UNIVERSITY OF CINCINNATI

Date: 24-May-2010

I, Erin K O'Connell, hereby submit this original work as part of the requirements for the degree of:

Master of Architecture

in Architecture (Master of)

It is entitled:

Senses of Place

Student Signature: Erin K O'Connell

This work and its defense approved by:

Committee Chair: Nnamdi Elleh, PhD

Elizabeth Riorden, MARCH
Senses of Place

May 2010

A thesis submitted to the
Division of Research and Advanced Studies
of the University of Cincinnati
in partial fulfillment of the requirements for the degree of
Master of Architecture
in the School of Architecture and Interior Design
of the College of Design, Architecture, Art and Planning

by

Erin Kathleen O’Connell
Bachelor of Science in Architecture
University of Cincinnati, 2008

Committee Chairs:
Nnamdi Elleh
Elizabeth Riorden
Abstract

This thesis will focus on the design of a place of learning for the visually impaired. Its theoretical underpinnings will be developed through explorations of how the senses might encourage learning among visually impaired individuals, by means of interactions with built form. In other words, can a built object be an instrument of teaching for the visually impaired?

The thesis argues that based on the scale and the large spaces built objects occupy wherever they are located, most architectural representations to the general public are overwhelmingly designed as a visual art, something that is experienced mostly through the eyes. Drawing from Peter Eisenman’s essay, “The End of the Classical, the End of the Beginning, the End of the End,” (1984), this thesis argues that the tradition of reducing buildings to objects that can be experienced primarily through the sense of sight dates back to the Renaissance era. However, architecture can be thought of and designed as an experiential passage that can excite all the five senses of its users. The exploration of how the five senses—smell, taste, touch, hearing, as well as sight—can be stimulated when using a building holds promise in the education of blind students. The study will be grounded in the hypothesis that although the sense of sight directs our visual understanding of the environment, movement and tactility can aid visually handicapped students to orient themselves in movement and in space.

Lastly, there will be an interpretation of the lessons learned from the theoretical explorations through the design of a Culinary Center for the blind at Clovernook Center for the Blind and Visually Impaired in Cincinnati, Ohio.
Thank you to everyone who helped me along the way, especially...

Nnamdi and Liz,

Esther, Mike, Karen, and everyone at Clovernook,

Mom, Dad, Katy, Kerry, Kyle,

and Kyle

...I couldn’t have done this without you
# Table of Contents

Abstract  
List of Images  
Introduction: Clovernook Center for the Blind and Visually Impaired  

1 Historical Analysis and Influences on the Sensory Experience  
   1.1 History of Ocularcentric Design  
   1.2 Designing for the Human Body and Mind  
      1.2.1 Place and Placemaking  
      1.2.2 Dwelling  
   1.3 A Return to Haptic Design  

2 Designing for the Visually Impaired  
   2.1 Perceiving Without Sight  
      2.1.1 Touch  
      2.1.2 Hear  
      2.1.3 Smell  
      2.1.4 Taste  
   2.2 Learning Without Sight  

3 Precedent Studies  
   3.1 W. Ross Macdonald School for the Blind, G. Bruce Stratton Architects  
   3.2 Hazelwood School, Gordon Murray + Alan Dunlap Architects  

4 Design Project  
   4.1 Site  
   4.2 Program  
   4.3 Design Strategy  
   4.4 Design Reflection  

Bibliography
List of Images

1. Procter Center at Clovernook Center for the Blind, author’s image
2. Figure-Ground of Clovernook and surrounding area, author’s image
3. Cary Cottage, author’s image
4. Procter Center, author’s image
5. Clovernook Multipurpose Building, author’s image
7. Raphael, “The School of Athens,” academic.shu.edu
8. Albrecht Durer, painter using a version of Alberti’s “veil” from Ackerman, Distance Points, 79.
9. Demonstrations of perspective distortions from Ackerman, Distance Points, 100.
11. Maison-Carree, flickr.com
12. Paladio’s Villa Rotunda, author’s image
13. Villa Savoye, author’s image
14. Downtown Cincinnati skyline, flickr.com
15. Union Terminal, www.benmautner.com
17. Zumthor’s Swiss Pavilion, www.arcspace.com
18. Zumthor’s Therme Vals, www.nickkane.co.uk
19. Peter Zumthor, diagramatic plan of Therme Vals, sofaarome.files.wordpress.com
20. Peter Zumthor,Floorplan, Therme Vals
21. Holl’s Chapel of St. Ignatius, mocra.slu.edu
22. Holl’s Chapel of St. Ignatius, flickr.com
24. Plan diagram of light/color in St. Ignatius, author’s image
25. Section diagram of light/color in St. Ignatius, author’s image
26. flickr.com
27-32. Images of touch, flickr.com
33-36. Images of hearing, flickr.com
37-42. Images of smell, flickr.com
43. Blind man cooking, okhorizon.com
44. Dining in the Dark, travelblog.viator.com
45. Braille Menu, flickr.com
46. Hazelwood School, hazelwood.glasgow.sch.uk
47. W. Ross Macdonald School,
48. Plan, W. Ross Macdonald School, G. Bruce Stratton Architects
51. Plan, Hazelwood School, designshare.com
52. Hazelwood School, designshare.com
53. Hazelwood School, designshare.com
54. Hazelwood School, designshare.com
55. Hazelwood School, designshare.com
56. Proposed Design, author’s image
57-59. maps by Google
60. Site diagram by author
61-64. Photos of site, author’s images
65. Site diagram by author
66. Current plans of Procter Center
67-68. Current kitchen, author’s image
69. Proposed site plan, author’s image
70. Proposed Plan, author’s image
71-72. Proposed perspectives, author’s images
73-74. Proposed elevations, author’s images
Introduction
Clovernook Center for the Blind and Visually Impaired

Sisters Florence and Georgia Trader formed Clovernook Center in 1903. Georgia herself was blind and the sisters recognized the need for a facility that would enable blind women to lead active and meaningful lives. The sisters befriended William A. Procter, head of the Procter and Gamble Company, who offered to purchase land and a cottage for their cause. The cottage, Cary Cottage, became the first home for blind women in Ohio. Over the last century, Clovernook has evolved into a comprehensive organization for visually impaired men and women providing medical, social, employment, and life skills services.

This institution aims to provide the visually impaired, their families, and the community with the highest level of services possible. Clovernook specializes in instructional services, offering life skills classes in orientation and mobility, low vision therapy, art and recreation, and computer skills. The Social Services program supports individuals adjusting to recent and long-term vision loss. The staff assists visually impaired persons with managing day-to-day activities, such as grocery shopping and transportation. Clovernook is also a major manufacturing center, producing millions of paper products from manila folders to paper cups. Additionally,
Clovernook is one of the largest Braille printing facilities in North America, printing Braille editions of magazines and restaurant menus, among other publications. This manufacturing center provides dozens of valued jobs to Cincinnati’s visually impaired men and women.

Currently the facility is composed of three buildings. The smallest is the Cary Cottage (figure 3), the childhood home of poets Alice and Phoebe Cary. The cottage, built in 1832, is now a museum on the National Register of Historic Places. The Procter Center (figure 4) houses the kitchen and art rooms, and is the main facility for youth and recreational services. The last and largest building (figure 5) houses everything else, including the main offices, printing, and manufacturing facilities. However, despite being a center for the visually impaired, Clovernook’s buildings are not very conducive to wayfinding without sight. For example, the visually impaired receptionist, Truie, complains that she cannot tell when people are coming or leaving, as the front desk is off to the side of the main corridor. The main
building was most likely built in the 1960s, and is overall unremarkable, with white CMU walls and carpeted floors, except in the warehouse and manufacturing areas, where there is just a simple concrete floor. Clovernook could benefit from well-designed spaces that will improve the experience for both sighted and non-sighted individuals.

Clovernook’s mission is to improve the quality of life for the visually impaired and their families by teaching life skills, offering medical services and job placement, and providing a support group. The institution’s core values include a respect for all people, celebration of diversity, an atmosphere of integrity, stewardship, and cooperation. Clovernook states its mission statement as, “Our mission is to promote independence and foster the highest quality of life for people with visual impairments including those with additional disabilities.”  

i  www.clovernook.org
Clovernook depends upon the generous help of volunteers in order to stay successful. The center has dozens of regular volunteers who help out with maintenance, transportation, administration, or events. Volunteers are needed to take visually impaired people to appointments, grocery shopping, and so on. Also, volunteers help with the Braille printing center by proofreading with a visually impaired person. The volunteer will read aloud while the other reads Braille, or vice versa. Volunteers also work as companions with the visually impaired by reading and answering mail, or helping with other things they may need sight for. Clovernook also depends on donations from the community.

A new, innovative space would give Clovernook more publicity and raise public awareness of its cause. If more members of the community knew about Clovernook and what they do, the institution could attract more volunteers and donations. Also, an income-generating element such as a restaurant or museum could help Clovernook financially, as well as providing more jobs for the visually impaired.

