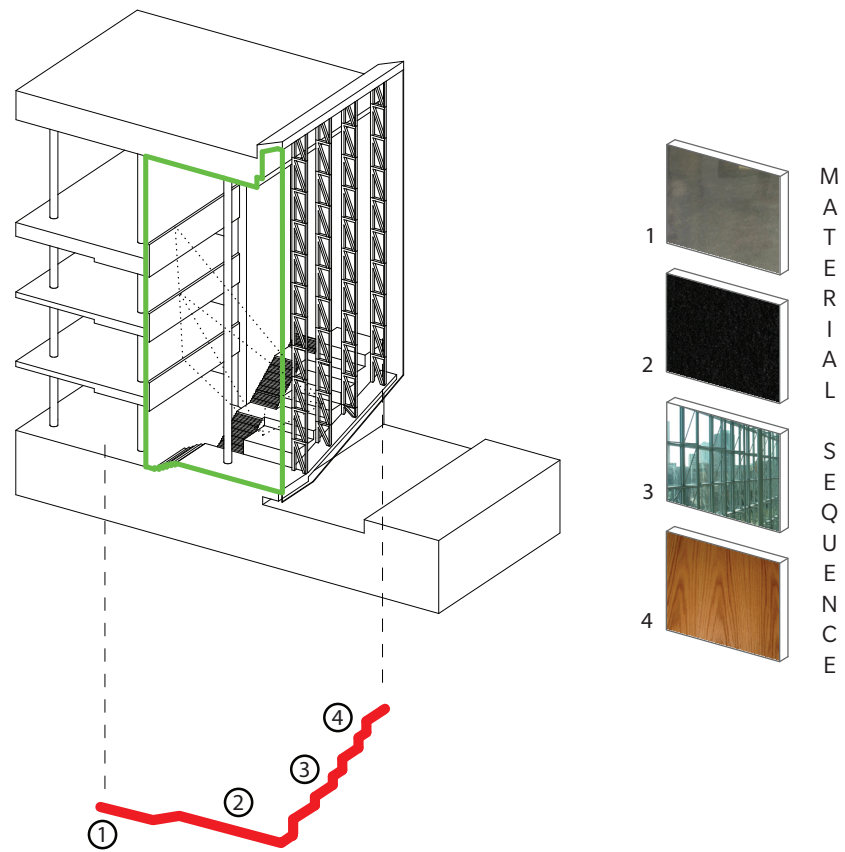


Figure 4.3

Dukyang Senior Center (unbuilt, competition entry)

Seoul, Korea

Office DA

2004

Competition entry

This unbuilt competition entry by Office DA exemplifies a number of principals and strategies discussed throughout the research. One of the major demands of this building's program is its circulation. Seniors require gentle slopes, even terrain and building technologies like elevators to move them through a building. This proposal highlights the importance of movement through a building-for a group of people who have difficulty with mobility. A circulation spine of gently sloped ramps connects the program of the building. This spine is punctuated by benches and activity tables that correspond with the adjacent program. The architects envision this as the social spine of the building.

From its intention through to its detailing, this proposal offers strategies to engage the user of the building through an experience-based approach. Furthermore, the proportion of the building and articulation of particular elements, resonates with much of the literature on this area of thought. Much like the Winnipeg Library expansion, repetitive elements are used to create patterns that changes throughout the day. The diagram to the right represents the dynamic nature of the space, with people crossing paths, moments of overlook and shadow pattern and natural light being used to animate the space.

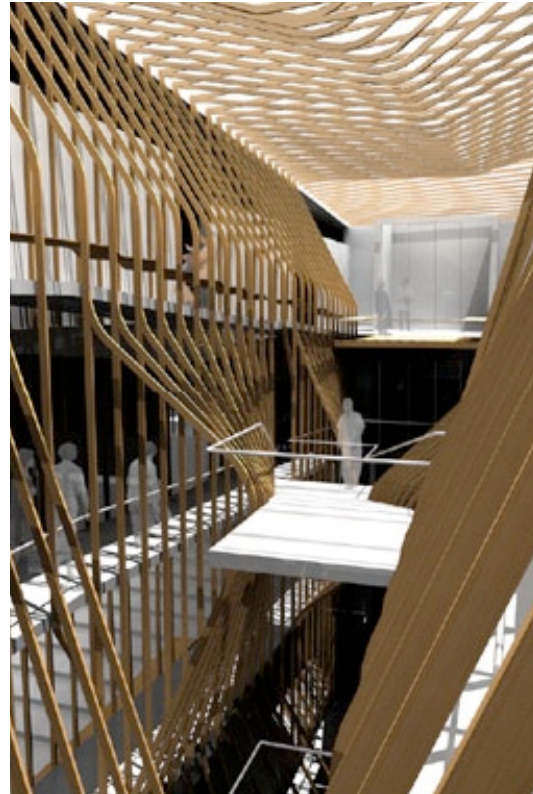


Figure 5.1



Figure 5.2

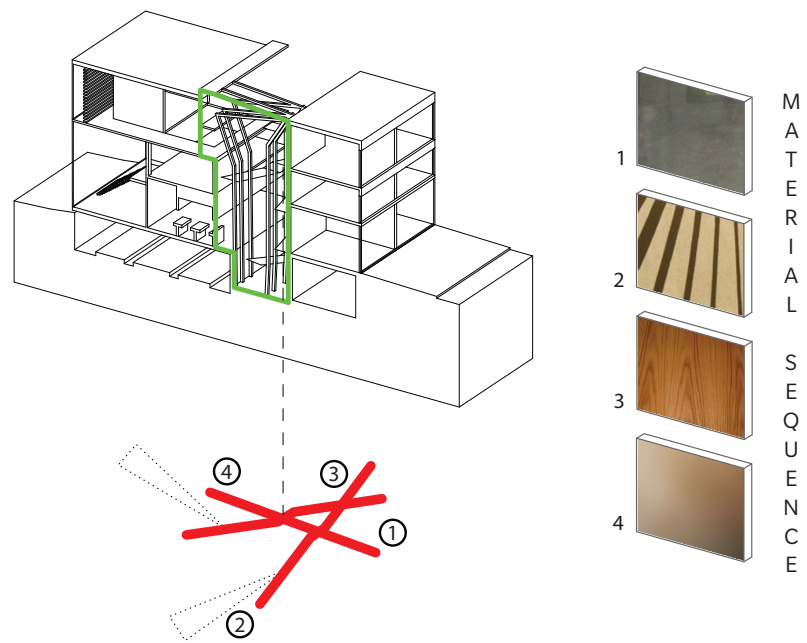


Figure 5.3

Seinäjoki Library

Seinäjoki, Finland

Alvar Aalto

1965

2 floors

The entire body of Aalto's work exemplifies many of the elements and themes explored in this thesis, however this building in particular demonstrates the power of the roof in the generation of an experiential architecture. The roof has been used to define the volumes of the building. In the sunken portion of the plan, the roof is lower, and it sweeps up toward the glazing. The sculptural form of this roof acts as a strong contrast to the plan. Much of the floor plate is occupied by book stacks, which require a rigid and uniform layout. The sculptural roof in combination with the sunken reading area engages the kinesthetic sense. One must move between different levels and through spaces defined by different volumetric proportions.

The materials of this building also respond to sensory experience. The floor material changes from a stone at the entry to a polished wood floor around the perimeter and again to a soft carpet in the sunken reading area. Wooden bookshelves provide a feeling of warmth within the space. The palette of materials is muted to allow the pattern of shadows and natural light to animate the space. This is the same strategy used in the Winnipeg Centennial Library Expansion. The diagram on the right describes the changes in height, volumes and materials as one moves through the space, and how each area provides an opportunity for a different experience.



Figure 6.1



Figure 6.2

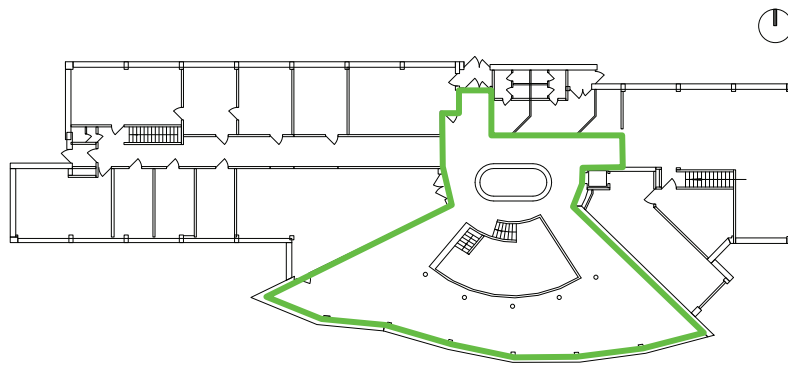
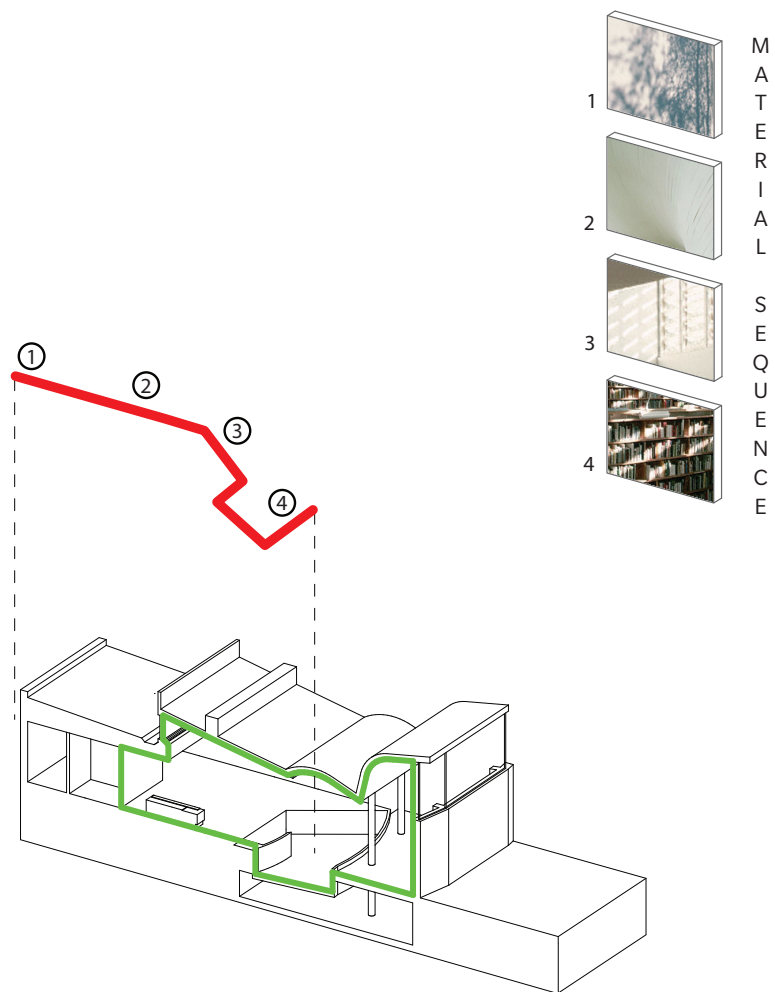


Figure 6.3



Chapel of St Ignatius

Seattle, Washington

Steven Holl

Completed 1997

1 floor

A great deal can be learned from Steven Holl's Chapel built for a Jesuit College in Seattle. The sculptural form of this building originates from a watercolour titled 'seven bottles of light in a stone box' which is a metaphor for the different parts of the Jesuit Catholic worship (Weston). These seven bottles are represented as six volumes in the building and the reflecting pool as the seventh. In plan, the rectilinear arrangement does not allude to the sculptural section, which defines the areas of the building and corresponds to the way one moves through the building.

The mystery factor is most evident in this example, through the use of light baffles that block a direct view to the glazing. The use of coloured glass or a painted surface reflect the natural light and splash colour onto the textured walls. This aspect is heightened by the colliding sculptural forms of the roof. As one moves from one area to the next, the volume varies greatly in scale, and colour/temperature. The texture of the walls invite touch as pictured in figure 7.2, and the walls become animated as the texture is highlighted by the coloured natural light that floods the space.

Much like the other examples, the palette of materials is simple, but arranged thoughtfully in relation to its position in the building.

In the design stage of this thesis, the experiential potential of a sculptural roof is explored for its ability to contribute to the mystery factor.



Figure 7.1



Figure 7.2

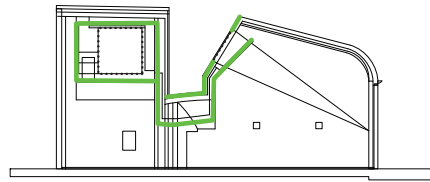
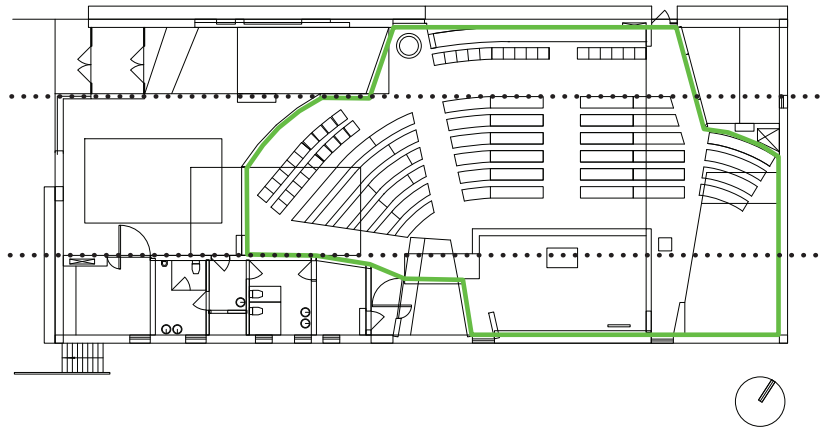
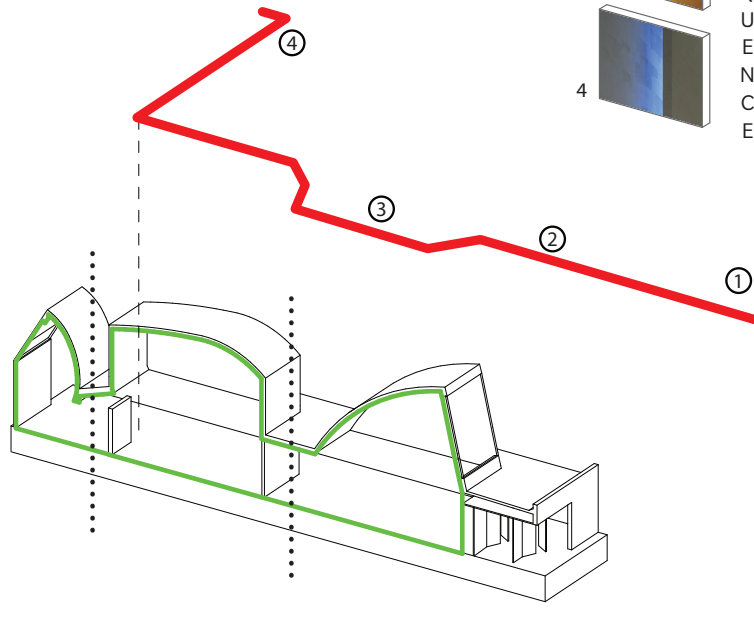


Figure 7.3



Chapel of Notre-Dame-du-Haut

Ronchamp, France

Le Corbusier

Completed 1954

Corbusier's Ronchamp Chapel is an inspiring precedent for this study. Its sculptural forms and playful approach has inspired me to explore the plasticity of architectural form in my own work. It is clear that sculptural forms have the ability to touch the senses and invite further exploration. Look at the way the shadow forms along the walls in figure 8.2, the way the light softly flows around the shapes in a gradient.

The chapel is sited on the top of a hill and the natural slope of that hill is brought inside instead of leveling it. The building is approached from the south at a lower elevation. The path leads the visitor around the building to its entrance on the north side. Along this path, the building is seen from a number of different perspectives, heights and lighting conditions. This choreographed approach is reminiscent of the care taken in the Japanese garden to reinforce particular elements of the tea ceremony.

Light streams into this chapel through the large and irregular apertures of the south wall, from the three hooded towers that bring light from above, and through the sliver between the roof and the wall. The curved walls define the main space of the chapel and lead the eye around its bends and into another space.



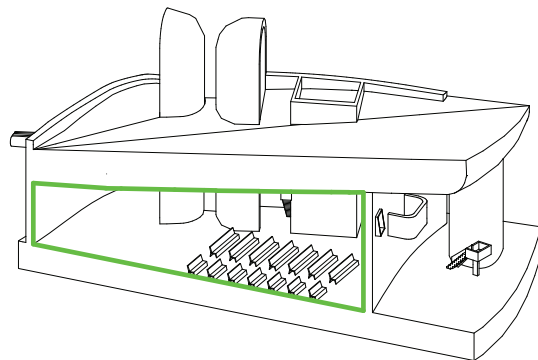
Figure 8.1



Figure 8.2



Figure 8.3



In order to reestablish sensory connections to our buildings, we must first break down the barriers of our thinking about architecture—we must start our exploration with a space that is not bounded and contained in traditional ways.

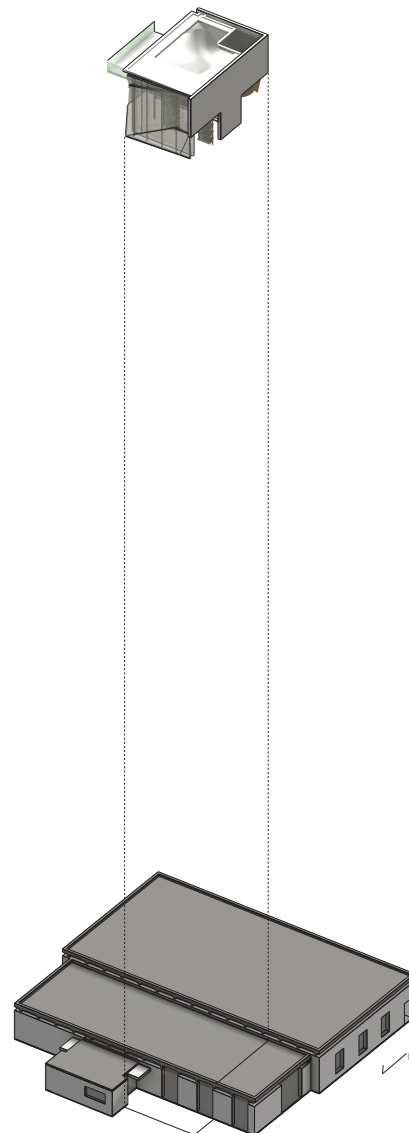
Revealing Sensory Connections

Design Research

This final section weaves together text, images and drawings in order to convey the scope of work undertaken during this project. It is divided into three sections; the first section discusses the influence of the 'Material Energies' research and its application in this project. The second section explains the approach taken in the design project through text and the design drawings themselves. Finally, the third section focuses on the sensory connections as they occur in the proposal. Through a combination of a text and visualization, this final section attempts to explain the progress made throughout this project and to conclude the overall discussion.

Approaches

There is an emerging body of research that is closely aligned with the strategy of intensities being developed in this project. It has been placed under the label of 'Material Energies' or 'Interior Atmospheres' and many of the leading contributors were part of a recent issue of *Architectural Design*. This area of architectural research is examining, to put it in simple terms,



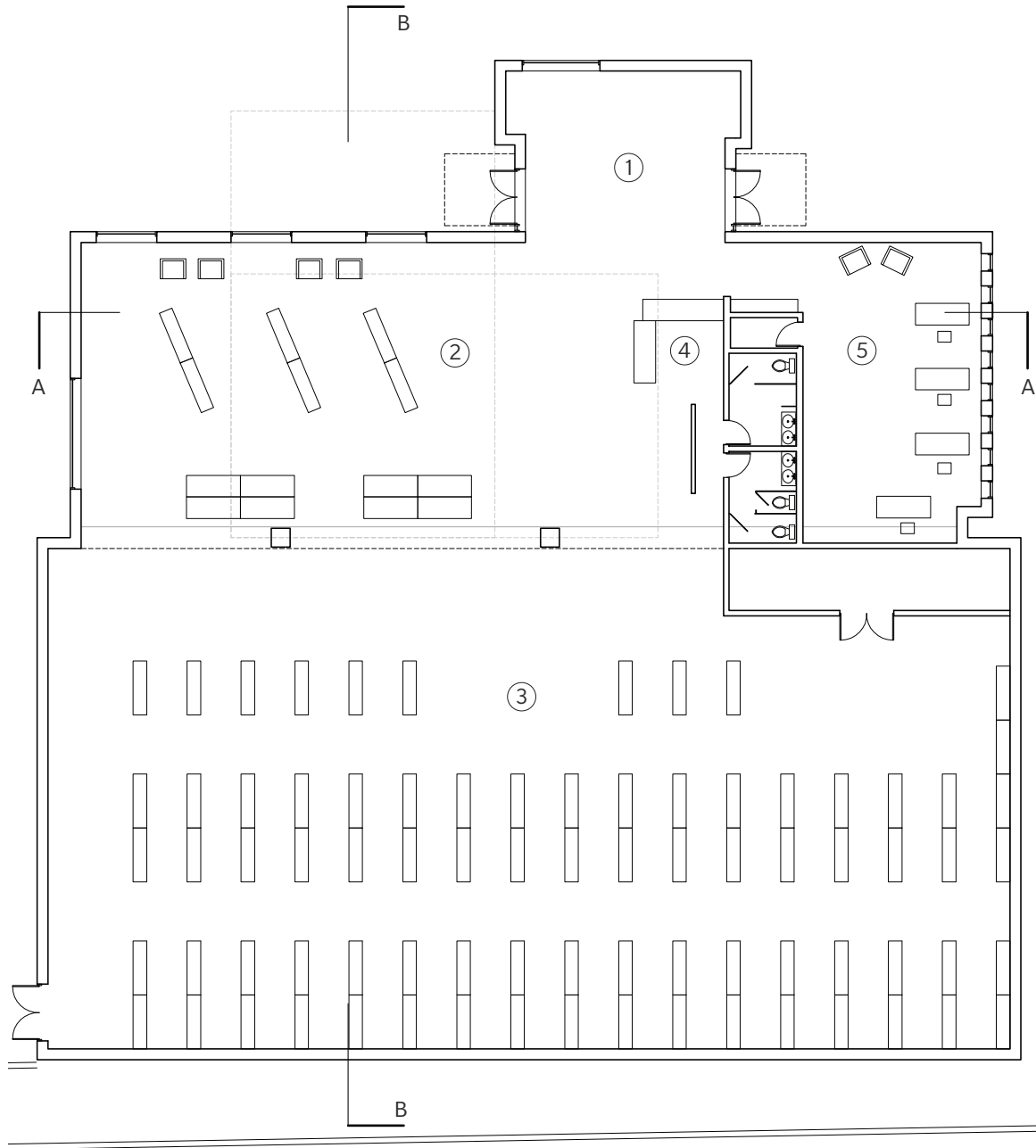
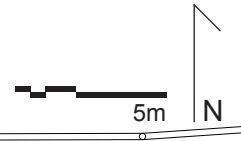


Parkdale Neighbourhood, Toronto.

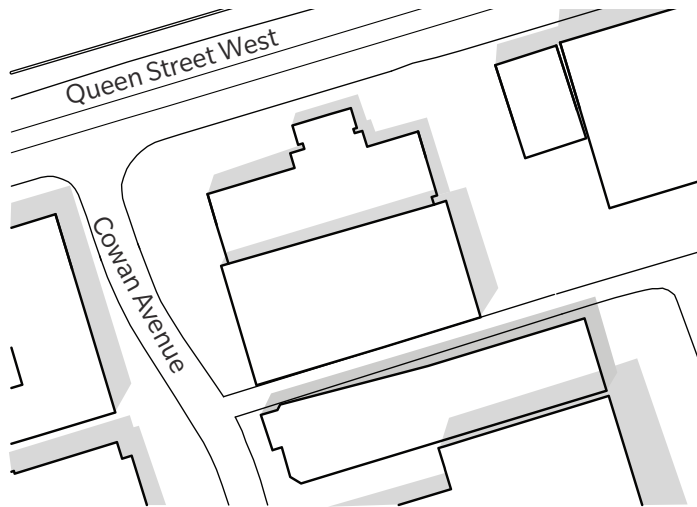


1303 Queen Street West.

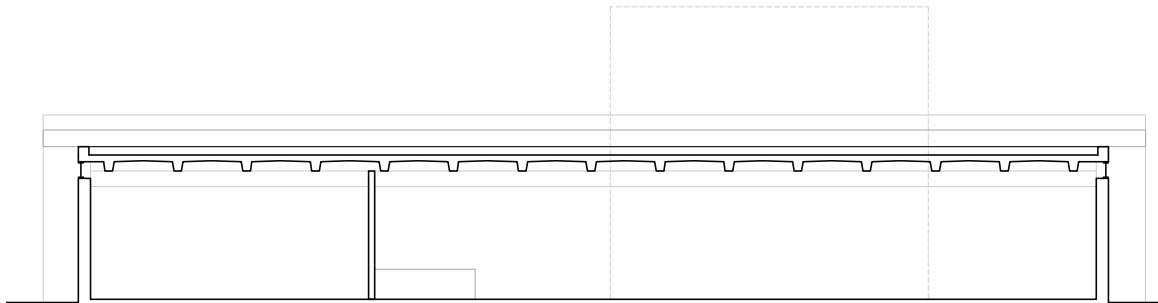
- 1. entry
- 2. periodicals
- 3. stacks
- 4. circulation desk
- 5. offices



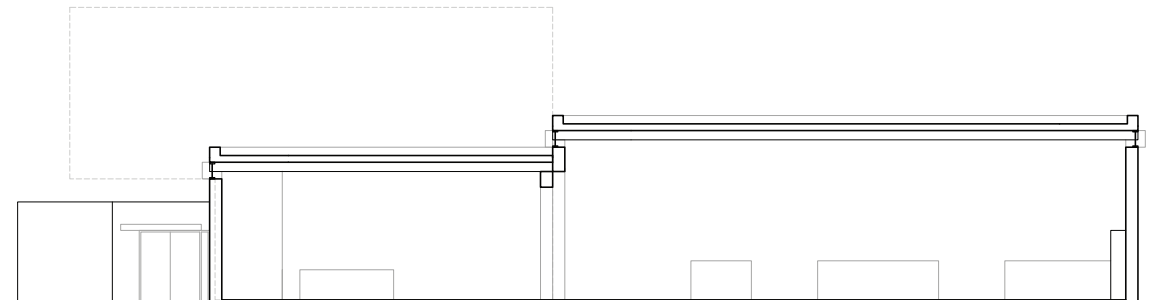
EXISTING PLAN



KEY PLAN



SECTION A



SECTION B

the separation between inside and outside. The strategy of breaking down the barrier and blurring the line between inside and outside is not a new idea. It was a strongly held modernist tradition—but only on a visual level. A new discussion has picked up on this idea which is now examining the blurred boundary as a means to mediate the interior environment, and eliminate the standard of the hermetically sealed box that architecture currently adheres to. The primary driver for this work is the experience of the inhabitants and the creation of new ‘atmospheres’ within a building that have the ability to engage with the body and its senses. This research presents an opportunity to create a condition in which the connections between the senses are better defined. For this reason, I focused on this work in the early stages of the design research.