Clovernook Center for the Blind and Visually Impaired is an inspiring institution that is dedicated to improving the lives of those with visual impairment. The center, while successful as it is, could benefit from an inventive building design to enhance the environment of the people who use the center daily. The users of Clovernook, both visually impaired and sighted, have unique ways of using and experiencing space. The building should be just as exceptional and distinctive as the people within it. Any addition to Clovernook’s complex would involve exploring how the blind experience space and built form. The interest in providing a setting for the visually impaired provides the main focus of this thesis.
Chapter 1
Historical Analysis and Influences on the Sensory Experience

Introduction
Throughout history, humans have depended on the sense of sight over all other senses. It is no wonder, then, that architecture is driven primarily by vision and aesthetics. Buildings became objects to look at rather than experiential spaces to explore. The following examines the history of visual dominance in Western cultures and the movement by some architects to design more haptic, experiential buildings.

1.1 History of Ocularcentric Design
Historically, seeing has been regarded as the “noblest” of senses. Hundreds of years ago, man heard and smelled and felt his way through space, relying on these senses to guide him in hunting, gathering, and evading danger. Today, “The only sense that is fast enough to keep pace with the astounding increase of speed in the technological world is sight.”

sight has transformed from one of five equal senses to the strongest and most depended-on sense. Indeed, many people cannot dream of a world without the sense of sight, and when asked whether one would rather lose his sight or a limb, most would pick the limb.³

In the days of Greek philosophy, sight was regarded as the supreme sense. Plato spoke of “the eye of the soul” ⁴ and regarded vision as humanity’s greatest gift.⁵ Aristotle is credited with the notion of the “five senses.” He systematically connects the senses to the elements. He writes in De Anima that the eye is water, as both absorb light; hearing is air, smell is fire, and touch with earth. (Aristotle considered taste and seeing to be forms of touch.)⁶ Also, he makes mention of special objects that are exclusive to each sense: color to sight, sound to hearing, flavor to taste. To Aristotle, touch was a sense found in all animals, and therefore the lowliest of senses. Touch was a sense for being, while the other four were senses for well-being. He ranks the senses in order from most to least valuable: vision, hearing, smell, taste, and lastly touch.

In Natural History, Pliny concluded that man’s sense of touch and taste were superior to those senses in other animals, however in all other senses man is surpassed. Despite this, the senses are ranked in order of their degree of immediacy. Taste and touch, with their direct contact with the Earth, are

---

⁵ Pallasmaa, Eyes, 15.
⁶ Stewart, “Remembering the Senses,”
lowest, while sight and hearing, senses that can be used across distances are highest. Smell falls in the middle.

Peter Eisenman argues in his essay, “The End of the Classical, the End of the Beginning, the End of the End,” that architecture has fundamentally been the same since Renaissance times, and has since been suffering somewhat of an identity crisis. Prior to the Renaissance, buildings were designed with inspiration from nature and the divine. In the fifteenth century, architects looked to the buildings of the ancient Greeks and Romans. They admired this style and thought it to be “timeless, meaningful, and true,” thus defining this style as “Classical.” They viewed these highly articulated and proportioned buildings as “architecture,” while others were merely buildings. With this mind set, designers began to study the Classical and design structures with the same properties and proportions. Thus ended the practice of designing with inspiration from began the era of buildings being designed as visual representations of other buildings. Since then, all buildings to the modern era were variations on the classical geometries.

The Renaissance embraced thinking, inventing, and creating, as man began to further push the limits of human intellect. The senses of smell, taste, and touch were regarded as the senses of beasts. Intelligent man, with the superior abilities of vision and hearing set himself apart from animals. Rene Descarte concluded that the senses were unreliable, and that only thinking could be trusted. He rationalized that the senses were only used to find objective truths and meaning through deduction, not feeling. The concept of aesthetic design through thinking was prevalent in this era, as architects such as Leon Battista Alberti and Leonardo DaVinci designed to a code of strict geometries and proportions.

---


8 Stewart, “Remembering the Senses”
Art and science united in the fifteenth century through the study of optics. Alberti’s *De Pictura* (1435) examined the science of optics and its application in art. Alberti rationalized the process of seeing, studied the functions of the eyes, and how the eyes process information such as depth and color and applied that to painting. No previous artist had ever oriented himself precisely in relation to his subject, and this is possibly Alberti’s greatest contribution to the art world.\(^9\) In order to paint precisely what the eye sees, Alberti made the analogy to painting on a glass window with a fixed viewpoint (figure 8-9). He noted that if the head moved, the whole scene changed. With this observation Alberti was able to mathematically create the concept of constructing a perspective with a viewpoint and vanishing point. He

established the idea that the painting was an intersection of the visual pyramid. With this, paintings became more realistic, and perspectival representation glorified the eye as “the center of the perceptual world as well as of the concept of the self.”

In the 18th century enlightenment, the understanding of the sense of sight evolved further. Claude-Nicholas Ledoux’s iconic “Eye Reflecting the Interior of the Theater of Besancon” (figure 10) portrays architecture as an art form of the eye. This exhibits architecture’s movement in history away from an experiential passage and toward a static aesthetic. However, also in the Enlightenment, Paris’s Ecole des Beaux-Arts was founded to support the experiential quality of architecture through expressive and compositional drawings. Although the intentions were present to create a more sensual experience in architecture, most designs from this school were intensely visual and had little concern for inhabitants and their activities.

In 1844, Karl Marx wrote that, “...the forming of the five senses is a labour of the entire history of the world down to the present,” meaning that the senses are both influenced by and influencing historical developments in humans. When speaking about the eye, people are speaking about the human eye, a social and human object defined by man. Marx recognized that the human senses had become socially constructed objects, as man placed greater value on some senses—specifically sight—over others. Sight could

10 Pallasmaa, Eyes, 16.

no longer stand on its own, as the human body in its natural and primal form had lost much of its interpretive power to the human mind.

While Renaissance architecture was the first to visually represent a past architectural style, the practice continued throughout history. Instead of designing for experience, designers visually studied the proportions and aesthetics of past buildings. The modern movement attempted to liberate itself from the classical and create a style all its own, however Eisenman argues that the modern movement was nothing more than a stripped-down visual representation of the classical. Modern architecture does away with much of the ornament and excess of past architectural styles, but the massing, shapes, and plans were essentially the same. While the classical draws inspiration from nature and the divine, the forms of modern architecture represent technology and functionality.\(^\text{12}\) He raises the argument that even with the classical style, architecture represented

\(^{12}\) Eisenman, “The End of the Classical,” 214

another object, whether it was nature, the human body, or divinities. Architecture has never been represented as its own entity, but rather has always been visually represented as something else. Eisenman states that this is one of the greatest “fictions” of architecture, its inability to stand on its own.  

The evolution of the human senses continues to fascinate the mind. Hans Jonas writes about vision compared to the other senses in *The Nobility of Sight: A Study in the Phenomenology of the Senses*. Sight is widely regarded as the most perceptive of the senses, when in fact it is incomplete by itself and requires the complement of other senses and functions. The distinction of sight manifests itself in the image-performance, which implies the simultaneity in the presentation of the manifold, neutralization of the casualty of sense-affection, and distance in the spatial and mental senses. The other senses are governed by succession, as the ears cannot wander, nor can tastes or smells. The body has to seek out stimulation for such senses. Touch shares the succession of the other senses and the apprehension of sight—one is compelled to touch something after seeing it. However, it is possible to train people to “see” using touch. The senses can be summarized such that hearing is the presentation of sequence through sequence, touch is the presentation of simultaneity through sequence, and sight is the presentation of simultaneity through simultaneity.

As Eisenman points out, architects are limited by their visual predisposition in understanding the world and built environment. If architects designed for the other senses as well as sight, buildings would become more enriching to those with visual impairment. It is the multi-faceted qualities of architecture that transforms spaces into places.

---

13 Eisenman, “The End of the Classical,” 222
1.2.1 Place and Place-making

At first, the idea of “place” may seem obvious and straightforward. However, upon further consideration, place takes on deeper and more abstract meanings for different people in different times and contexts. One could be “in the wrong place at the wrong time”, be metaphorically “stuck between a rock and a hard place,” or “invite someone back to one’s place.” It is possible to finish in first place, or “put him in his place.” Place, therefore, can signify hierarchy, position, memory, or even a state of mind. Defined architecturally, place suggests a location, building, part of a building, or an area occupied as a home.\(^1\)

Any piece of land can support a building, and any building can shelter people. Many factors, from the largest to the smallest affect whether or not a space can transform into a place. In Place: A Short Introduction, Tim Cresswell states, “…place is not just a thing in the world, but a way of understanding the world.”\(^1\) The difference between “space” and “place” is crucial to place-making, for a place is a space with an emotional attachment. These emotions may be personal or communal, and can convey historical, religious, or social significance. It is also possible for sensory stimulation to create the feeling of a sense of place. Senses trigger memories that bring feelings of comfort and contentment, a true sense of place. For every space, each person feels a different sense of place. It is “…how we make the world meaningful and the way we experience the world.”\(^1\) In his essay, Cresswell categorizes three approaches to understanding place: the descriptive approach, social constructionist approach, and the phenomenological approach.