The issue [of Architectural Design] looks to ways of releasing these material energies from their dependence on surfaces and services to deploy them as building materials in and of themselves: redefining the physical boundaries and edges that architects use as organization strategies opens the potential for design innovation and the creation of new spatial and social constructs. (Lally, 2009, p.8)

By material energies, Sean Lally means, “These ‘material energies’ of thermal variation, air velocity, light spectra and electricity [that] all have potential roles beyond merely producing moods or effects along a surface” (p.8). They effectively become part of an architect’s palate of materials. Furthermore,

Such materialities – the shifting intensity and variability of spectra of light, thermal diffusions and transfers, levels of relative humidity, and even our range of olfactory sensitivity – come into existence when we can act upon them and give them organizational responsibilities. They offer an opportunity to understand boundaries not as static lines or surfaces, but as fluctuating intensities read best as a gradient condition. (Lally, p.9)

In addition to the exploration of how these material energies can be a part of architectural consideration, the magazine also profiles designers who are investigating this new palate of materials. I am using this example from the discussion instead of projects that offer their own method for working with these materials because understanding what already exists allows one to develop a different strategy, rather than adopting an existing one. Malate Wagenfeld provides such an example in his article titled *The Aesthetics of Air*. For his study, Wagenfeld set up a laser and spinning mirror equipment, and a smoke machine in an abandoned warehouse to study the movement of air. In a calm condition he observed that air moved in a “...complex set of paisley-like patterns of gently spinning vortices” (p.23). This finding was far different from the convective flow of rising and falling air that he had expected to see. He then observed the effects of

someone moving through the space and also the effect of swinging a door open and closed. These movements created a trail that extended almost the full length of the space, creating an air current that rippled outward and, in a subtle way, affected the flows of the entire space. Wagenfeld went on to design a fan blade that closely mimics the natural movement of air. The most significant result of this work was the way in which he spoke of his newfound awareness for the way air behaves inside a building. He began using a different vocabulary to describe the phenomena, explaining that the experience of moving through interior space had become more intense as he thought about how his movement was interacting with the flows of the space.

Along similar lines to the air investigation, and to the earlier discussion of the book *Sense of the City*, David Gissen's recent book titled *Subnature* also contributed to the thinking behind this thesis project. In this book, Gissen argues through theoretical projects and his own narrative that the "subnatural forces" of dirt, dust, smoke, weeds and debris will play a significant role in a future, sustainable architecture. Instead of striving to civilize our interior spaces by filtering out all traces of natural matter, Gissen offers the position that their inclusion will actually contribute to a healthier and more desirable indoor environment. The book provides a number of possible strategies that establish a connection between the occupant and the natural processes and cycles of what exists outdoors. It is with this goal in mind that the design work of this thesis project seeks to establish an environment where the connections between the senses can be highlighted.

...reintroduce the invisible, the subconscious, the action reaction: the sheer biology of things.
If our interest in the procedures and methods of nature resettles, then why not introduce
biology into our work and into architecture literally? (Blaise, 2009, p.87)

Narrative

"Cultures whose members organize their environment by means of massive structures tend to visualize space as they have lived in it, that is bounded and contained, limited by walls, floors and ceilings" (Banham in Addington, p.16). In order to reestablish sensory connections with our buildings, we must first break down the barriers of our thinking about architecture—we must start our exploration with a space that is not bounded and contained in traditional ways.

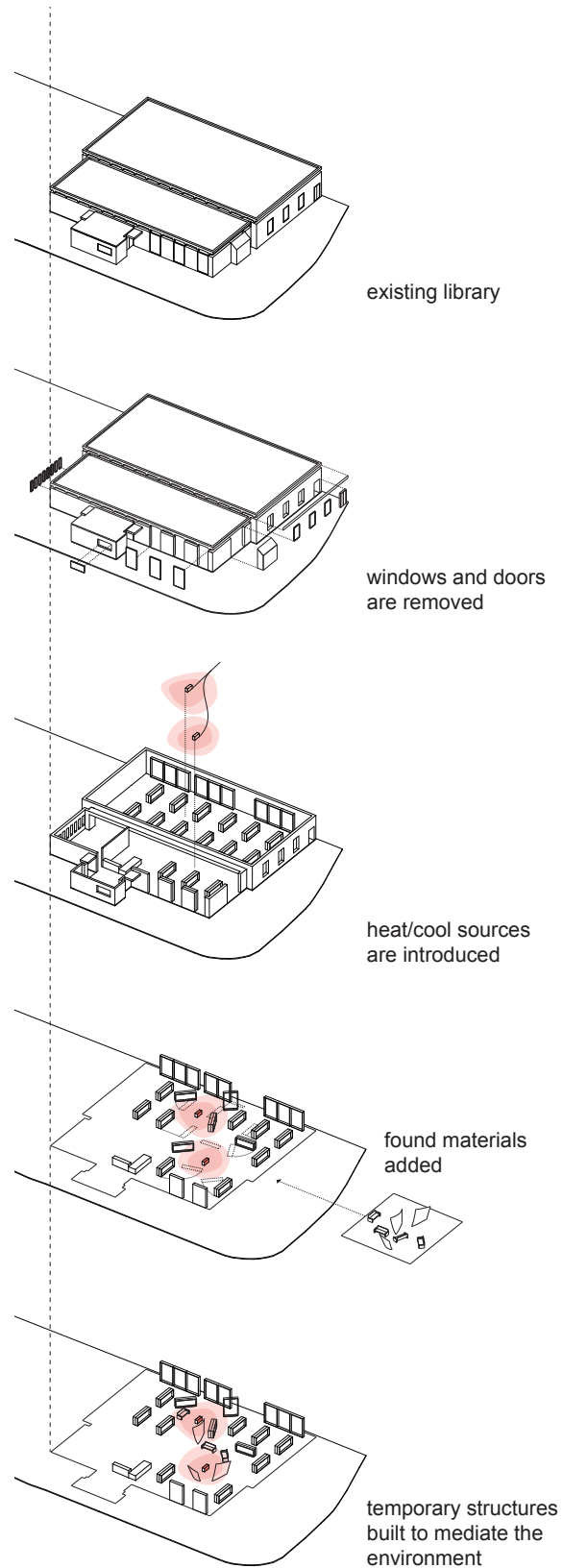
To this point, the project research has investigated many of the leading architects in this area and it has established a strategy to focus on particular areas of architecture that provide an already sensory active condition waiting to be expressed. The ensuing discussion and accompanying design drawings extend this work to propose a corporeal architecture.

The design proposal is sited on Queen Street West in Toronto's Parkdale neighbourhood. This area of the city houses a dynamic mix of businesses, local shops, families and individuals of all socio-economic groups. The area is experiencing gentrification and it is slowly becoming a more

desirable place to live. The existing Parkdale Library is the chosen location for this project.

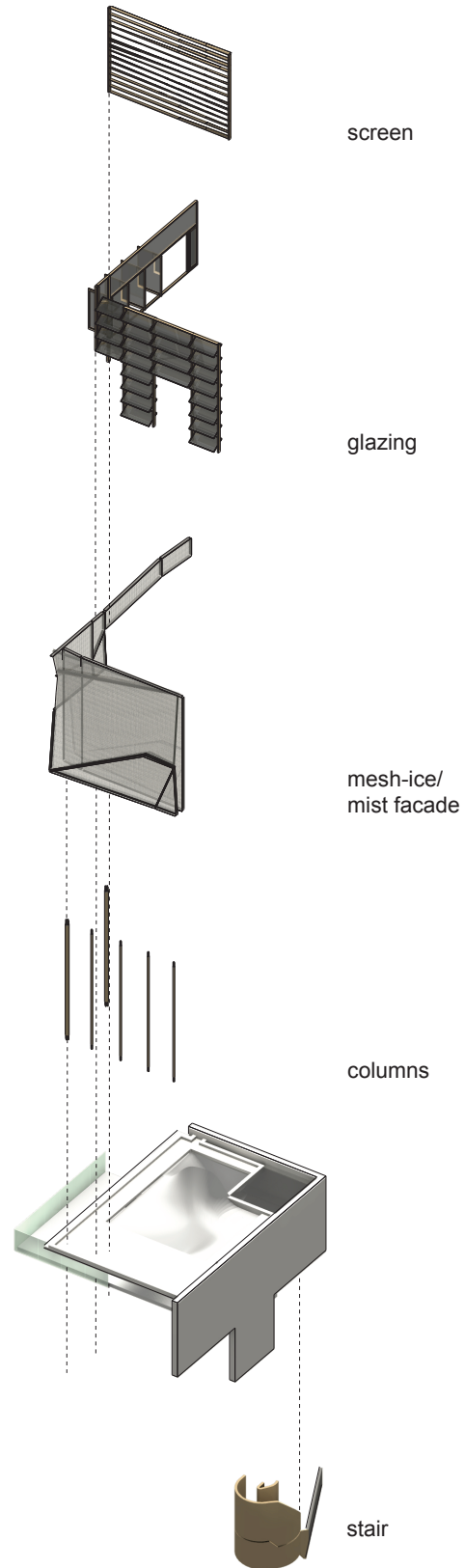
A library is a place that causes one to be aware of the noises one makes within the space; the sound of their steps on different surfaces and how their voice travels through the building. As a way to extend this already heightened awareness, what if the library was exposed to the elements? The beginning stage of the design project poses this question and investigates a scenario in which the existing library is modified by removing the exterior glazing and doors. In this scenario, it is expected that the surrounding community will still use the library and therefore a heating and cooling source must then be introduced. This fictional scenario is being used as a device to set up a context for the proposal, which 'is not bound and contained in traditional ways'.

Around the two proposed heating and cooling sources, library patrons have the ability to rearrange the bookshelves, creating structures in order to mediate their environment. The two constructions become nodes where people can read the books that they have located in the open portion of the building. Layers of mesh and fabric along with the existing bookshelves are arranged to contain the heat and employ a gradient effect to mediate the space. The outer 'rings' of the layers are colder and dirtier spaces where precipitation, dirt, bugs and animals are all able to move freely. The inhabitants of the library add on layers of clothing and footwear to move through these spaces from one 'inner space' to another. Defining the 'inner space' is a heavy curtain and the bookshelves.



Once in the 'inner space', one removes their shoes and some layers of clothing to congregate around the heat source. Warm colours of wood, fabric and a carpet add to the warmth of the space through visual means. The fabric that hangs from the ceiling, makes the ceiling height lower in this area and keeps the heat closer to the occupied area of the space. This instinctual way of building is comparable to vernacular inhabitations (as discussed earlier through the igloo example), which created a much different kind of social and bodily interaction. Spaces were more open and activities were organized within the space according to their temperature, and exposure to weather. These types of spaces engaged the body and connected it directly to the architecture because the structure had to be modified or adjusted to mediate the environment as exterior conditions changed. The advent of interior climate control drastically changed this relationship and transformed the social and programmatic arrangements of our buildings. In doing so, it removed much of the sensory engagement.

That being said, it is not appropriate to propose a return to vernacular construction, so the project moves on from this point using current materials and methods while learning from the conditions established in the fictional scenario. The project evolves into a two-storey addition that grows out of an existing node located toward the north end of the building. This addition serves as a reading space for the library and an open area for community events to take place. The addition is conceived as a series of layers and transitions that attempt to express the connections between the senses as they occur in the experience of architecture. Each element in the building







Rendered view of the library as it would look in the context of the fictional scenario established in the narrative.

experiments with one of the following scenarios:

- what you see is reinforced by an exaggerated condition that might provoke you to also feel the sensation which would normally be constructed mentally when presented with an image.
- what you sense haptically is reinforced by what you see: cold, winter day > ice façade; humid summer > mist façade; a breeze > flowing fabric; heat from radiating surface > natural light.
- what you sense through the taste-smell and auditory systems is not reinforced by what you see. Changes in direction block views to the source of the stimuli.
- the links between the senses are reinforced through contrasts; something is only curved because there is something planar to compare it to, something is only rough because there is something smooth to compare it to.

The mist/ice façade mentioned above is a screen that wraps the north and a portion of the east façade of the addition. This screen is rendered with misting nozzles that blanket it in a fine mist. The mist freezes on the surface of the screen in the colder months and it evaporates in the summer. The screen also serves a public function on hot summer days by providing a place to cool down. In combination with the other layers, this screen creates a blurred interior/exterior boundary that expresses the gradient thermal condition created by the layered envelope system. The large wall that wraps the south and west façades of the building is a radiant surface that conditions the space in combination with a ventilation system. Heating and cooling the building this way is both more efficient and closely linked with the way the body itself operates. It also allows the air temperature to fluctuate around 15 degrees on either side of our comfort zone because the energy transfers directly to the body. The proposed stair winds around to create a sense of discovery, and the walls of the stair extend vertically to bring focus to a view directly up, while blocking your view into the second floor space. This condition of deprivation is meant to highlight the way the senses work together through the absence of the visual sense. Each component comes together to create an overall space that engages the senses and engages with the surrounding city.

| STUDIES

The fictional scenario serves to establish a context and sets up an exaggerated condition for this exploration to take place. And the summary of the design work captures the overall intensions of the design research and provides a frame of reference when looking at individual pages later on. The following studies argue for the 'strategy of intensities' and outline how the major themes of the research are explored through design.

THE GARDEN ANALOGY

contrast

views

path

This section of the research centers around a discussion of the Japanese Tea Garden. In the design work, the project evolved into a series of spaces - inner spaces, outer spaces, different levels of enclosure, quiet areas and busy areas. Each area is characterized by either high or low ceilings, the ability to overlook other spaces and in some cases, the areas are clearly separated to mark the transition between spaces. It is the contrast between these distinctive areas that helps to bring focus to the experience of architecture. The renderings to the right study some of these conditions and are a part of the process of this project.

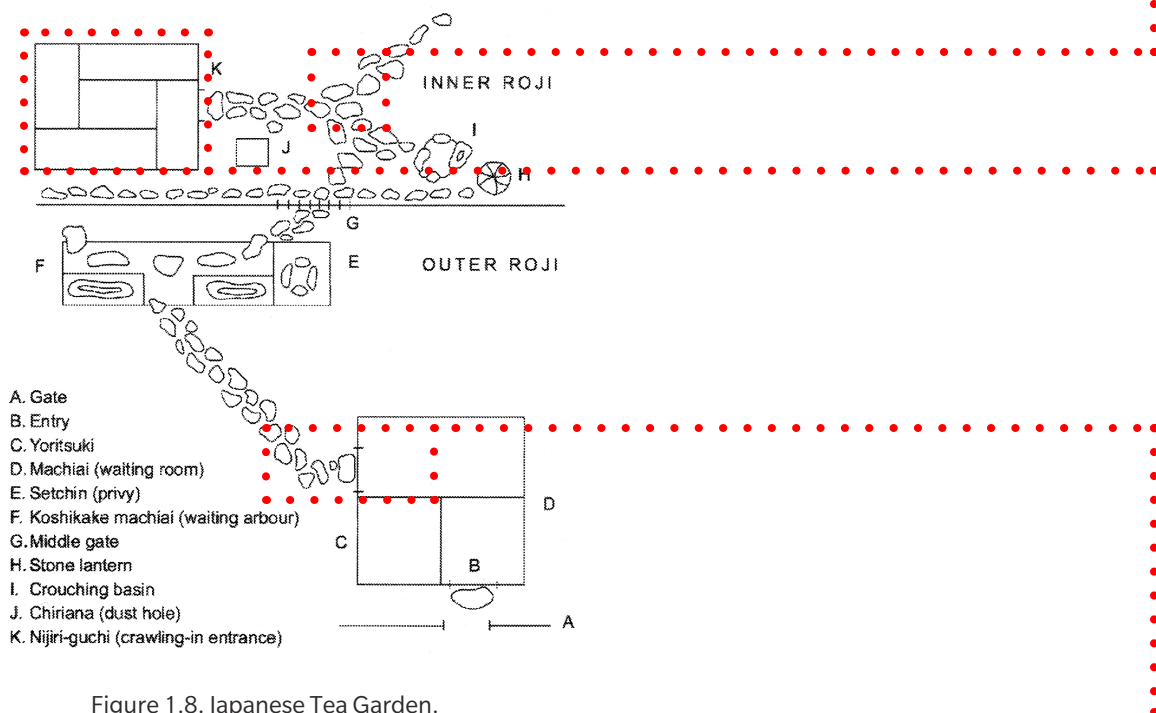
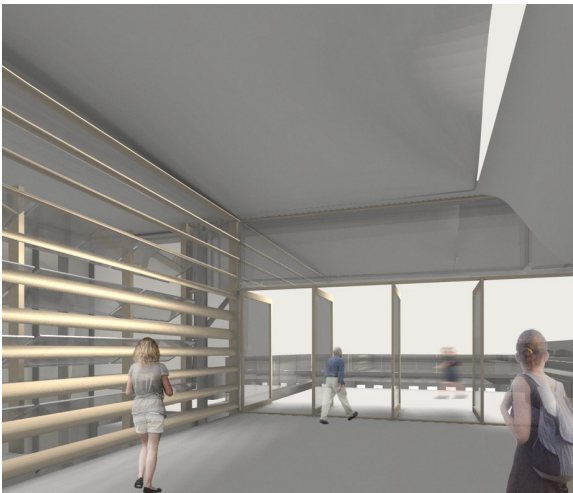


Figure 1.8. Japanese Tea Garden.



Rendering of the roof terrace in summer. Flowing fabric marks the interior/exterior transition.



Rendering of the second level, looking out onto the roof terrace.

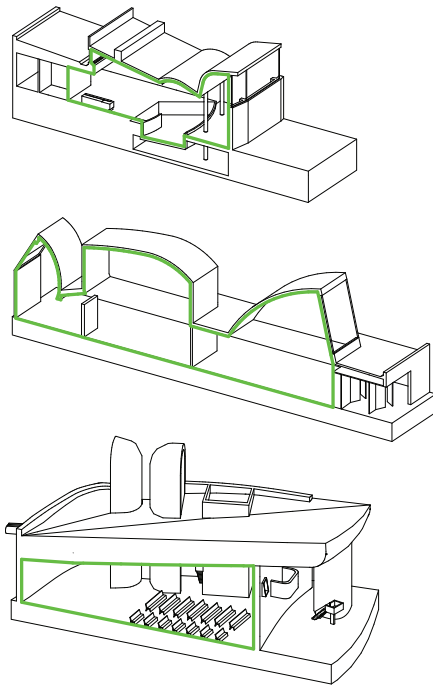


Rendering of the entry. One passes through the layers of the facade in a double height volume. (an exterior space)

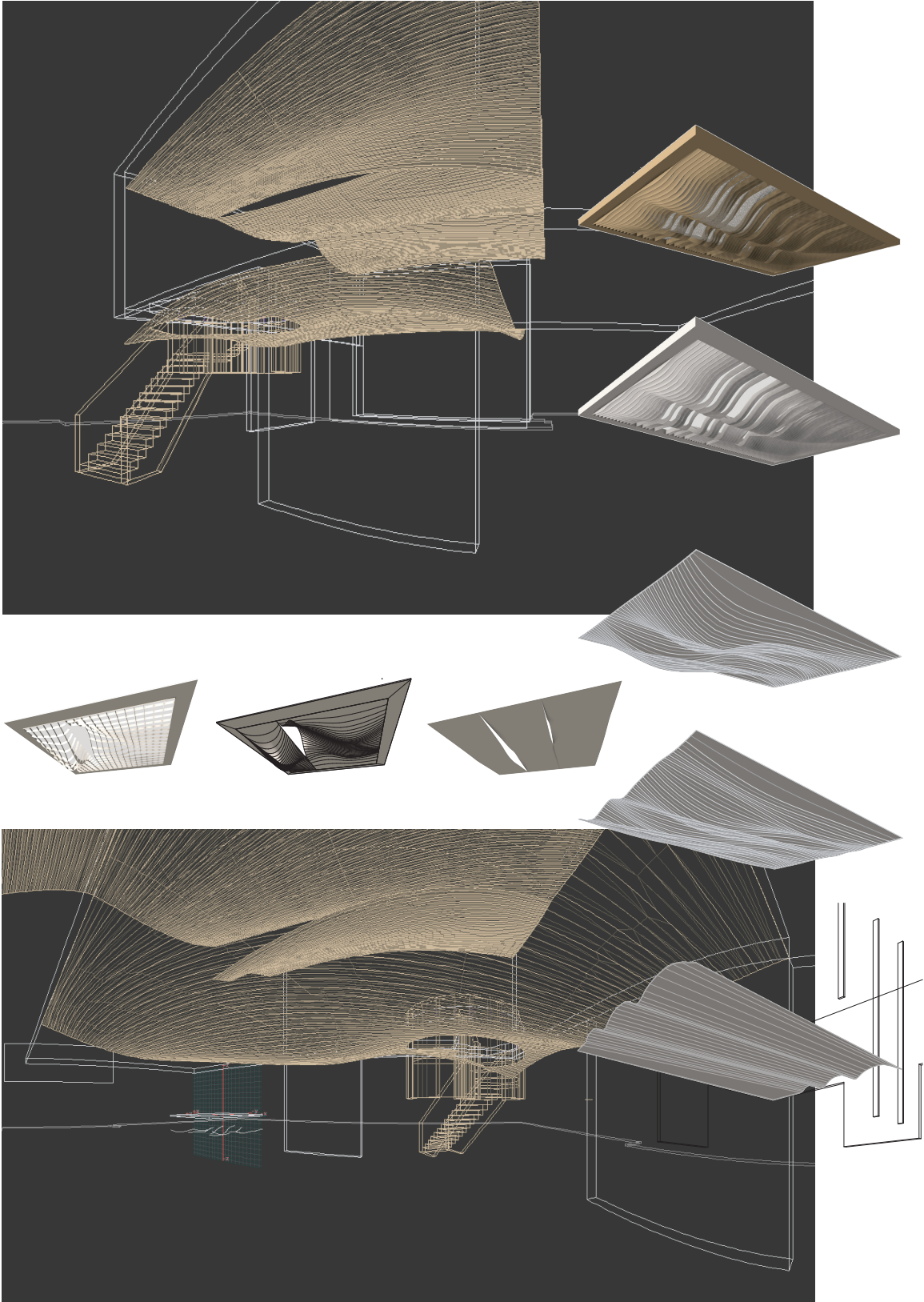
CASE STUDY

ceiling
materials
mystery

In the case study I set out to argue that the chosen precedents engage the human body through their use of materials and form. Many of the examples have an expressive roof or a similarly exaggerated element that helps create an engaging space. It is not important which element is expressed but how that element does not reveal the entire view at once; or the way it brings attention to natural phenomena; or the way it uses a particular element to engage the body and lead the visitor through the building. The two studies on the right picture the space as a wire-frame and test different heights and ceiling configurations.



Wire-frame and rendered ceiling studies.
Also showing preliminary ideas about a
vantage point for the final renderings.



TRANSITIONAL ELEMENTS

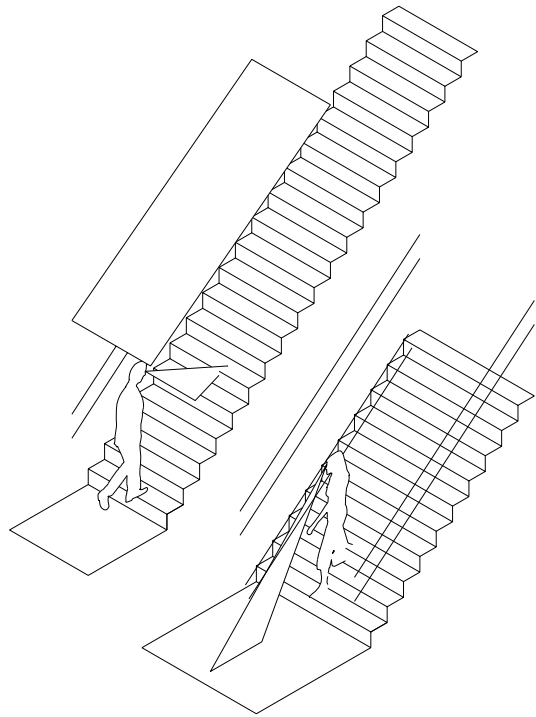
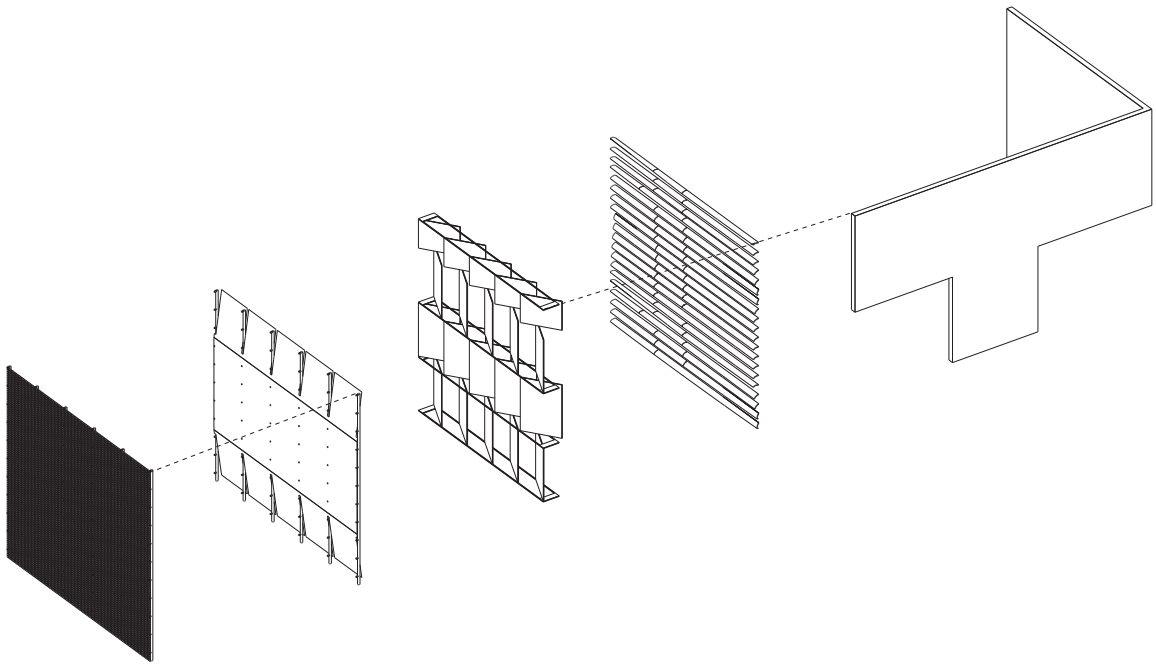
stairs
screen
entry

Moments of transition were identified as an important point of focus in the research. During the design phase, the initial concepts and research topics were explored in a variety of ways. The layered screen facade was developed through large and small scale physical models as well as digital models and renderings. The design of the stair in the addition considers its role in the overall project and the ability for its details to engage the body. Height of the risers and handrail, the run and curvature of the stair, its materials and the height of the guards, all went through numerous iterations and developments during the process.



Exploded view showing a number of early variations of the layered facade.