To be fully successful, a facility for the visually impaired cannot be merely a space—it must be a place. In selecting a location for this facility, it is important to chose a site that people will want to go to. In other words, it is advantageous

\(^{14}\) www.merriam-webster.com

\(^{15}\) Tim Cresswell, Place: A Short Introduction, (Malden: Blackwell Publishing, 2004), 11

\(^{16}\) Cresswell, Place: A Short Introduction, 11.
if the site is already a place. Using Cresswell’s theory in defining place as a springboard, the city of Cincinnati proves itself as a place.

The descriptive approach is the most direct, straightforward approach. In this method, places are simply spaces distinguished by unique characteristics. They are urban artifacts, famous and distinctive, one-of-a-kind spaces. Looking at Cincinnati from a merely descriptive point of view, the city has much to offer as a place. The skyline of the city (figure 14) is commanding and unique. Buildings such as Carew Tower and Paul Brown Stadium frame the view of the city as one approaches it from the highway. Colorful bridges cross the Ohio River and connect Cincinnati and Kentucky. The city is made up of beautiful neighborhoods like Hyde Park, Mt. Adams, and Mariemont, and less appealing places like Over-the-Rhine and Clifton Heights. The good and the bad make Cincinnati the distinctive place that it is. Iconic images such as Fountain Square and Union Terminal (figure 15) also help contribute to Cincinnati’s descriptive ability as a place.
The social constructionist approach to the understanding of place concentrates on the underlying social processes. The unique attributes of these spaces are related to capitalism, patriarchy, colonialism, feminism, and so forth. They may not be visually distinctive, but past and present events, as well as the social structure of these places make them unique. Cincinnati also has qualities of a social constructionist place. The city sits on the border of the North and South, and has housed tensions for centuries. The National Underground Railroad and Freedom Center celebrates Cincinnati’s role in abolitionism. However, the city still struggles with racial issues, largely due to the polarized economic standing between white and black residents in the metropolitan area. Cincinnati’s Over-the-Rhine neighborhood has been rocked with historical and racial events over centuries, and all Cincinnati residents recognize the name as a hotbed of violence in a hub of history and culture. On the lighter side, Cincinnati is home to the Cincinnati Reds and Cincinnati Bengals, as well as many other social, cultural, and entertainment institutions.

Finally, the phenomenological approach concentrates of the physical experience of spaces and their sensory properties. Merriam-Webster defines phenomenology as, “a philosophical movement that describes the formal structure of the objects of awareness and of awareness itself in abstraction from any claims concerning existence.” The phenomenological approach ties to memory and emotion more than the other two approaches.

Christian Norberg-Schulz also wrote on the differences between “space” and “place.” In his essay, “The Phenomenon of Place,” (1976) Norberg-Schulz writes that our world is made up of phenomena, both concrete and intangible. Some of these phenomena form an environment to others. The concrete things, such as the material, shape, texture and color, create a space. However, it is the intangible things, things that cannot be seen or touched, that make a space a place. A place, therefore, is a total phenomenon,

17 www.merriam-webster.com
one that is complete in itself, and cannot be described using scientific principles.

In order to understand phenomenology and the structure of places, one has to be able to distinguish between natural and man-made phenomena, and also understand the categories of earth-sky and inside-outside. These categories introduce space as an existential dimension, a dimension grounded in the experience of existence, rather than a concrete concept. Also, one must understand the concept of character in order to grasp the genius loci, or the spirit of the place. All places, natural and man-made, have character, and character is the way the world communicates to us in a phenomenological sense.

The purpose of architecture is to help man to dwell, to concretize the world in buildings and things. The psychological functions involved in dwelling are orientation and identification, meaning man needs to be able to both orient himself within a space, as well as identify with the character of the place. A practical place is not enough; it needs to express the genius loci. When a man is truly dwelling, he belongs to that space and shares an existential connection with the place. The next section elaborates more on dwelling.

Whether it is a room, a building, a city, or a country, “Place” is an important need in human life. It is how we relate to the earth, how we determine our place in the world. Juhani Pallasmaa wrote, “The real measure of the qualities of a city is whether one can imagine falling in love with it.” \(^{18}\) A place is a space that has the capacity for a human to fall in love with it.

---

\(^{18}\) Pallasmaa, *Eyes*, 70
1.2.2 Dwelling

In “Building, Dwelling, Thinking,” Martin Heidegger contemplates building and dwelling. Humans achieve dwelling, it seems, through buildings. Dwelling is the goal of buildings; however, not all buildings are dwellings. According to Heidegger, we generally classify dwelling and building as separate activities, but in reality to build is to dwell. Many answers to Heidegger’s questions lie in language: he analyzes the Old English and High German meanings of the word for building, buan, which means to dwell, to remain, and to stay in a place. The way in which humans exist on the Earth is buan, dwelling. Humanity is inherently tied to dwelling.

Heidegger names four elements, the fourfold, as being essential to dwelling: earth, sky, divinities, and mortals. Mortals are humans, capable of dying. Only human existence entails building, dwelling, thinking, and dying; therefore only humans can truly dwell. Humans place themselves in the fourfold in relation to the earth and sky, and wait for the divinities to reveal their presence in the world. All four
elements of the fourfold are unified through humans being on Earth as dwellers. Mortals dwell by saving the Earth, receiving the sky, awaiting the divinities, and initiating their own divinities, therefore, dwelling occurs as the fourfold preservation of the fourfold. Dwelling preserves the fourfold by securing itself in things.

There is a certain thoughtfulness necessary in dwelling, Heidegger claims. Buildings have to have meaning, rather than just be a construction, in order to be dwellings. Everyday activities dull human understanding of dwelling, thus making it harder for us to dwell as mortals. The nature of human beings is to forget the true essences of things in space. Heidegger describes a bridge, and describes the ways it gathers Earth, sky, divinities and mortals in its own way. When we pay attention to our spaces, we notice the essence of those spaces as entities, and we dwell by thinking of spaces and by building. Building is relating to spaces, by making them into locations. At these locations, we create a site for the fourfold.

Heidegger contemplates the relation between location and space, as well as the relation between man and space. He defines a location as a space into which the elements of the fourfold are admitted. The nearness and remoteness between men and things can become intervals of space. Thus, there is always space as interval and also space as extension. If we pay attention to the relations between location and spaces, we get help in understanding the relation of man and space. To man, space is neither an external object not an inner experience. Rather, the relationship between man and space is dwelling.

Building, through constructing locations, is a joining of spaces. Because building produces locations, the nature of building is letting dwell. We can build only if we are capable of dwelling. Dwelling is the basic character in which mortals exist. Building both belongs to dwelling and receives its nature from dwelling. Thinking also belongs to dwelling, and building and thinking both are necessary for dwelling. The
real plight of dwelling is that mortals are always searching for the nature of dwelling, always learning how to dwell.

Kenneth Frampton took Heidegger’s essay further, listing four contemporary conditions that diminish the potential contribution of architecture and dwelling. The first is a failure to distinguish between architecture and building, the fallacy being an assumption that all built work is architecture. The second condition is the passive acceptance of industrialized construction, and therefore the demise of craftsmanship. Third is the pursuit of an autonomous place, an act that counters “place-making.” Finally, the last condition is a loss of a connection to nature, which is a fundamental human need. These conditions highlight the ways that buildings move away from being “dwellings,” and therefore lose their emotional connection to humans.

Gaston Bachelard muses about dwelling, home, and daydreaming in his seminal essay, “The Poetics of Space.” Bachelard believes that every person has a deep attachment to his or her childhood home, and “all really inhabited space bears the essence of the notion of home.” Through daydreams, people revisit their childhood home—something in the outside world may trigger a memory that instantly takes a person back to his or her childhood, a place where they played carefree all day long, a place of happiness and safety. He writes, “the house shelters daydreaming, the house protects the dreamer, the house allows one to dream in peace.” When one thinks of his house, he is enveloped in feelings of warmth and belonging. Furthermore, all of the spaces of our past remain in us, waiting to be revisited in daydreams.

The spaces that we hold closest to our hearts, oneiric places, cannot be easily described or visualized. They are purely felt in the crevasses of our memories. Also, in attempting to describe such intimate spaces, a reader becomes lost

---

20 Bachelard, “The Poetics of Space,” 88
in his own memories of his own room. Writes Bachelard, “The values of intimacy are so absorbing that the reader has ceased to read your room: he sees his own again.” 21 Despite the various spaces we experience in our lifetime, it is surprising how attached humans are to their childhood home. “…there exists for each one of us an oneiric house,” Bachelard writes, “a house of dream-memory, that is lost in the shadow of a beyond of the real past.” 22 Decades after these spaces are gone, their phenomenological properties live on though our dreams.

From what Heidegger, Pallasmaa, Norberg-Schulz, and Bachelard theorize, these writings illustrate that it takes more than seeing to dwell. To truly dwell is to connect to the fourfold in a way in which sight alone is unable to accomplish. If architects considered theses concepts when designing buildings, these spaces move beyond just spaces of being and into places of dwelling. The following section examines ways in which some architects are designing for experiences beyond sight—spaces where visitors can dwell.