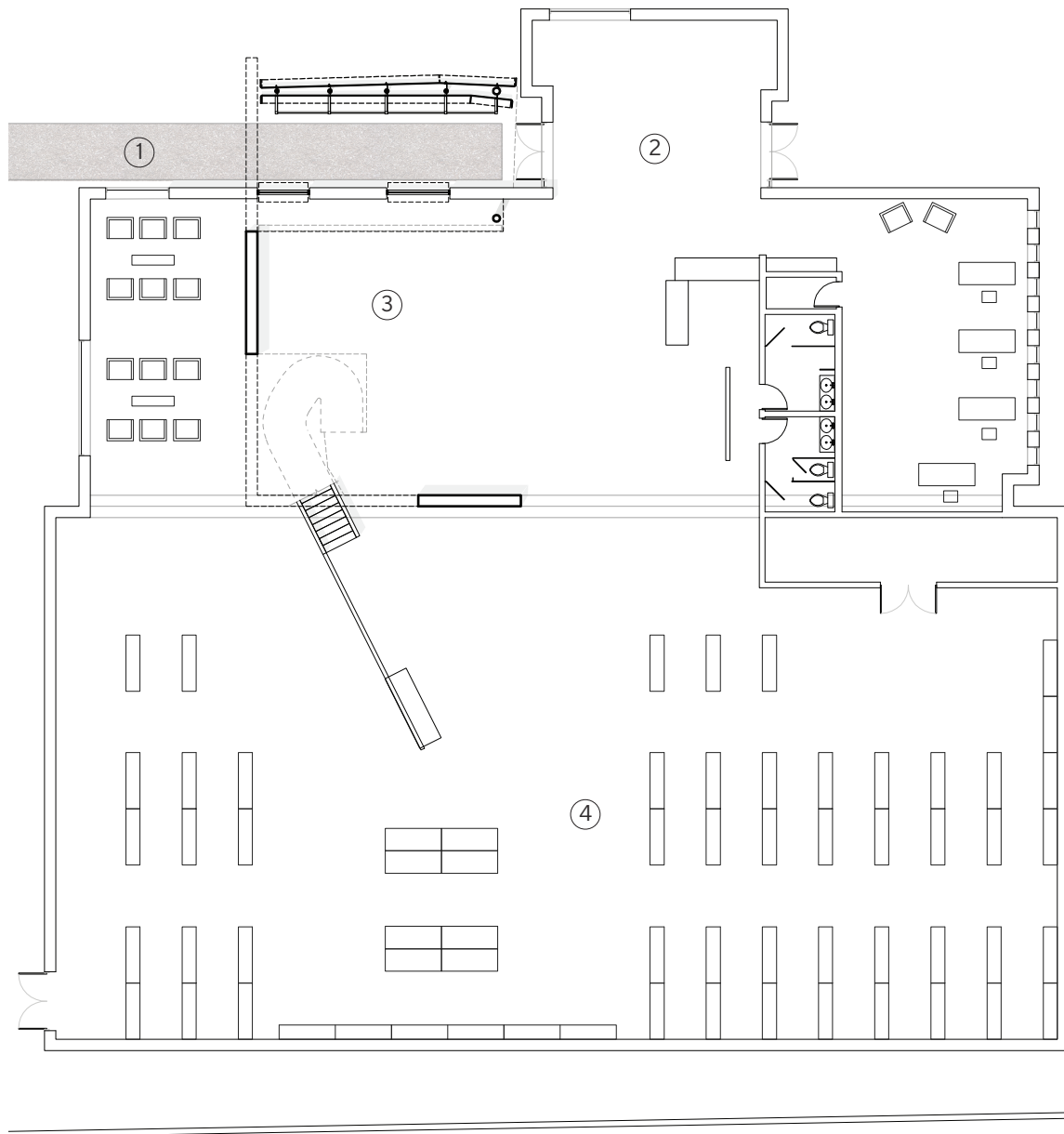
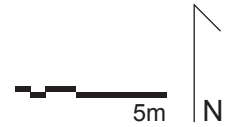
Rendered image of the louvers in the facade. And one of the stair diagrams that studies the possible width, handrail height and amount of headroom.



STUDIES |

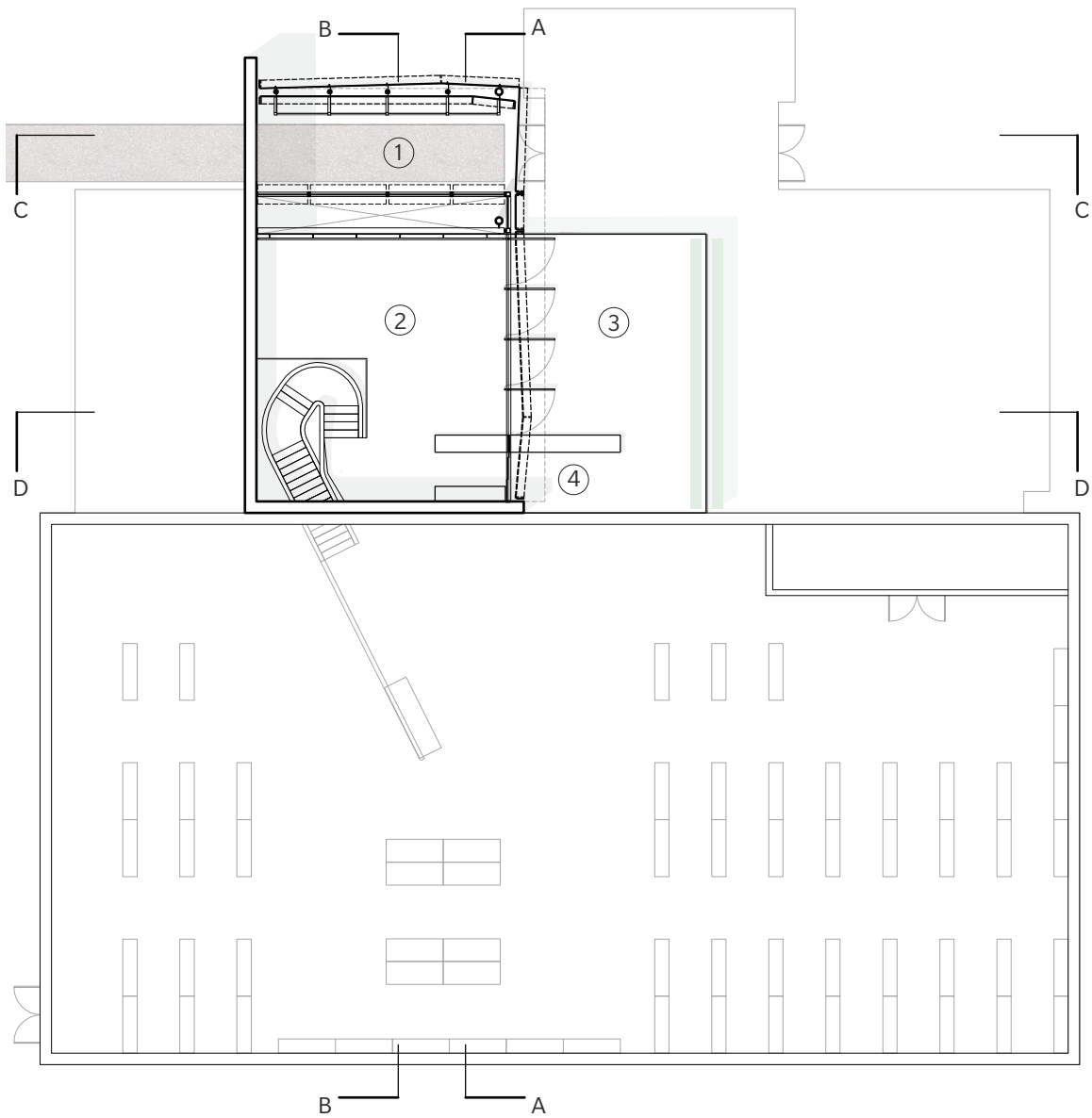
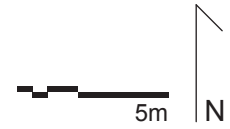
The garden analogy, case study, and transitional elements are the critical research concepts that make up the 'strategy of intensities'. These initial research topics were further explored through the design research and became the major components of the final proposal.

1. woodchip path
2. entry (allows entry without going through the addition)
3. community event space
4. modified stack layout

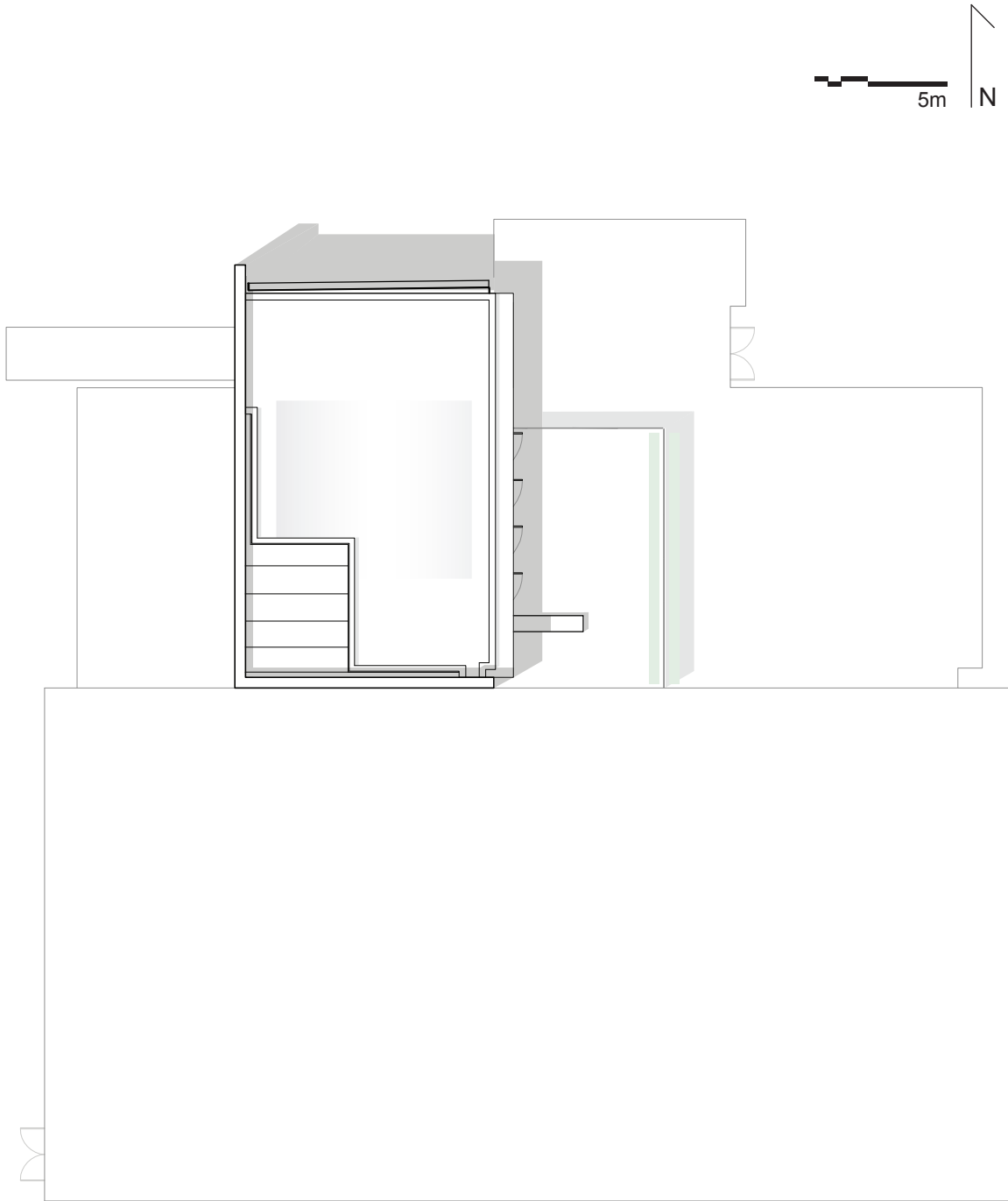


GROUND FLOOR

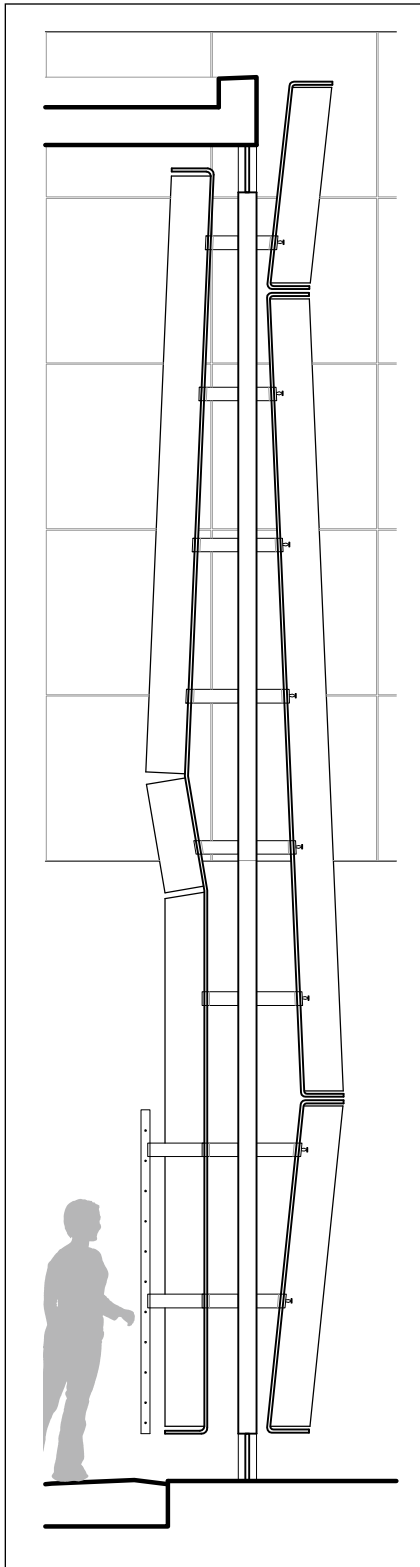
1. entry area below
2. second level reading area
3. outdoor terrace
4. espresso bar



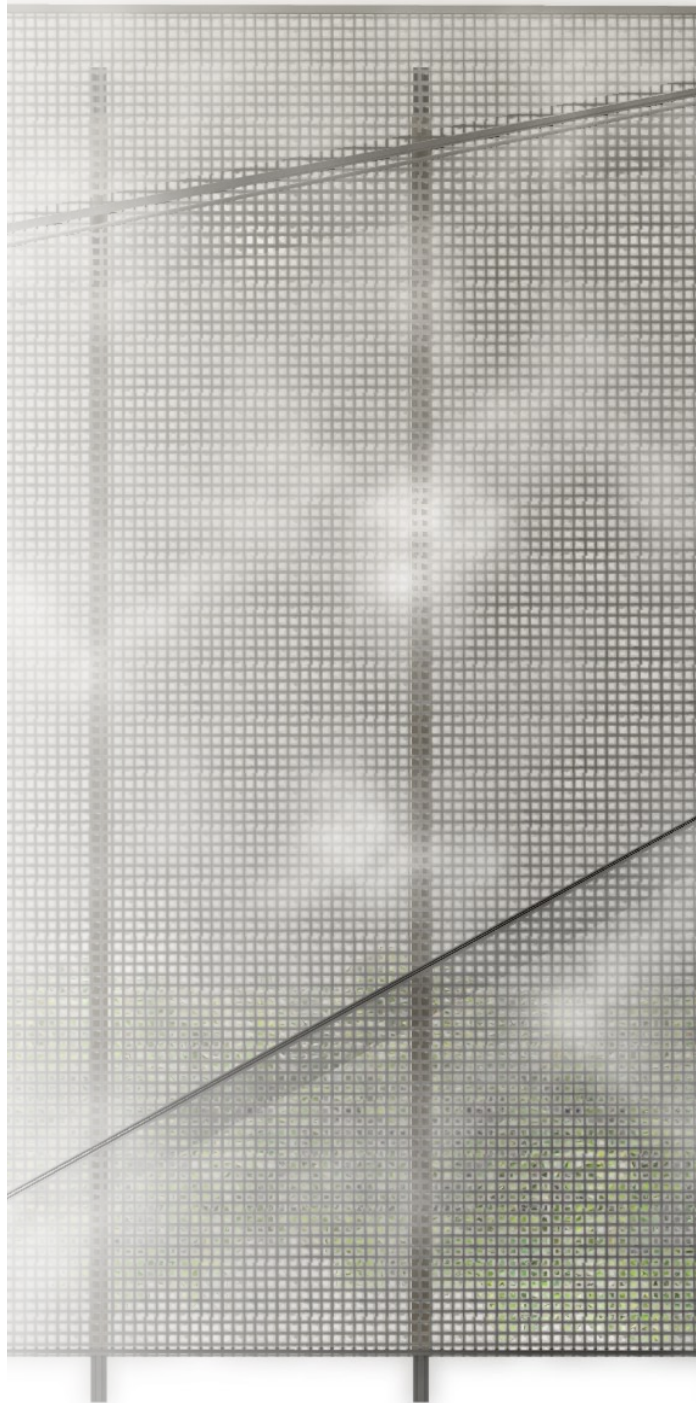
SECOND FLOOR

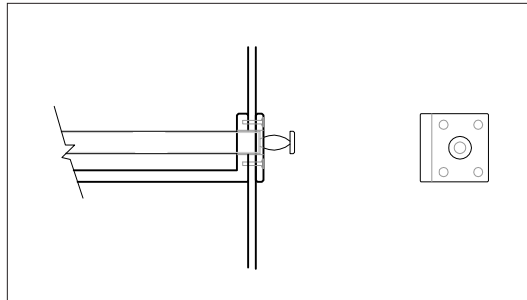


ROOF PLAN



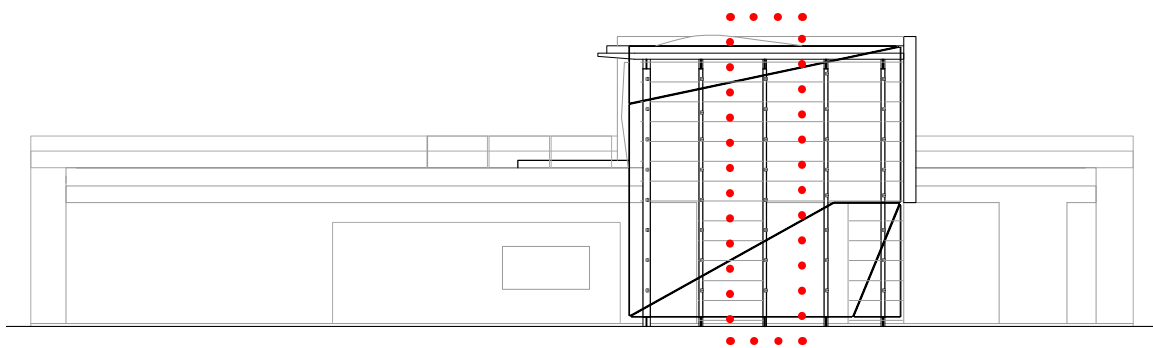
1 : 50 WALL SECTION (taken at Section B)

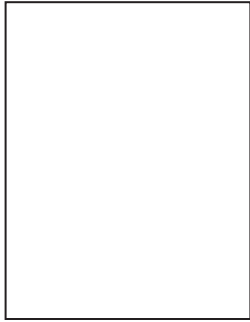


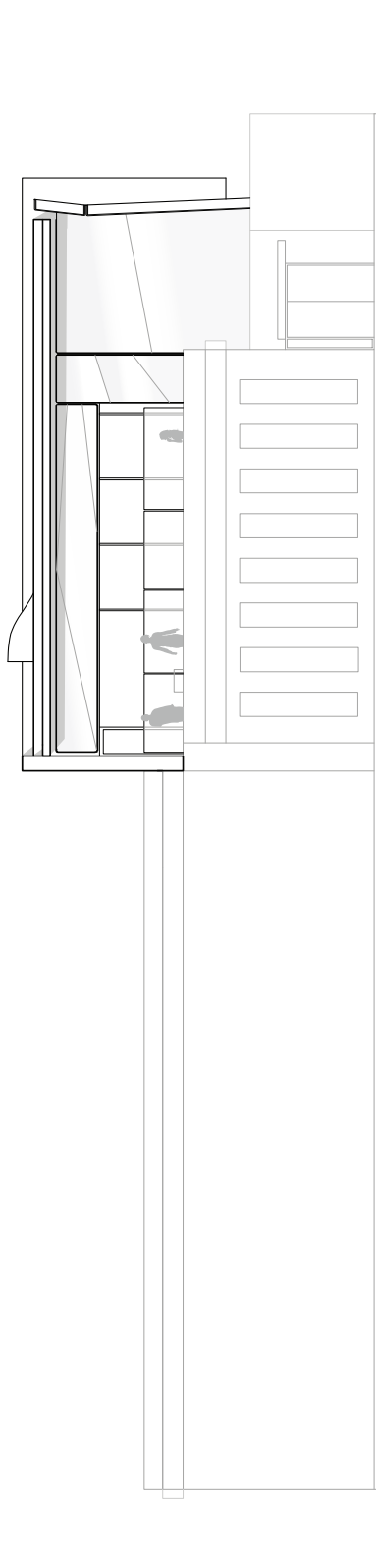


1 : 10 DETAIL OF SPRAYER ASSEMBLY

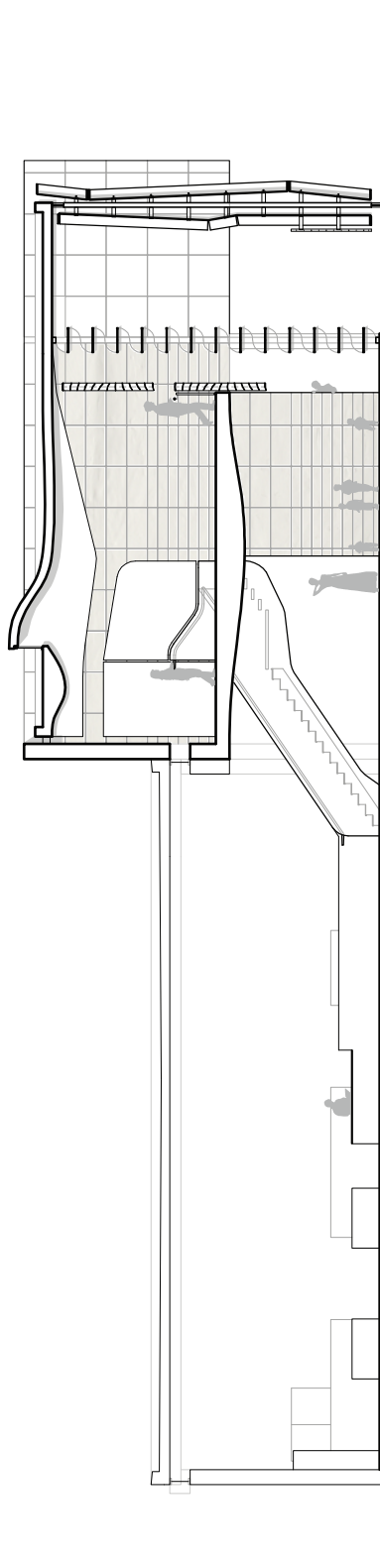
This detail integrates a standard sprinkler head into the bracket that fixes the mesh screen to the column. A heated water line runs parallel to each column and supplies the network of sprinkler heads.