21 Bachelard, “The Poetics of Space,” 92
22 Bachelard, “The Poetics of Space,” 93
1.3 A Return to Haptic Design

Modern Western attitudes put a strong emphasis on better, faster, and bigger all to be experienced by the sense of sight. Buildings are designed and built quickly to satisfy society’s thirst for instant gratification. Technology has taken architecture to new heights, engineering buildings in forms that hundreds of years ago no one would have dreamed of. While this groundbreaking architecture is stimulating and exciting to look at, for some reason the experience of space created by some of these buildings falls flat. Because these spaces are designed primarily for the eyes to look at and not for the body to experience, these buildings do not touch the soul. Juhani Pallasmaa writes, “With the loss of tactility, measures and details crafted for the human body—and particularly for the hand—architectural structures become repulsively flat, sharp-edged, immaterial and unreal.” Pallasmaa relates the paradigm shift away from haptic building to the desensitization of humans to reality. Technology, the media, and a fast-paced world has left humanity out of touch with its senses. In response to this ocularcentric paradigm, some designers are committed to designing for the whole body.

J.J. Gibson defined haptic perception as, “The sensibility of the individual to the world adjacent to his body by use of his body.” Haptic design involves designing spaces for the whole body to experience, and creating spaces that stimulate all of the senses. This philosophy does not eschew the sense of sight, but rather recognizes that problems arise when the eye is isolated from its natural interaction with the other senses. Architects such as Peter Zumthor and Steven Holl have become committed to haptic design.

In *Thinking Architecture*, Peter Zumthor muses about creating and experiencing good architecture. His writing is simple, explicit, and metaphorical, taking his readers to an intimate place inside his mind and memories. Zumthor is

23 Pallasmaa, *Eyes*, 31

interested in why certain spaces affect us on an existential level, while others leave its users feeling uninspired, if not bored. He writes about his aunt’s kitchen, the sights, smells, light, and feelings, and says, “Memories like these contain the deepest architectural experience that I know.”

He believes that materials have a key role in developing this emotional response in architecture. Materiality goes beyond just straight composition—the tangibility, smell, and acoustic qualities enrich the architectural experience. Zumthor considers architecture the container for the life that goes on in and around it.

Zumthor’s buildings further enforce his viewpoints. In Thinking Architecture, he wrote, “In order to design buildings with a sensuous connection to life, one must think in a way that goes far beyond form and construction.”

His Swiss Pavilion for the Hanover World Fair in Germany (figure 17) was especially designed to appeal to the senses of smell and sound. The structure is constructed of stacked pine, and the wood seeps, expands, and contracts like a living being. Over time, the pine shrinks and buckles as well. The aroma of the fresh pine fills the space, and visitors are instantly greeted by its earthy scent. Zumthor also considered temperature when designing this space. When hot outside,

26 Zumthor, Thinking Architecture, 39.
the pavilion was “cool as a forest,” 27 and when it was cold outside the pavilion felt warm. The sound, however, is the focal point of the building. Often referred to as the Sound Box, the wooden building becomes a sort of resonance box. It echos the music played within, as well as the rain outside. It acts as a giant wooden walk-in instrument.

Zumthor also considered experience in his Thermal Baths at Vals (figures 18-20). Architecture is a temporal art, meaning that users are meant to move through and experience space, not statically observe it. With the baths, it was important for Zumthor to allow the users to have a sense of freedom when moving through the building. He wanted them to stroll, and feel like they could linger in a space that intrigues them, rather than be directed and pushed through the building. In these baths, Zumthor introduced a delicate blend of direction, seduction and freedom.

Steven Holl is another architect whose work enhances the experience of space. His Chapel of St. Ignatius (figures 21-23) lies on the corner of Seattle University, and has become an icon of the school. Holl designed the chapel as a “gathering of different lights,” a reference to both Seattle University’s mission as well as St. Ignatius’ vision of faith as a light in darkness.

“Seven bottles of light in a stone box” was the guiding vision of Holl while designing this chapel. Light passes through each bottle and floods specific parts of the chapel with colored light. Throughout the day, different parts of the chapel are illuminated with brilliant colored light, therefore every visit to the chapel is unique, as the light is never quite the same. At night, the effect is similar, but reversed; the chapel glows with colored light, and projects the light into the darkness. A visitor’s first impression of the chapel comes at the doors. The doors are the place where a person first touches the building, as well as being the portal into the space. St. Ignatius’ doors are different sizes, a reference to the tradition of making a smaller, private door and a larger ceremonial door. The ceremonial door is only used on select special occasions. Both doors are made of yellow cedar and accented with bronze. Seven windows puncture the doors, a reference to the seven bottles metaphor. At night, light radiates out of these windows and invites people into the chapel.

The Blessed Sacrament Chapel (figure 22) lies at the end of the processional corridor. Seattle artist Linda Beaumont designed this small, intimate space, as a place for reflection and prayer. The walls are coated in beeswax, (figure 23) and the fragrance fills the room, engaging the senses of touch and smell. Gold-leaf prayers are engraved in the walls and etched into the floor, making prayer literally a part of the room. This room also houses the tabernacle, which consists of an onyx box lit from within. A gnarled Madrona tree lies at the heart of this space, symbolizing life’s struggles.
Holl’s work is founded in phenomenology. The Chapel of St. Ignatius links its users with the patterns of the sun, the changing natural light, the echos of footsteps, and the sweet smell of beeswax. He wanted his building to be more than just visual—he wanted it to speak to all of the senses. The building is vitally linked with nature, for it would not have nearly the amount of emotional power it now holds without its relationship with the outside world. The way the light inside the chapel is constantly changing with the sun creates a harmonious balance between inside and outside, and reminds the user of his or her relationship with nature. Beeswax coating the walls also accomplishes an emotional tie between the user, nature, and the building. Because smell is commonly said to be the sense strongest tied to memory, the earthy fragrance of beeswax will continually remind the visitor of this space. Natural textures appeal to the sense of touch: copper door handles, tiled floors, wooden pews, and textured beeswax-coated walls all stimulate the sense of touch. Even the glass is the windows is etched and textured.

The small Blessed Sacrament Chapel is especially effective in engaging its user. The space is intimate, perfect for meditation and reflection. The prayers on the walls and floor inspire and comfort the user. The scent of beeswax calms and relaxes, while the purple-orange light fills the room and reminds the user of God’s heavenly presence.

The experience of Steven Holl’s Chapel of St. Ignatius is intimate, yet complex. At first glance, the building seems fairly banal, however upon further investigation, users will find that the chapel is in fact filled with stimulation and symbolism. The building is not meant to draw attention to itself, but to facilitate inward contemplation and provoke reflection on the user's relationship with God.
Light and color are two of the most powerful architectural design features of this building. The following diagrams illustrate Holl's use of natural light and color. As the sun moves, the color moves throughout the chapel. Therefore, no visit to the chapel is ever the same.
Chapter 2
Designing for the Visually Impaired

As a whole, western people are intensely visual. To many, there cannot be a worse fate than losing the sense of sight. Many people simply do not understand; when they think of blindness, they see Helen Keller or some caricature of a blind person. Some are completely stymied by the thought of how they could possibly know anything about the environment if they could not see. This negative emotional response from society is one of the greatest challenges to the visually impaired community. It is important to look at the full range of visual impairments. Many people think of blindness only in absolutes—either one can see or one cannot. However, visual impairment exists in a wide spectrum, from no light perception to significant amounts of residual vision. In fact, it is possible for a person to be legally blind and have 20/20 vision, provided they have very limited side vision.

Vision is described as a sense that integrates other senses. It groups with the senses of taste, smell and touch to provide information on close things, and pairs with hearing to give a person information on distant objects and events. Sight is unique because it is continuous, meaning it is

28 Mike Walsh, Interview: November 19, 2009
constantly transmitting information without actively looking for it. For most, vision is the principle medium used to construct knowledge of the environment. Just by opening his eyes, a man instantly understands a great deal about his surroundings. Vision also directs behavior by providing feedback, as a woman walking down the street knows to avoid the oncoming obstacle long before she reaches it. The other senses would have to become much more intimately involved with the environment to achieve the same understanding that sight gives in just a moment’s glance.29

Those who have been visually impaired their whole lives have a very different experience than those who lost the sense of sight as adults. Visually impaired children have unique ways of learning about their environments. As infants, humans respond best to the “close” senses—the breastfeeding senses of touch, taste and smell.30 Babies use their sense of sight to guide touch, but eventually sight takes over as the primary sense. However, for those children without the sense of sight, touch remains the main sense used for learning. Throughout their lives, these children will learn through their heightened other senses.

Conversely, adults who lost their sight due to illness of injury later in life still learn visually, even without the ability to see. In the book *Touching the Rock: An Experience of Blindness*, John Hull recollects losing all sense of sight as an adult. In his experience, he found that his visual abilities were reallocated to other senses. Within two years of becoming blind, Hull had apparently become so non-visual that he could not remember the shape of the number ‘3’ or the face of someone he had known his whole life. He had become a “whole-body seer,” 31 “seeing” the world in the sound of the rain on a roof or wind in the bushes. He found that, without sight, he had a more intimate connection with nature.

---

and being-in-the-world. As Heidegger would say, he had learned how to “dwell.”

Others who lost their sight as adults, however, never lose their visual abilities. Dennis Shulman lost his sight at the age of thirteen, but still pictures his wife and children, whom he has never seen, visually. Also, he still pictures himself as he last saw his face in the mirror—a child of thirteen. Even when he gives lectures, he finds himself picturing the words as he reads his Braille notes.  