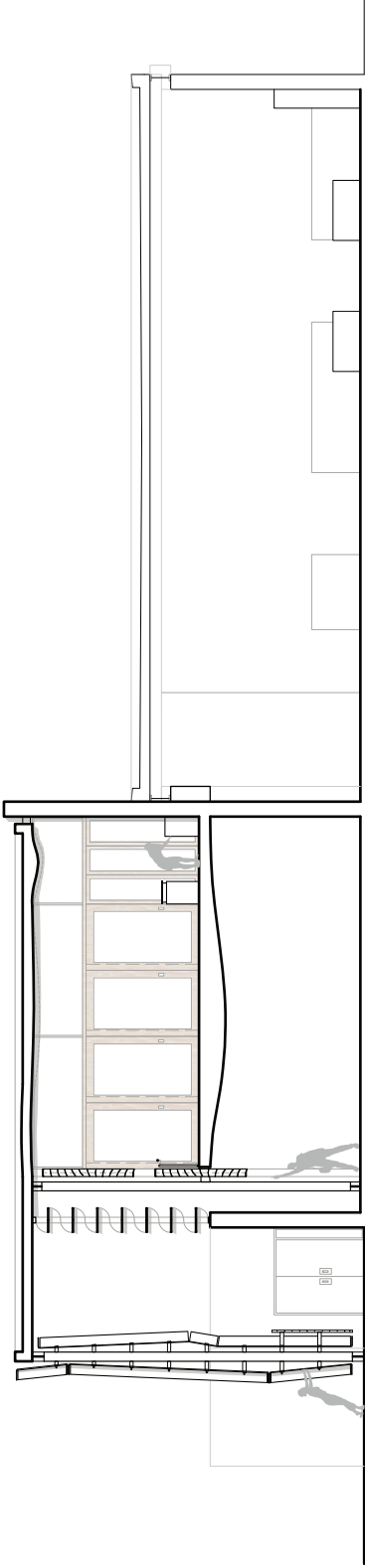


EAST ELEVATION

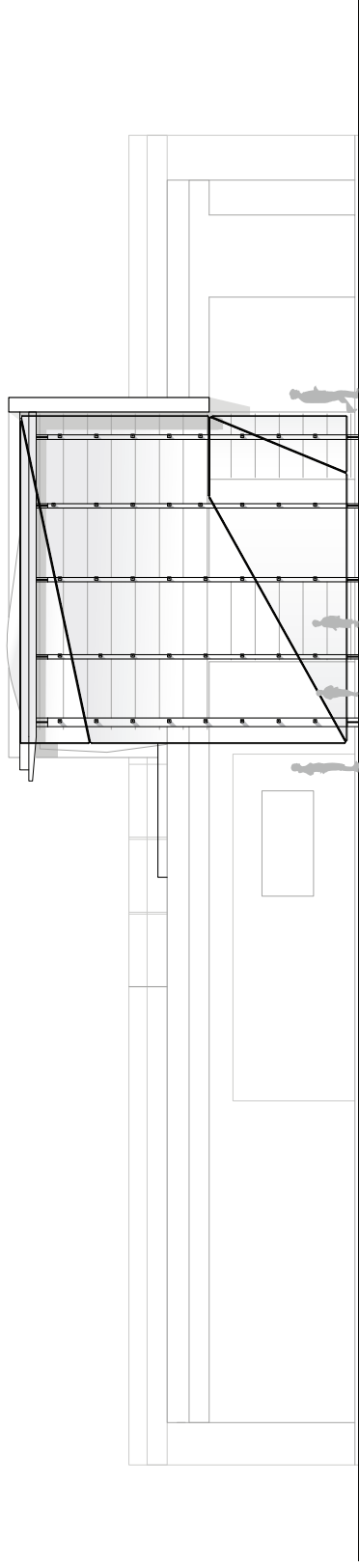


SECTION B

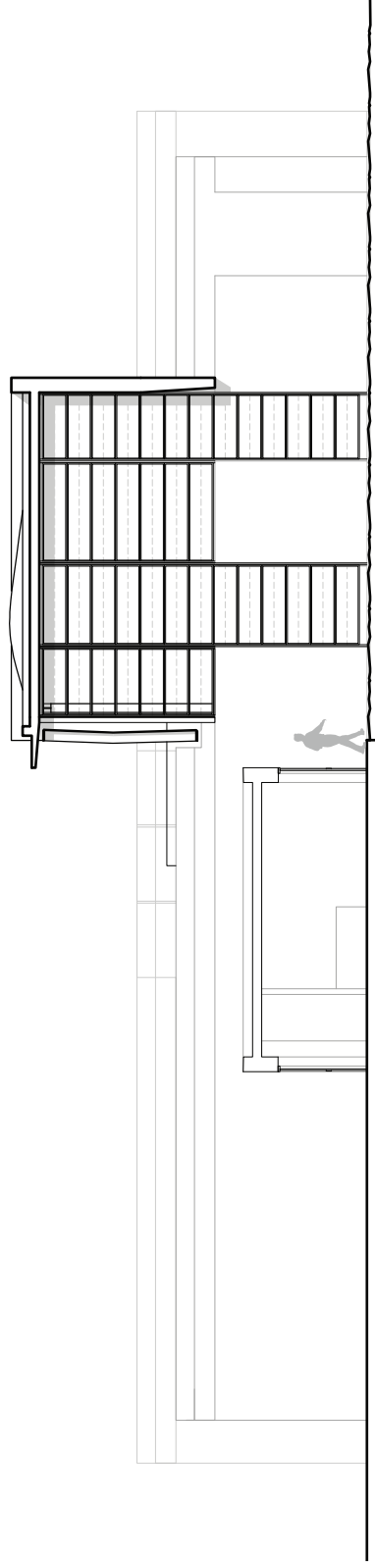




SECTION A

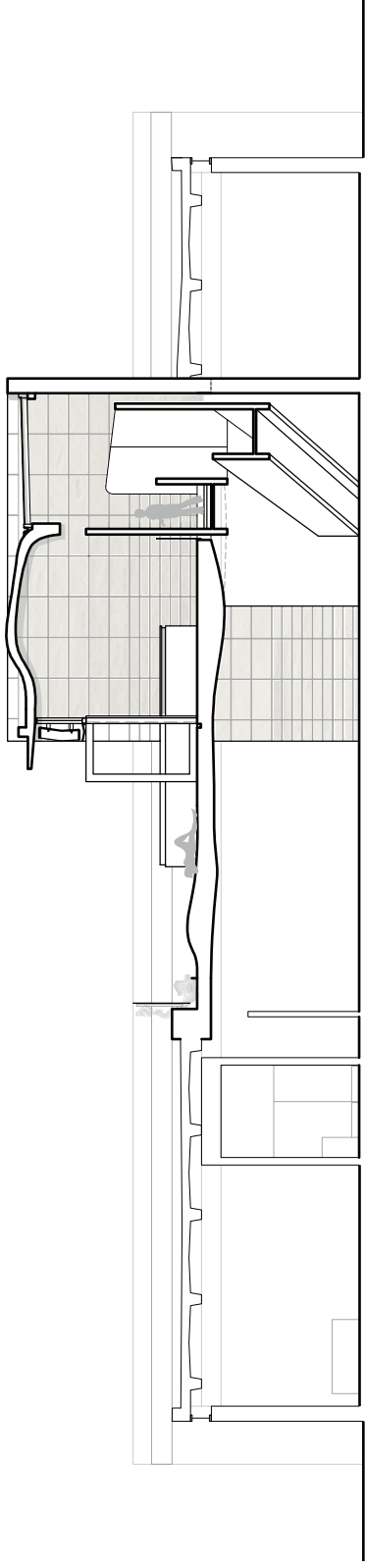


NORTH ELEVATION



SECTION C



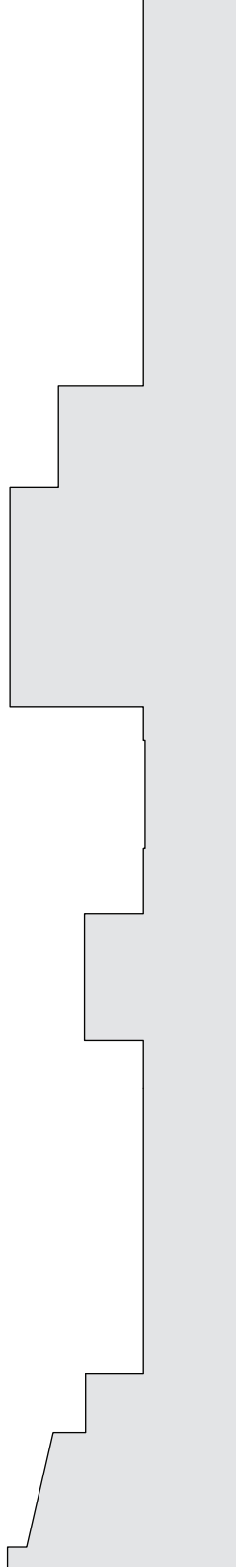
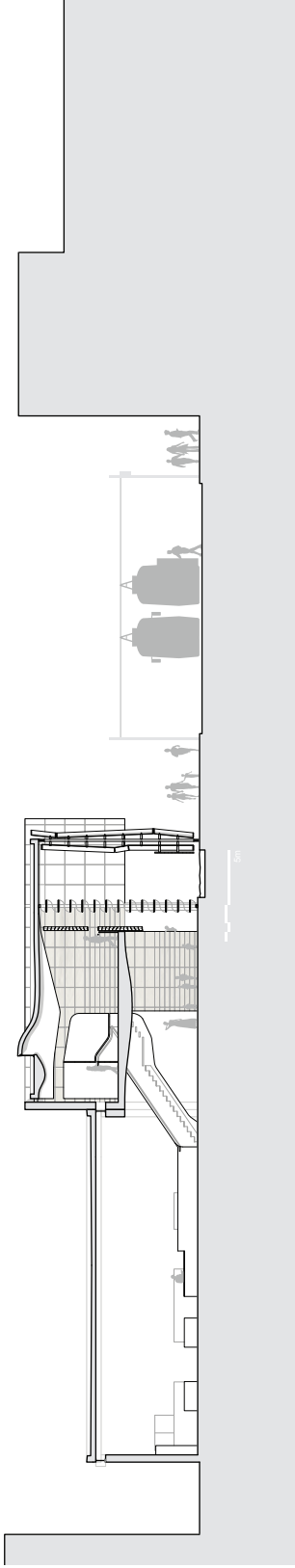
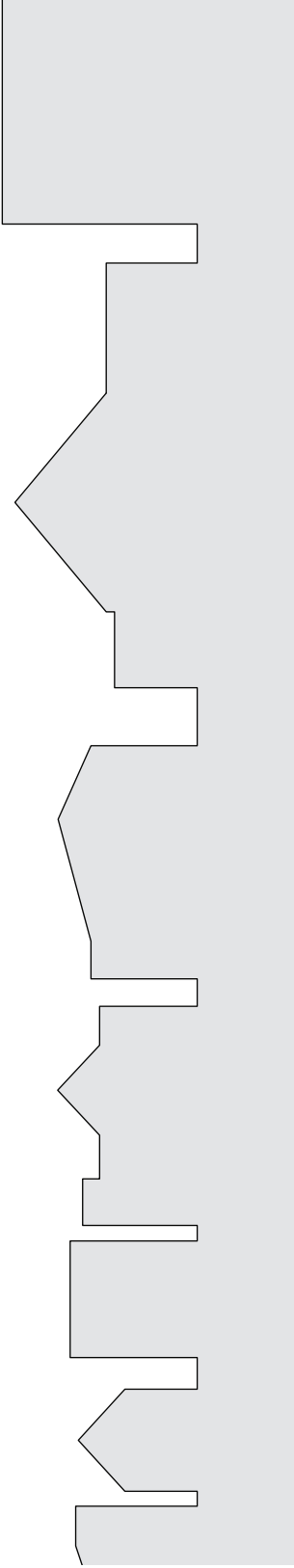


SECTION D

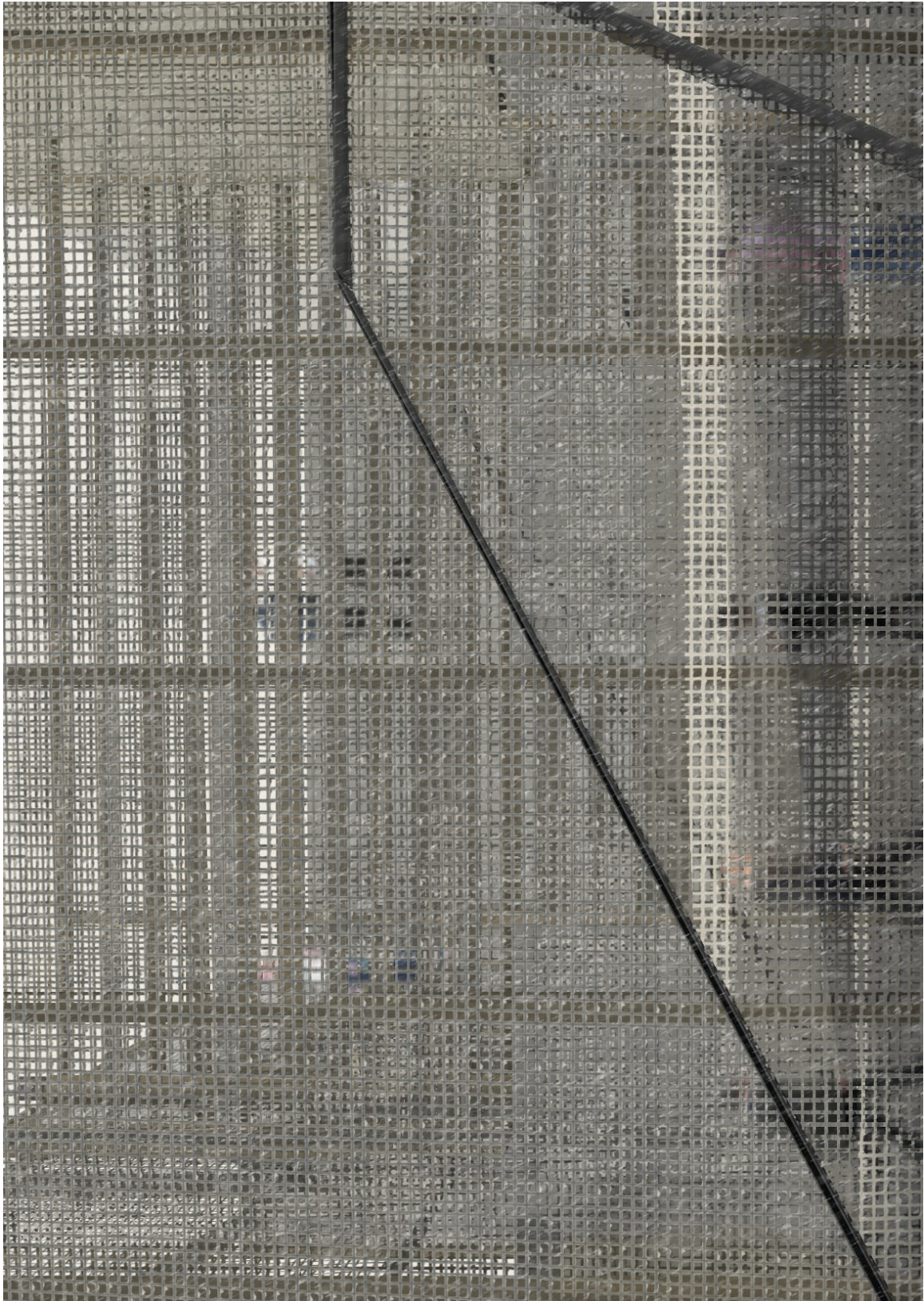


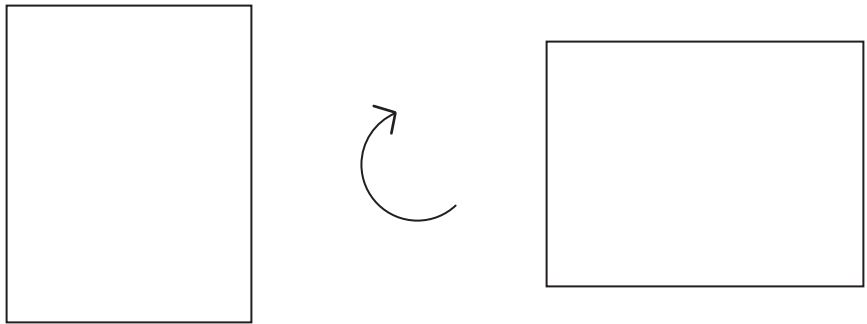






City Section
(read left to right, top to bottom)

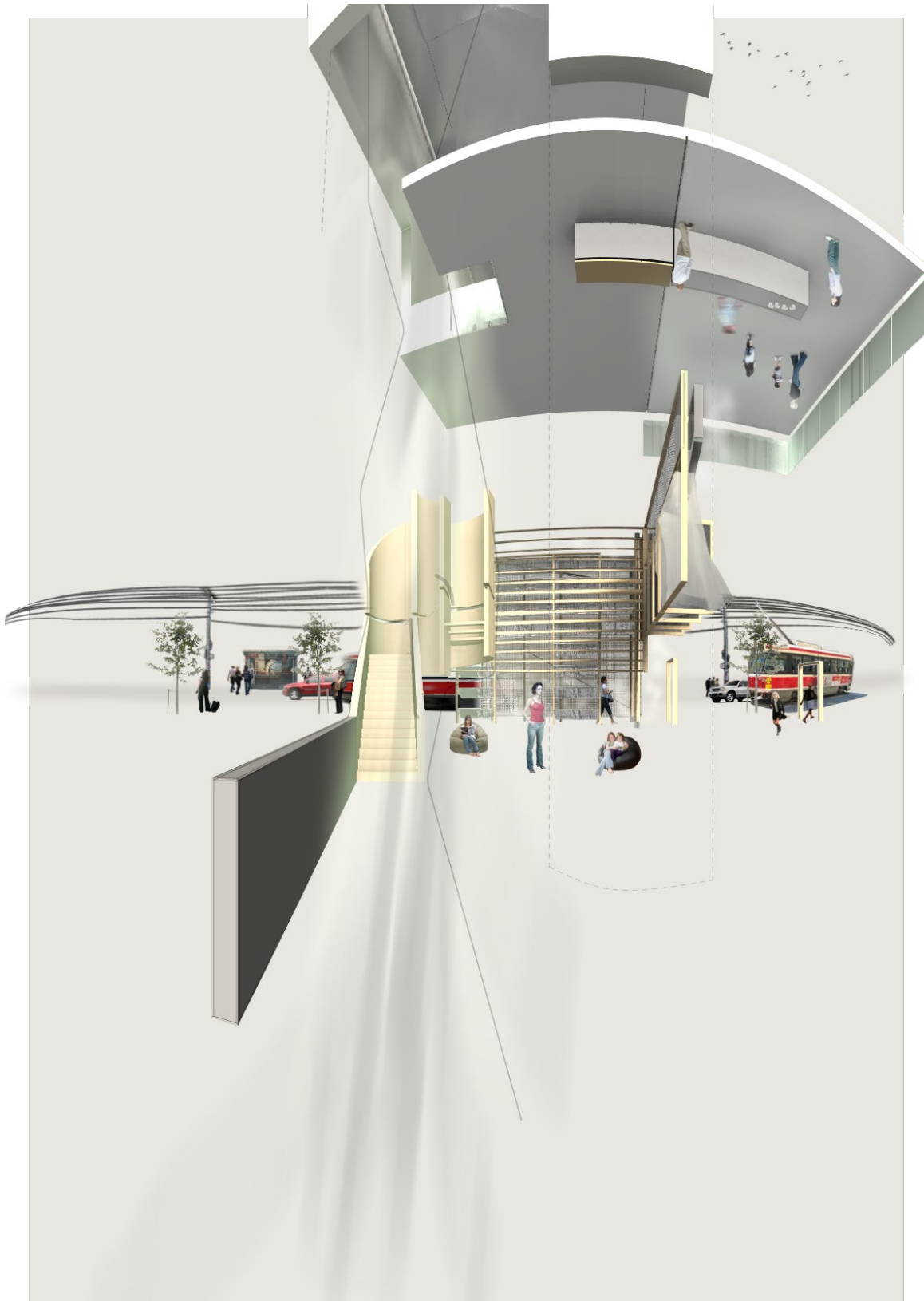




Each element in the building experiments with one of the following scenarios:

- what you see is reinforced by an exaggerated condition that might provoke you to also feel the sensation which would normally be constructed mentally when presented with an image.
- what you sense haptically is reinforced by what you see: cold, winter day > ice façade; humid summer > mist façade; a breeze > flowing fabric; heat from radiating surface > natural light.
- what you sense through the taste-smell and auditory systems is not reinforced by what you see. Changes in direction block views to the source of the stimuli.
- the links between the senses are reinforced through contrasts; something is only curved because there is something planar to compare it to, something is only rough because there is something smooth to compare it to.

A strategy of intensities



Sensory Connections and Conclusions

The search for the relationship between the haptic and visual systems in the experience of architecture is a challenging problem that is difficult to qualify. However, this project proposes an approach to architecture that gives focus to these connections and offers possibilities for an increased engagement between the body and architecture. Conveying the way in which we perceive these connections or become aware of them is difficult through an architect's standard visual mode of communication. Despite this limitation, the renderings and drawings in this project attempt to convey the ways in which the senses work together to form our understanding of architectural space. Throughout this project, I have attempted to move the focus away from renderings and large scale views of the project in order to establish a focus on a detailed and experiential consideration of materiality. In addition, the building itself has been opened up to the elements for an extended part of the year. Aside from the winter and the most extreme temperature days of the summer, the building is filled with natural breezes and the sounds of the city. Through this investigation an architectural method, that I am calling the 'strategy of intensities' was developed as a counterpoint to methods that do not consider the experiential qualities of architecture. This strategy operates from a base of knowledge about the senses, phenomenology, and a group of significant precedents. The strategy is focused on particular moments in the experience of architecture, moments when a number of the senses are at play. These moments of experiencing the unique, moving between spaces and being affected by the phenomena taking place, offer an opportunity to engage the body in new ways.

In contrast to focusing on hand crafted details, ideal situations or a prescribed path of travel, this project experiments with the idea that the engagement or the feeling of a connection or a space that resonates with us, comes through simply because it expresses something about the human condition—it expresses sensory experience.

References

Notes, comments, and further reading.

The purpose of this brief section is to provide additional information and suggestions for those interested in further exploration on this topic.

An excellent place to begin is to look at recent exhibitions, publications and installations related to this area of study. Specifically, *Sense of the city: An alternate approach to urbanism*, an exhibition and later a publication by the CCA in Montreal. This exhibition and collection of essays sets the tone for much of the contemporary exploration in this area, and serves to introduce several prominent theorists and practitioners. *Sensorium* is another similar example however, it takes a technological approach to the discussion. These two collections are representative of the two major streams of contemporary thought on this topic—one stream is focused on the search for a sensory architecture through practice oriented means of detailing, a focus on materiality and by critically evaluating architecture through this lens. The other stream follows a technological and academic-based exploration. Through experimentation with new technologies and computer software, this stream seeks to express a sensory connection with responsive and adaptive

architectural environments. The most recent thinking on this stream is collected in two issues of *Architectural Design* titled *Interior Atmospheres* and *Energies. New Material Boundaries*.

These four publications together introduce the reader to the scope of the current exploration on this topic and they provide a very general introduction to the phenomenological basis of this work.

For an in depth understanding of this work, it is necessary to be familiar with the earlier work of architects and theorists such as, Juhani Pallasmaa, Steven Holl and Alberto Pérez-Gómez. Although there is a much longer line of thinking that precedes theirs. Another publication that both introduces this topic and proposes its own approach is *Sensory Design*. It is useful for the connections it draws between many different examples and theories. However, it falls short in its attempt to quantify and capture ‘sensory experience’.

Even with minimal knowledge and understanding of this topic, it should be clear that the key to its true exploration is through one’s own work; pairing research with one’s own architectural project or personal experiences. Providing a context and scenario for the work will allow you to better understand the research and the discussion as a whole.

The following pages list the references for each section and cover the additional sources that were not directly referenced, but had a significant influence on the project as a whole.

Introduction

References

- Deleuze, Gilles (2003). Francis Bacon The logic of Sensation. (Daniel W. Smith trans.) Minneapolis: U of M Press. (Original work published 1981).
- Fascari, M. (2002). A Tradition of Architectural Figures: A search for *vita beata*. In Dodds, G., Tavernor, R. (Eds.). *Body and Building: Essays on the changing relation of body and architecture*. pp.258-267. The MIT Press.
- Gartner, Scott. Unpublished manuscript of a lecture presented to the Association of Collegiate Schools of Architecture Conference, Washington, 1990. Quoted in Frampton, K.
- Mitnick, Keith. (2008). *Artificial Light. A narrative inquiry into the nature of abstraction, immediacy, and other architectural fictions*. New York: Princeton Architectural Press.
- Zumthor, P. (2006). *Atmospheres: Architectural Environments - Surrounding Objects*. Boston, Mass.: Birkhäuser Basel.

In search of a corporeal architecture

References

- Baird, G. (2002). Introduction. In Dodds, G., Tavernor, R. (Eds.). *Body and Building: Essays on the changing relation of body and architecture*. pp.2-27. The MIT Press.
- Buchli V. (Ed.) (2002). *The material culture reader*. New York: Berg.
- Deleuze, Gilles (2003). Francis Bacon The logic of Sensation. (Daniel W. Smith trans.) Minneapolis: U of M Press. (Original work published 1981).
- Drobnick, Jim (2005). Volatile Effects: Olfactory Dimensions of Art and Architecture. In Howes, David. *Empire of the Senses: The sensual cultural reader*. pp. 265-280. New York: Berg.
- Feld, Steven (2005). Places Sensed, Senses Placed: Toward a sensuous epistemology of environments. In Howes, David (Ed.). *Empire of the Senses: The sensual cultural reader*. pp. 179-191. New York: Berg.
- Frampton, K. (1988). *Intimations of Tactility: Excerpts from a Fragmentary Polemic*. *Body and Architecture*. New York: Rizzoli.
- Frampton, K. (2002). Corporeal Experience in the Architecture of Tadao Ando. In Dodds, G., Tavernor, R. (Eds.). *Body and Building: Essays on the changing relation of body and architecture*. pp. 304-318. The MIT Press.

- Frascari, M. (2002). A Tradition of Architectural Figures: A search for *vita beata*. In Dodds, G., Tavernor, R. (Eds.). *Body and Building: Essays on the changing relation of body and architecture*. pp.258-267. The MIT Press.
- Gibson, J. J. (1966). *Senses considered as perceptual systems*. Boston: Houghton Mifflin.
- Heschong, L. (1979). *Thermal delight in architecture*. Cambridge, Mass.: MIT Press.
- Howes, David (2005). *Architecture of the Senses*. In Zardini M., Schivelbusch W (Eds.). *Sense of the city: An alternate approach to urbanism*. pp. 322-333. Montreal: Canadian Centre for Architecture
- Howes, David (2006) *Scent, Sound and Synaesthesia: Intersensoriality and material culture theory*. In Tilley C. Y., Keane, W., Kuchler, S., Rowlands, M., Spyer, P. (Eds.). *Handbook of Material Culture*. pp. 161-172. London: SAGE.
- Jones C. A., Arning B. (Eds.) (2006). *Sensorium: Embodied experience, technology, and contemporary art* (1st MIT Press ed. ed.). Cambridge, Mass.: MIT Press
- Kondo, Dorinne (2005). *The Way of Tea: a symbolic analysis*. In Howes, David (Ed.). *Empire of the Senses: The sensual cultural reader*. pp. 192-211. New York: Berg.
- Malnar, J. M., Vodvarka F. (Eds.) (2004). *Sensory design*. Minneapolis: University of Minnesota Press.
- Mattern, S. (2007). *Media Acoustics: Sounds of the American public library*. In Ripley, C., Polo, M., Wigglesworth, A. (Eds.). *In The Place of Sound: Architecture, music, acoustics*. pp. 147-156. London: Cambridge Scholars Publishing.
- Mattern, Shannon (2007). *The New Downtown Library*. Minneapolis: U of M Press.
- Mcluhan, M. (2005). *The Way of Tea: a symbolic analysis*. In Howes, David (Ed.). *Empire of the Senses: The sensual cultural reader*. pp. 43-52. New York: Berg.
- Pallasmaa, J. (1996). *The Geometry of Feeling: A look at the phenomenology of architecture*. In Nesbitt, K. *Theorizing a new agenda for architecture*. New York: Princeton Architectural Press. pp.447-453.
- Pallasmaa, J. (2005). *The eyes of the skin: Architecture and the senses* (2nd ed.). Hoboken, |: Wiley.
- Pallasmaa, J. (2009). *The Thinking Hand: existential and embodied wisdom in architecture*. London: John Wiley & Sons Ltd.
- Sauzet, M (unknown). *Sensory Phenomenology as a Reference for the Architectural Project*. *Architecture and Behaviour*. 5(2), pp. 153-160.
- Schivelbusch, Wolfgang (2005). *Nightfall Fear in the Street*. In Zardini M., Schivelbusch W (Eds.). *Sense of the city: An alternate approach to urbanism*. Montreal: Canadian Centre for Architecture.
- Smith, Daniel W. (2003). *Deleuze on Bacon: Three conceptual trajectories in The Logic of Sensation*. In Francis Bacon *The logic of Sensation*. Minneapolis: U of M Press. (Original work published 1981).
- Unwin, S. (2007). *Doorways*. New York: Routledge.

Vesely, D. (2002). The Architectonics of Embodiment. In Dodds, G., Tavernor, R. (Eds.). *Body and Building: Essays on the changing relation of body and architecture*. pp. 304-318. The MIT Press.

Weston, Richard (2003). *Materials, Form and Architecture*. New Haven: Yale University Press.

Zumthor, Peter. (1999). *Thinking Architecture*. Boston, Mass.: Birkhäuser.

Design Research

References

Addington, M. (May 2009). Contingent Behaviours. *Architectural Design*. Vol. 79(3). pp. 12-17.

Blaisse, P. (May 2009). The Instinctive Sense of Space and Boundary. *Architectural Design*. Vol. 79(3). pp.84-87.

Gissen, D. (2009). *Subnature: Architecture's other environments*. New York: Princeton Architectural Press.

Lally, S. (May 2009). Twelve Easy Pieces for the Piano. *Architectural Design*. Vol. 79(3). pp. 6-11.

Wagenfeld, M. (May 2008). The Aesthetics of Air. *Architectural Design*. Vol.78(3). pp. 20-25.

Consulted sources

Calvino, I. (1974). *Invisible cities*. New York, N.Y.: Harcourt, Brace, Jovanovich.

De Landa, Manuel. (1997). *A Thousand Years of NonLinear History*. New York: Zone Books.

Durie, B. (2005, January 29). Doors of Perception. (Cover story). *New Scientist*, 185(2484), 33-36. Retrieved September 3, 2009, from Academic Search Premier database.

Frampton, K. (2006). *Reflective Practice*. in Patkau Architects. New York: The Monacelli Press.

Fernandez-Galiano, L. (2000). *Fire and Memory: On architecture and energy*. (Gina Carino trans.). Cambridge: The MIT Press. pp.100-126.

Gregory, R. (2008). *Key Contemporary Buildings. Plans, Sections and Elevations*. London: Lawrence King Publishing Ltd.

Holl, S., Pallasmaa J., Perez Gomez A. (Eds.) (2006). *Questions of Perception: Phenomenology of architecture* (2nd ed.). San Francisco, CA: William Stout Publishers.

Manguel, A.(2006). *The Library at Night*. Toronto: Random House.

McLuhan, Marshall. (2003). *Understanding Media: the extensions of man*. (Critical Edition, W. T. Gordon Ed.). New York: Ginko Press. pp. 162-177.

Pallasmaa, J. (2000, May). Hapticity and time: Notes on fragile architecture. *The Architectural Review*, 207(1239), 78-84. Retrieved November 1, 2009, from Research Library.

Perez-Gomez, Alberto (2002). Introduction. In Kieran, S., Timberlake, J. (2002). *Manual*. pp. 6-8. New York: Princeton Architectural Press.

Perez Gomez, A. (2006). *Built upon love: Architectural longing after ethics and aesthetics*. Cambridge, Mass.: MIT Press.

Pevsner, N. (1976). *A History of Building Types*. Princeton: Princeton University Press.

Weston, R. (2004). *Plans, Sections and Elevations: key buildings of the twentieth century*. London: Lawrence King Publishing Ltd.