Likewise, Arlene Gordon lost her sight in her forties, but even after thirty years she still considers herself a very visual person. She has a strong sense of color, and picks out her own clothes once they have been described to her. Also, she likes to travel, priding herself in the fact that sighted people enjoy traveling with her, as when she asks them to describe a place to her, she forces them to observe things they would not otherwise. “Too often people with sight don’t see anything!” she says, “It’s a reciprocal process—we enrich each other’s worlds.”

Overall, those who have found themselves visually impaired later in life do not mourn the loss of sight, but consider themselves blessed with the chance to experience the world from two points of view. They find that the blind have better senses or feeling, taste, and touch, and consider these the “gifts of blindness.”

Some people with visual impairments have the ability to see light. They can identify light sources and changes in light, even if they are unable to decipher objects in space. These people are very sensitive to light and glare. Therefore, when designing a space for the blind, it is important that all light be controllable in terms of intensity, direction, and glare. Furthermore, some people in the visually impaired community have a sense of color. Introducing bright and contrasting colors adds visual interest to a space, and tasteful and judicious use of color may help a visually impaired man orient himself within a building.

32 Sacks: “The Mind’s Eye,” 32
33 Sacks: “The Mind’s Eye,” 33
34 Sacks: “The Mind’s Eye,” 36
Almost every case of visual impairment is unique. Those with some sense of sight have a completely different experience than those with no visual abilities. Also, people who lost their sight later in life have different interpretative abilities than those who have always been visually handicapped. This wide range of impairment provides an interesting and complex design challenge—how does one design a space that is safe and attractive to the whole spectrum of visual impairment?
2.1 Perceiving Without Sight

Architecture is unique in being an art form that stimulates multiple senses. It is a complex and multi-faceted craft that is grounded in function and utility. Sculpture is meant to be looked at—architecture is mean to be lived in. In his book *Experiencing Architecture* (1959), Steen Eiler Rasmussen writes that when seen from afar, architecture may be mistaken for sculpture, but when looked at with a close and inquisitive eye, it is apparent that “architecture means shapes formed around man, formed to be lived in, not merely seen from the outside.” 35 The architect, therefore, must think like a theatrical director, being aware of how he guides people through space in their day-to-day lives. Rasmussen writes of architecture, “…no other art is so intimately connected with man’s daily life from the cradle to the grave.” 36 Indeed, the great majority of the human population spends most of their lives inside buildings, and experiencing them with their whole bodies. Therefore, an architect must be aware of the power he holds in affecting the lives of his building’s users and carefully design spaces that can be appreciated by senses other than sight.

Among those with visual impairments, about 20% have no vision at all, meaning visual impairment is a loose term enveloping a wide range of seeing ability. However, no matter how severe the handicap, those with visual impairments rely on the other four senses to help them navigate through space. Touch, hearing, smell, and taste all work together to enrich the experience of space, and for those with visual impairments, a building designed to embrace these senses can be the difference between a fulfilling or dissatisfying experience.

36 Rasmussen, *Experiencing Architecture*, 14
“the hands want to see, the eyes want to caress”
Johann Wolfgang von Goethe
2.1.1 Touch

Touch is a complicated and multi-faceted sense. Skin has the ability to read texture, wetness, shape, elasticity, weight, density, pressure, vibrations, and temperature. Related to touch, the body’s proprioceptive system can sense where things are without seeing them, making it possible to pass popcorn in a dark theater or pass a note behind one’s back. Though the eyes cannot see these objects, the body knows exactly where they are. 37

Touch provides important information-seeking abilities. The active use of touch to seek out information has been deemed “haptic touch,” relating to the bias for how things feel rather than the way they look. 38 However touch is not always actively searching for information; it can also passively acquire information incidentally. For example, the warmth the whole body feels sitting by a fire, or the vibrations that pulse through the body during a particularly violent bout of thunder. Furthermore, touch provides a role in daily interactions between people as they hug, kiss, or shake hands. These “interactive touches” are not meant to gather information, but to display a social exchange. Also, people perform non-interactive functions of touch upon themselves when they scratch an itch or rub a leg cramp.

Geza Revesz, a scholar who drew comparisons between touch and visual perception, suggested, “…the eye takes in the ‘form’ of an object as an immediate impression, through spatial examination, whereas the hand is predominately concerned with the ‘structure’ of an object, through serial or linear examination.” 39 In contrast to vision, gathering information about an object through haptic touch is a slow, analytical, and intimate process. Revesz argued that active touch is superior to passive touch, as passive touch only gives a limited understanding of an object. Passive touch can bring an object to attention, but to fully understand it, one must actively touch it.

37 McLinden and McCall, Learning Through Touch, 19
38 McLinden and McCall, Learning Through Touch, 26
39 McLinden and McCall, Learning Through Touch, 30
In buildings, the first touch comes at the door handle, which Pallasmaa considers the “handshake of the building.” The door handle greets a man entering the building in the same way it greeted the hundreds of those who have entered before him in the same way. Once inside, the man can feel the texture of the floor beneath his feet, the temperature of the air, the smoothness of the walls as he traces his fingers along.

The visually impaired use touch more than any other sense when moving through a building. They may use a white cane to reach out in front of them and test for obstacles and clues. Changes in floor textures can provide excellent clues. For example, the floor changing from carpet to tile can clue a blind man that he is approaching an intersection. Or, if one section of a building has a certain type of flooring, the man can locate himself within the building just by knowing what floor surface he is walking on. The blind also trace their hands along walls to navigate through space. This helps them locate doors and other obstacles along walls.

40 Pallasmaa, Eyes, 56
“There are buildings that have wonderful sounds, telling me I can feel at home, I’m not alone”

Peter Zumthor
2.1.2 Hearing

Hearing is unique in that it cannot be turned off, even in sleep. Pallasmaa compares this to the sense of sight writing, “…the eye reaches, but the ear receives.” The listener has little control over the production of the sound, either by people or objects in her environment. Though it does not require active screening, a listener can pay selective attention to one sound over others, therefore enhancing comprehension. Hearing is the main avenue for processing oral language, and also in many aspects of thinking.

Humans are generally less aware of what they are hearing than the actions of other senses. It is not until sounds are removed and the atmosphere is eerily silent that the full impact of ambient sound is understood. According to Peter Zumthor, “Interiors are like large instruments, collecting sound, amplifying it, transmitting it elsewhere.” To Zumthor, sounds give a space a feeling of ease and “home,” delighting in the idea that sounds connect him to other people, either in a different room or outside the building.

Buildings reflect and absorb sound. When thinking about the sounds of a space, a large cathedral has a very different sound than a small cottage, as a hotel atrium has a different sound experience than a library. Size, volume, and materials all contribute to this effect. Hard materials in a large and open atrium reflect sound well, and can create a disorienting effect for those with low vision.

In studying the sense of hearing in architecture, Rasmussen notes that, “every large church interior has its own voice, its special possibilities.” Vaults and domes are acoustically very effective in churches, as they help to reverberate hauntingly beautiful chants and hymns. St. Mark’s, in Venice, Italy, has two music galleries, one to the right and one to the left with a large dome in the middle. The congregation could therefore

---

41 Pallasmaa, *Eyes*, 49
42 Zumthor, *Atmospheres*, 29
43 Rasmussen, *Experiencing Architecture*, 230
simultaneously hear the music of two separate orchestras in two separate domed vaults.

As church practices changed, architects adapted designs. Church services began to be held in a community’s native language, and resonance of gothic cathedrals became too much for many to understand speech clearly. In this time, large areas of wood were added to the stone to absorb sound and reduce reverberation. However, up to the advent of “talkie” motion pictures and radio architects had been placing acoustics second to aesthetics and even concert halls had been designed sloppily in terms of sound. When the confusion became too much, designers finally began to study ways to minimize sound resonance. However, Rasmussen notes that it may have been taken too far, as most modern rooms sound flat, with no unique acoustic properties.

Buildings also create their own sounds. Elevators, HVAC systems, fountains, appliances, and general creaking and aging of a building all contribute to noises that a building may make. Furthermore, some buildings even incorporate speakers throughout corridors to constantly project music throughout the building. These speakers can be especially disorienting to a visually impaired person. Often, a blind person will use landmarks to navigate through a building. These landmarks may be an elevator, water fountain, or particular door. Once a landmark is located, the blind person uses the building’s features to get around. For example, a water feature provides a constant sound source at a fixed location in space. If a blind woman is traveling from the lobby of a building toward the restroom and passes the landmark fountain on her right, she can know that her desired destination is the third door on her left. On the other hand, speakers positioned throughout a space provide constant auditory stimulation, but their uniformity would make them useless as landmarks.

---

44 Rasmussen, *Experiencing Architecture*, 231
45 Rasmussen, *Experiencing Architecture*, 235
“The most persistent memory of any space is often its smell”
Juhani Pallasmaa
2.1.3 Smell

It is commonly said that the sense most closely tied to memory is smell. Many people can remember the spicy smell of their grandmother’s kitchen, or the earthy scent of a log cabin. Every space has a unique scent, and when the nose finds a scent that resembles the smell of a place, the brain instantly triggers memories of the place and the people and events involved. Smells have the power to evoke very intense reactions. Gaston Bachelard writes, “I alone in my memories of another century, can open the deep cupboard that still retains for me alone that unique odor, the odour of raisin, drying on the wicker tray. The odour of raisins! It is an odor that is beyond description, one that takes a lot of imagination to smell.” Even decades later, Bachelard is able to remember this distinct smell and therefore call to mind childhood memories.

One great pleasure of the sense of smell is how quickly it changes when walking along a city street. In a mere block, a person can smell the sweet smell of a bakery, followed by the sharp odor of a seafood restaurant, finished by the pungent aroma of a perfumerie. It is one of the greatest experiences of a city, following the changing smells. Every city has a different scent, as fishing towns smell very different that urban metropolises or mountain villages. Gardens create a feast for the nose, as those walking through are treated to the perfumes of different flowers, and the scent of freshly clipped grass. Even later in the year, crispy autumn leaves give a warm aroma and evergreen trees and holiday trimmings release a sharp and spicy scent.

Inside buildings, materials contribute to the scent. A cedar cabin gives off a natural, woody smell and infects the fabric and clothing of all who spend time within it. Also, a fresh coat of paint instantly gives a space a feeling of freshness and newness. Kitchens emit smells that are constantly changing, depending on what the cook is concocting. Smell is unique in how it changes and dissipates so quickly. While the blind

46 Bachelard, “The Poetics of Space”
have a heightened sense of smell, scents are of very limited value as clues for mobility within a building, because odors and aromas tend to dissipate fairly inconsistently.
APPETIZERS
- Egg Rolls ........................................ $2.95
- Onion Rings ...................................... $2.95
- Breaded Mozzarella Sticks (6) .................. $4.95
- Deep Fried Button Mushrooms (12) .......... $4.95
- Deep Fried Chicken Livers ..................... $4.95
- Chicken Quesadilla ............................. $5.95

All above served with your choice of dipping sauce (BBQ, Cocktail, Ranch, Honey Mustard, Sweet-n-Sour & Hot Mustard).

SPECIALITY SANDWICHES
- Fat Ernie’s Gourmet Burger, ¼ Pounder ...... $4.65
- Deluxe Bacon Cheeseburger, ½ Pounder .... $5.95
- Chicken Fried Steak Sandwich, Hand Breaded $5.95
- Chicken Fried Ranch Sandwich, 6oz .......... $5.95

Grilled chicken, bacon & Swiss cheese topped with ranch sauce.

Club Sandwich, Triple Decker ................... $6.45
- Ham, turkey, Swiss & American cheese, bacon & tomatoes

Dagwood .............................................. $6.25
- Shaved ham, lettuce, mayo, bacon, tomato, Swiss cheese. Served on grilled sourdough bread.

Corned Beef Reuben ................................ $5.95
- Shaved corned beef on grilled rye with Swiss cheese, sauerkraut & our reuben sauce

DESSERTS
- Fresh Baked Pie ................................ $1.95
- Pie Ala Mode ..................................... $2.50
- Whole Pie ........................................ $7.95
- Sugar Free Pie ................................... $8.95
- Layer Cakes ...................................... $1.95
- Brownie Supreme ................................. $2.50
- World’s Greatest Brownie .......... $1.25
- Ice Cream ........................................ 75¢
2.1.4 Taste

Taste was originally thought to be an extension of the sense of touch. As infants, humans learn through their mouth. Everything they find they explore with their mouths. Relating to breastfeeding, at this age, taste is a human’s strongest sense. A baby’s hands are still clumsy, speech is just noise, sight is blurry, but taste is a sense that an infant can readily understand. A four-month-old will bring an object to his mouth and actively explore it with his mouth. By the time a child reaches a year, objects are passively placed in the mouth as placeholders, as manual manipulation begins to take over as the primary means of exploring an object.\(^{47}\)

The sense of taste has few architectural implications, however a new trend in restaurant spaces is emerging. Visitors are being invited to restaurants to “dine in the dark.” Restaurants turn off all lights and close all windows to create a pitch-black environment for guests to dine in. The philosophy behind this is that, when a person cannot see a food, they cannot judge it before eating it. This encourages people to try new foods and appreciate the subtle flavors and textures in everything that they eat. Significant to the blind community, these restaurants are hiring visually impaired cooks and servers to help guide guests through their meals.

\(^{47}\) McLinden and McCall, Learning Through Touch, 40-1
2.2 Learning Without Sight

Up to the eighteenth century, visually impaired children were not offered a formal education. These children were almost always denied a tutor, and therefore were deprived of the socializing and humanizing effects that education brings. Educational institutions for the blind were finally founded in the United States in the early nineteenth century, but it was not until the mid twentieth century that visually impaired children began attending community schools rather than residential institutions. However, despite the most advanced materials, equipment, and special education programs for the blind, visually impaired children inevitably suffer some educational deprivation. Some concepts, such as color, distance, and transparency exist only in a visual context.

The visually impaired are faced with many challenges when it comes to learning. They are restricted in the amount of the environment they can engage with, and likewise the environment provides a lower stimulus on them. Vision gives meaning to actions. Those with visual impairment lack incentive, as they cannot see how others perform tasks, and therefore they have no visual model to base their actions. Because of these constraints, learning requires close physical contact with sighted partners.

Many methods are used in teaching visually impaired children. One of the most effective is hand-over-hand guidance, in which a sighted adult teaches a visually impaired child to manipulate and object. Over time, the child will learn to be more independent. Children pass through three stages. In the first stage, the coactive stage, the adult and child act as one person to complete a task. In the cooperative stage, an adult will support a child as he or she completes a task. Finally, in the reactive stage, the child learns to complete the task independently. When a child reaches this reactive stage, he has developed the cognitive ability to solve problems for himself. Unfortunately, many visually impaired

---

48 McLinden and McCall, Learning Through Touch, 55
49 McLinden and McCall, Learning Through Touch, 69
children never advance past the cooperative stage and remain dependant on sighted adults.\textsuperscript{50}

One important skill for the visually impaired to learn is literacy. Braille and Moon have opened many doors for the blind community, allowing them to communicate through written language. While Braille is by far the more common means of writing, it requires a level of skill that unfortunately many visually impaired people cannot master. Fifty-two percent of blind children have some other disability, whether physical or cognitive, and therefore lack the fine skills Braille requires.\textsuperscript{51} Also, many adults who lost their sight later in life find that they cannot learn Braille because they never learned to develop their sense of touch to the level that Braille requires. Moon characters are much larger and more simple than Braille characters, and therefore can be easier to learn. They are good for labeling and other simple short written tasks, but Moon’s size makes it impractical for large written text. For those with some sense of sight, large, clear, sans-serif text is the most legible. For any educational institution for the visually impaired, signage and labels should be able to be read in both Braille and legible printed text.

Adults with visual impairment also benefit from educational programs. Though their formal education has ended, technology, tools, and resources for the blind community are constantly developing, and many adult programs keep these people up to speed with changes. Also, as a significant portion of the blind community lost their sight in adulthood, resources are available to help them cope with their blindness and teach them life skills. Simple tasks such as dressing, cooking, cleaning, and transportation all have to be relearned. Adults need help adjusting as they learn to rely on other senses to guide them through their daily lives. Facilities such as Clovernook Center for the Blind are dedicated to helping visually impaired adults.

\textsuperscript{50} McLinden and McCall, \textit{Learning Through Touch}, 69  
\textsuperscript{51} McLinden and McCall, \textit{Learning Through Touch}, 115
Chapter 3

Precedents

Designing a school for the visually impaired is no simple task. A designer cannot merely take the plan for any ordinary school and add some handrails and Braille labeling, but instead the design requires a deep consideration of the experiential qualities of the space. Extra time needs to be spent on research, to make sure the designers have a complete understanding of the day-to-day challenges and experiences of the visually impaired. Without understanding visual impairment on a scientific, social, and practical scale, it is impossible for someone to create a successful environment for the blind.

Furthermore, the concept of wayfinding in these buildings is far more complicated than in an ordinary school. The users cannot simply look down the hall to navigate the space, but rather must rely on the sounds and textures of the walls and floor. Every object can become a landmark; any object out of place can become a source of confusion.
Light is also an element to be carefully considered. As the visually impaired have varying levels of vision, some will be able to perceive light, while others may be sensitive to glare. Windows may distract children with the ability to see outside, while others may be hurt by the intensity of sunlight. All natural light should be indirect and diffused, with shades and blinds to use when necessary.

Details also need to be thoughtfully designed. The blind can run into protruding shelves or trip over something as small as uneven floor surfaces. All details need to work together as seamlessly as possible to create a comfortable experience for those using the building.

All of these considerations aid in the success of a school for the visually impaired. Two precedents, W. Ross Macdonald School for the Blind and Hazelwood School, have been designed to elegantly address wayfinding, light, details and more. Though very different, both schools provide safe, thoughtful, and pleasing environments to both visually impaired users and sighted instructors, family, and guests.
3.1 W. Ross Macdonald School for the Blind, G. Bruce Stratton Architects

The W. Ross Macdonald School in Brantford, Ontario was established in 1872. Its campus is composed of several buildings dedicated to the care and education of over 200 visually impaired children from first to twelfth grades. To replace two older buildings in the complex, G. Bruce Stratton Architects designed a new 30,000 square foot building to house the classrooms for first through sixth grade, a six-person residence center, and a health services center.

The school is organized along an interior “street,” a ten-foot-wide corridor to facilitate the safe and easy navigation for the students, and any obstructions or sharp corners that could cause injury have been eliminated. From the corridor, the building separates into two wings: one that holds the
residences, health center, music rooms, a multipurpose room, and an atrium and another that houses the teaching area. The teaching area is broken up into four pods, each with two classrooms for six to eight students, a restroom, and an activity room.

Stratton approached the project paying close attention to “the functional specifics—particularly related to touch, sound and physical orientation.” He shares Pallasmaa’s respect for the door handle, believing that how a handle meets the hand is more important than how it meets the eye. This belief carries through the building, as Stratton designs down to the smallest detail. Materiality drives this project, as he uses a variety of materials to provide both tactile and aural clues for orienting the visually impaired students. The corridors are lined with a 14-inch-wide smooth black rail along the walls, and children trail their fingers along the rail to guide them through the building. Floor materials vary

throughout the building; corridor and classroom floors are typically black ceramic tile, but at intersections the flooring switches to wood to signal the transition. In addition to being a tactile clue, these floor transitions provide tonal variation for footsteps or canes.  

Beyond the haptic and aural qualities of the building, the building must appeal to those with full or limited vision. All of the students are legally blind, but many have some sense of sight. Also, the staff, parents, and community are primarily sighted. In designing the building, it was important for Stratton to mediate how light enters the building, as the visually impaired are very sensitive to glare. Eaves and fins block afternoon sun from entering the building, and blinds are used to further filter the light. Sandblasted glass is also used to diffuse the natural light indirectly entering the corridors. Inside, all lighting fixtures are on dimmers to customize the amount of light in any space. Those with limited vision are

able to recognize contrast and colors, and bright, primary-colored glass panels are also used in the building to add interest and appeal to those with sight. Functional, yet beautiful, Stratton has created a building that speaks to the body without neglecting the eye.\textsuperscript{54}

3.2 Hazelwood School,
Gordon Murray + Alan Dunlap Architects

Hazelwood School in Glasgow, Scotland is a life skills educational facility for children with dual sensory impairment. In addition to being deaf and blind, many of Hazelwood’s 46 students have learning disabilities, behavioral problems, or use a wheelchair. The sensitive and complex conditions of Hazelwood’s students drove the process for Gordon Murray + Alan Dunlap Architects’ competition-winning design.

The school is situated within Glasgow’s Bellahouston Park, and the building responds by organically meandering through the natural, wooded environment. The building has a long, low profile and is clad with the natural materials of wood and slate. These materials are tactiley pleasing for children to investigate, as well as allowing the building to blend in with its surroundings. Along the exterior of the building, children
can feel the course wood, cool slate and smooth glass of the façade. Hazelwood integrates itself with the woods taking the opportunity to form outdoor spaces. The wooded site stimulates all senses, so even the sensory impaired children have opportunities to smell, feel and hear what the natural environment has to offer.

Like W. Ross Macdonald School, Hazelwood is designed along a main axis, with the programmed spaces branching off of it. The central corridor is lined with a textured cork sensory wall. Students trace their fingers along this wall to guide and orient themselves throughout the building. This main corridor runs east-west, and five “pods” housing two classrooms and a restroom each branch off of the north face. The southern façade holds the more public spaces, including the pool, gymnasium, kitchen, music room and library.

Light is usually indirect and highly controlled within the building, usually entering from clerestories above the
students’ heads. In instances where glazing is at eye level, a system of louvers is employed to diffuse the light. This way, the students are aware of the outside environment—the changing seasons, the falling rain—without being distracted by the view or a glare.

GM+AD wanted to make sure that the school was safe without feeling too safe, as safe buildings are sometimes boring buildings. 55 Also, as a school for life skills, the designers did not want the building to be too easy to navigate, because the students need to learn how to manage obstacles themselves. Hazelwood succeeds in being a school that does not feel too institutional. Instead, it is just the opposite; rich, warm and inviting, a playground for curious senses.

Chapter 4
A Culinary Center for Clovernook Center for the Blind and Visually Impaired

4.1 Site
The site for this project is located in North College Hill, Ohio. This city is located on the northwest side of Cincinnati, about halfway between I-75 and I-74 on the Ronald Reagan Cross County Highway. This community of about 10,000 residents is slightly below state average in terms of income and home values.

The city is mostly residential with a small business district. Most single family dwellings in this area are small “Cape Cod” style houses built in the 1940s. There are also a number of multi-unit apartment complexes. The business district is centered on the corner of Hamilton Avenue and Galbraith Road. There is a striking amount of vacant commercial real estate, and most surviving businesses are chain stores and restaurants.

Besides Clovernook Center for the Blind, key places of interest in North College Hill include Clovernook Country Club, the North College Hill Community Senior Center and Kids Plus Learning Center.
The proposed site for this project is located on the property of Clovernook Center for the Blind. This Center is just north of the intersection of Hamilton Avenue and West Galbraith Road, right in the heart of North College Hill. This site is easily accessed from Ronald Reagan Cross County Highway and Hamilton Avenue, a major route to Cincinnati’s Central Business District. Metro busses 17, 15x, and 41 stop along Hamilton Avenue in front of the site. Metro’s Access bus stops at the front door to Clovernook’s main building, as well as the Procter Center.
The building is to be located on the hill next to the Procter Center. This location has a lot to offer, including visibility from Hamilton Avenue, proximity to existing buildings and parking, transportation, and views of the Clovernook grounds. However, the proximity to the street poses some challenges, and it became important to keep sound control and privacy in mind when designing for this site.
Site Features
Just south of Cary Cottage, a garden is dedicated to the founders of Clovernook.

A stream cuts through the site.

The nature trail starts at the top of the hill by the Procter Center.

Along the nature trail, the woods clear to reveal soccer fields and a playground.
4.2 Program

Being a facility that serves the visually impaired, it was necessary to pick a site that is accessible and supportive to the needs of those with low vision. Clovernook Center for the Blind is well-established in the visually impaired community, and has bus and volunteer services already in effect to ensure that the new Culinary Center is accessible to those who will need to use it. Therefore, Clovernook Center for the Blind was seen as an ideal site for this new facility.

Clovernook’s Procter Center currently houses public art galleries, art studios, and the kitchen. This project proposes that the Procter Center’s existing kitchen be converted into another art studio. The new Culinary Center would then connect to the Procter Center.

Users will arrive to the Culinary Center from Hamilton Avenue by car, bus, or foot. An existing Access (Cincinnati Metro’s bus service for the disabled) bus stop is located on the site, at the entrance of the existing main Clovernook building. From there users can walk along a clearly marked and accessible sidewalk to the front door of the Culinary Center. Those arriving by car will park in the adjacent parking lot and make the short walk to the front door. There will also be a drop off area at the entrance to the new Culinary Center.

Upon entering the building, students may proceed to spaces to meet and learn about and practice cooking. Spaces will need to be in the form of both classroom and practical settings. Adjacent to these spaces will be areas for dining. Both public and smaller, private dining spaces will be necessary to keep the building flexible to parties of all sizes. Staff and volunteers will need offices as well as places to hold meetings. Visitors will be welcome to dine in the public dining room and be served food prepared by the visually impaired students.
The Culinary Center will also include a residential component. For privacy, this space will be isolated from the rest of the building. This area will include spaces for residents to sleep, lounge, socialize, cook, and eat.

The public spaces of the Culinary Center will be adjacent to the Procter Center, creating a hub of activity for the arts. Guests could visit the Art Gallery in the Procter Center, and then visit the Culinary Center for a meal.
Activities and Relationships

ENTER
- wait
- meet
- greet
- sit
- socialize

VISITORS
- eat
- drink
- talk

STUDENTS
- practice
- learn
- taste
- meet
- socialize
- study

STAFF
- work independently
- group work
- staff meetings
- clean
- store

SIT

MEET

GREET

SOCIALIZE

WAIT

STUDENTS
<table>
<thead>
<tr>
<th>Area Name</th>
<th># of Rooms</th>
<th>Sq. Footage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTRANCE/VESTIBULE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coat Storage</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Dog Area</td>
<td>1</td>
<td>500</td>
</tr>
<tr>
<td>Waiting Area/Host Station</td>
<td>1</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,100</td>
</tr>
<tr>
<td>PUBLIC DINING ROOM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large Dining Room</td>
<td>1</td>
<td>1,500</td>
</tr>
<tr>
<td>Male Restroom</td>
<td>1</td>
<td>200</td>
</tr>
<tr>
<td>Female Restroom</td>
<td>1</td>
<td>200</td>
</tr>
<tr>
<td>Server Station</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,000</td>
</tr>
<tr>
<td>LARGE TEACHING KITCHEN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kitchen</td>
<td>1</td>
<td>1,000</td>
</tr>
<tr>
<td>Pantry</td>
<td>1</td>
<td>150</td>
</tr>
<tr>
<td>Supply Storage</td>
<td>1</td>
<td>150</td>
</tr>
<tr>
<td>Deep Freezer</td>
<td>1</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,450</td>
</tr>
<tr>
<td>CLASSROOMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom</td>
<td>2</td>
<td>400</td>
</tr>
<tr>
<td>Storage Area</td>
<td>1</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,000</td>
</tr>
<tr>
<td>GUEST ROOMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One Bedroom Suite with Restroom</td>
<td>4</td>
<td>350</td>
</tr>
<tr>
<td>Two Bedroom Suite with Restroom</td>
<td>3</td>
<td>450</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,750</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RESIDENTIAL COMMUNITY AREA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lounge</td>
<td>1</td>
<td>270</td>
</tr>
<tr>
<td>Restroom</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Dog Room</td>
<td>1</td>
<td>300</td>
</tr>
<tr>
<td>Small Dining Room</td>
<td>1</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td></td>
<td>895</td>
</tr>
<tr>
<td>PRACTICE KITCHEN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kitchen</td>
<td>1</td>
<td>180</td>
</tr>
<tr>
<td>Pantry</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Supply Storage</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>280</td>
</tr>
<tr>
<td>OFFICES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office</td>
<td>3</td>
<td>150</td>
</tr>
<tr>
<td>Conference Room</td>
<td>1</td>
<td>325</td>
</tr>
<tr>
<td>Storage</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Male Restroom</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Female Restroom</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Custodial Room</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,125</td>
</tr>
<tr>
<td>Mechanical Space - 15%</td>
<td>1</td>
<td>1,728.5</td>
</tr>
<tr>
<td>Circulation - 10%</td>
<td>1</td>
<td>1,590.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14,406</td>
</tr>
</tbody>
</table>
ENTRANCE/VESTIBULE   1,100 sqft
This is the space where patrons will enter the Culinary Center. It is also the space that will connect the new Culinary Center to the existing Procter Center, therefore bridging Clovernook’s two buildings dedicated to the arts. This space filters people into their desired activities—dining, learning, working, or sleeping. (Those sleeping will have an additional private entrance.) Most of this space will consist of the waiting area, but coat storage and rooms for seeing eye dogs will also be necessary.

PUBLIC DINING ROOM   2,000 sqft
Guests who wish to dine at the Culinary Center will be seated in the public dining room. This is a large space with ample room between furniture for visually impaired patrons to navigate through. Additionally, this space will contain a server station and be adjacent to male and female rest rooms.

LARGE TEACHING KITCHEN   1,450 sqft
Students who are taking cooking lessons will spend much of their time in the large teaching kitchen. The space will be large to accommodate many visually impaired students navigating through it. Each station will be well-labeled in Braille, and supplies and ingredients will be organized in an easy-to-find manor. The stations will be large enough for a student and teacher to work together. The kitchen will be designed to dampen as much ambient sound as possible, making it easy for students to hear and follow directions from their teacher.

CLASSROOMS   1,000 sqft
Classrooms serve as quiet class meeting spaces. They will not be formal teaching spaces, but rather smaller spaces to learn individually or in groups. Classrooms may be equipped with basic kitchen appliances.
GUEST ROOMS   2,750 sqft  
Clovernook has expressed the need for overnight housing, and these guest room suites will be able to house up to ten people. Both one and two bedroom suites will be available, and all guest rooms will have a bathroom.

RESIDENTIAL COMMUNITY AREA   895 sqft  
This private space will serve those staying in the guest rooms. It will be a space where guests can relax and socialize with each other. Additionally, it will have a small dining room that will be privately used by those staying in the guest rooms. A room to house seeing eye dogs will also be available.

SMALL PRACTICE KITCHEN   280 sqft  
As a benefit to those staying in the guest rooms, a practice kitchen will be available. Guests will be able to share this space and prepare meals to eat in the community dining area.

OFFICES   1,125 sqft  
Administration and volunteers will have office spaces adjacent to both the teaching and residential area. One single office and two double offices will be offered.

NOTES  
Every space in the Culinary Center will be designed to be comfortable and stimulating for both those with sight and the visually impaired. Spaces will be slightly larger than standard, to aid those with low vision in navigation. However, spaces will not be so vast, as those spaces can be confusing and uncomfortable for the visually impaired.
The Procter Center - Current Plans

area to be renovated
4.3 Design Strategy

The existing Procter Center is a lackluster facility, where neither the art studio nor the kitchen is large enough to support growing needs and interest in art and culinary programs. This project proposes renovating the existing Procter Center. The art gallery would be relocated to the first floor, replacing the offices and the art studio would be moved to the other side of the lobby, replacing the current kitchen and unused mock apartment. The offices would be relocated to the second floor, taking the place of the small art studio and gallery, while the vision clinic would remain untouched. Also, the front facade of the Procter Center will be renovated to tie it together with the new Culinary Center.
Clovernook’s buildings feel disconnected, with nothing unifying them. This fragmentation of the campus also makes traveling between the buildings difficult, even for those with the sense of sight. Visitors are forced to walk through parking lots or grassy fields in order to move from the main building to the Procter Center. This scheme proposes a meandering path to guide visitors between the buildings. Along with guiding patrons, the path will take its users on a sensory journey.

A sensory wall will run the length of the path, guiding those with limited vision through touch. The wall will be constructed of tactile materials that are safe, engaging and pleasing to the sense of touch. A smooth, dark rail will be applied to the wall for the visually impaired to trail their fingers along. The paving of the path also speaks to the sense of touch, as the paving material changes when approaching and within an intersection. This gives visually impaired users a clue as to where they are on Clovernook’s grounds.

The path is landscaped with a abundance of flowers to appeal to the senses of sight and smell. Flowers will be selected to bloom throughout the season, giving the path an ever-changing experience. Also, footlights will be installed at the base of the wall at consistent intervals to guide those who can see light.
The path splits and follows the trail rail on both sides. On one side, it guides the visitors into the new culinary center, as the sensory wall becomes the building. The culinary center is comprised of two buildings; one contains a public dining room and commercial quality kitchen. This is a place where students can cook together and show off their culinary skills, as well as a place where patrons can come and dine, eating the food prepared by the visually impaired students and served by the blind as well. This restaurant will also offer “Dining in the Dark,” where guests can come and eat in a completely dark space, and enjoy their meals without any visual information. This experience teaches guests to enjoy the subtle flavors and textures in their food, as well as encourages them to try new foods. When not being actively used as a restaurant, this space will serve as a much-needed gathering space for Clovernook.

Adjacent to the public dining building is the learning center, which holds classrooms and offices. This building is much more private and understated than the dining building, and is where Clovernook’s students and visitors can meet for intimate cooking classes, or for more casual meeting and dining spaces. Both the classrooms and the offices have access to private patios for outdoor cooking, eating, and relaxing.

These buildings were designed to pay special attention to mobility and the senses. A trail rail lines the corridors and guides visually impaired patrons through the building. Also lining the corridors, lights are built into the floors, for those who are more comfortable following the light. All floor materials are designed to be flush, to minimize tripping.
hazards. The floor materials also change at intersections, to cue patrons that there is a door or another path to take on the opposite wall.

Both daylight and artificial light is carefully controlled. All glazing at eye-level is built using sandblasted glass. This material not only diffuses the light, but proves to be interesting for the hands to explore as well. Unfiltered sunlight enters the building from clerestory windows, thus protecting those with sensitive eyes from direct sunlight and painful glare. All windows are equipped with shades in the event that more sun control is needed.

Because the visually impaired rely on sound more than those with sight, sound control is also evident in this design. The classrooms are kept far away from the noisy dining room and kitchen, and all walls are paneled with an attractive yet functional acoustic paneling system.

The nature of the Culinary Center's program appeals to the sense of smell. Delicious aromas will waft through the buildings, reflecting whatever is being cooked that particular day. The gardens also provide opportunities for the sense of smell to be stimulated. The flowers and plant life emit earthy and natural scents to connect the patron with nature and the outdoors.

The materials used in the culinary center are chosen for their sensory properties. These materials are simple, safe, and effective while still being interesting to the senses. Also, natural materials are favored for their ability to phenomenologically tie the user back to nature and encourage him to dwell.
4.4 Design Reflection

Looking back, I am very pleased with this project. The goals were to provide Clovernook with a building that could be used for both teaching and gathering, connect the disjointed existing buildings, and design all spaces with special attention to the needs of the visually impaired without compromising aesthetics. I believe I achieved those goals. The Culinary Center gives Clovernook space to teach the life skill of cooking, while also providing the campus with gathering spaces, both public and private. Also, the Culinary Center could bring in revenue to Clovernook through the restaurant and “Dining in the Dark” application. The sensory wall connects the buildings, providing a safe and tactiley pleasing path to travel along. Also, all of the materials and details were selected to appeal to all senses, not just vision, making this a building that all users can connect with.

If I had more time, I would further investigate materials, and how the five senses respond to each material. Also, I would design more details to control light and sound. Furthermore, I would continue to develop the outside garden spaces, selecting plants and materials for their sensory properties. Finally, I would want to design the residence buildings, making them enjoyable places for the visually impaired to live independently with all the amenities Clovernook has to offer.
Bibliography


